

***2007 Southeastern InfORMS
Conference Proceedings***



***Hilton Myrtle Beach Resort
October 4-5, 2007
Myrtle Beach, South Carolina***

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An Analysis of Disclosures Under FIN 48

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ABSTRACT

The FASB issued Interpretation No. 48 in an effort to clarify accounting for income taxes, specifically addressing accounting for uncertainty in income taxes. This Interpretation adopts a two-step process – recognition and measurement. Tax positions are to be recognized if they meet the more likely than not threshold. Measurement of the benefit is the largest amount of tax benefit that is greater than fifty percent likely of being realized upon settlement. The interpretation provides standards for subsequent recognition, derecognition, and changes in measurement. The most controversial area of FIN 48 is the required disclosures, most notably the disclosures of unrecognized tax benefits. This paper examines those disclosures and their implications for enterprises making the disclosures. In addition, the impact of the apparent erosion of the IRS Policy of Restraint is examined.

INTRODUCTION

In June 2006, the Financial Accounting Standards Board (FASB) released FASB Interpretation 48 (FIN 48). This Interpretation is effective for fiscal years beginning after December 15, 2006. The title of the interpretation is “Accounting for Uncertainty in Income Taxes,” and is an interpretation of FASB Statement No. 109. There are three objectives that FIN 48 seeks to accomplish:

- Clarify accounting for income taxes
- Provide greater consistency in criteria used to recognize, derecognize, and measure benefits related to income taxes.
- Establish consistent thresholds, improving relevance and comparability of financial statement reporting. [7]

SFAS No. 109

As mentioned, FIN 48 is an interpretation of FASB Statement No. 109. The Statement of Financial Accounting Standards No. 109 was effective for fiscal years beginning after December 15, 1992. It replaced the Statement of Financial Accounting Standards No. 96. As the focus of this paper is not SFAS No. 109, only a brief overview is given here. The objectives of SFAS No. 109 are to recognize:

- The amount of taxes payable or refundable current year, and
- Deferred tax liabilities and assets for the future consequences of events that have been recognized in an enterprise’s financial statements or tax returns. [8]

Although SFAS No. 109 provided a great deal of guidance in accounting for income taxes, one of its important features is that it established four basic principles of accounting for income taxes.

- A current liability or asset is recognized for the estimated taxes payable or refundable on tax returns for the current year.

- A deferred tax liability or asset is recognized for the estimated future tax effects attributable to temporary differences and carryforwards.
- The measurement of current and deferred tax liabilities and assets is based on provisions of enacted tax law; the effects of future changes in tax laws or rates are not anticipated.
- The measurement of deferred taxes is reduced, if necessary, by the amount of any tax benefits that, based on available evidence, are not expected to be realized. [8]

Even though SFAS No. 109 provided more guidance than had previously been available, its focus was on deferred tax liabilities and assets. Little guidance was given for how to account for uncertain tax positions. As a result, there arose a variety of inconsistent accounting practices in the reporting of tax positions. FIN 48 is an attempt to introduce some uniformity and comparability in the reporting of income taxes as reported on financial statements. [21]

FIN No. 48 – A TWO-STEP PROCESS

FIN 48 defines a tax position as “a position taken in a previously filed return or a position expected to be taken in a future return that is reflected in measuring current or deferred income tax assets and liabilities for interim or annual periods.” [9] The interpretation continues, explaining that a tax position can be a permanent reduction of income taxes payable, a deferral of taxes payable, or a change in the realizability of deferred tax assets. A tax position can be a decision not to file a return, an allocation of income between jurisdictions, the characterization of income or a decision to exclude reporting taxable income in a tax return, or a decision to classify a transaction, entity, or other position in a tax return as tax exempt. [9]

As can be seen, the definition of a tax position is quite broad, and can impact a large number of enterprises including tax-paying, pass through, and exempt entities. For example, a 501(c)(3) entity may make the determination that a certain type of its income is not unrelated business taxable income (UBTI). This is a tax position, and if the income is of a type that puts it into the gray area, the enterprise has an uncertain tax position.

To accomplish its objectives, FIN 48 lays out a two-step process, first establishing a recognition threshold, then following with measurement criteria. The Interpretation adopts a standard of “more likely than not (MLTN)” as the threshold for recognizing an uncertain tax benefit. More likely than not is considered a “positive assertion of entitlement to the economic benefits of the positions. Furthermore, it is presumed that the position will be upheld by relevant tax authority having full knowledge of all relevant information. [9] Obviously, this precludes the enterprise from withholding damaging information if the tax position is examined by the appropriate taxing authority.

Critical to the recognition threshold is the adoption of a “unit of account.” The FASB declined to define a unit of account, but stated that it should be based on individual facts and circumstances in light of all available evidence. [9] In determining the unit of account the enterprise should consider both the level at which the entity accumulates information to support the tax return as well as the level at which it expects tax authorities to address the issues during an examination. [1] For example, the company may report tax depreciation expense by project or aggregated on all of its projects.

The definition of the unit of account adopted by the enterprise should be undertaken with a great deal of care, as that definition must be maintained for future periods unless there is a change in the “facts and circumstances” to warrant a change in the unit of account. [21] In a FIN 48 Client Action Plan, PriceWaterhouseCoopers suggests that management document its judgment and provide a basis for its conclusions on unit of account in cases where significant judgment is required. [18]

Once the enterprise determines that it must recognize an uncertain tax position, management must then turn to the task of measuring the position. The amount of tax benefit to be recognized is “the largest amount of tax benefit that is greater than 50 percent likely of being realized upon effective settlement with a taxing authority that has full knowledge of all relevant information. [9]

Initially, the Interpretation used the terminology “ultimate settlement.” However, in FASB Staff Position No. FIN 48-1, the Interpretation was effectively amended with a substitution of effective settlement in lieu of ultimate settlement. In an explanation, the paper stated that settlement is a matter of judgment due to the fact that examinations, and by extension settlements, occur in a variety of ways. [10] This is an acknowledgement by the FASB that settlement is not always evidenced by a defining moment, but can take many forms and does require management to analyze if settlement has occurred on its open tax positions.

SUBSEQUENT RECOGNITION, DERECOGNITION, AND MEASUREMENT

Realizing that taxes exist in a dynamic environment, the FASB provided for recognition or derecognition subsequent to the initial decision. Subsequent recognition is to occur in the first interim period in which one of three conditions is met:

- The MLTN threshold is met by the reporting date.
- The tax matter is settled through negotiation or litigation.
- The statute of limitations expires. [9]

Derecognition occurs when a previously recognized position no longer meets the MLTN threshold. This adjustment is made in the first period that the position falls below the recognition threshold. The adjustment must be treated as a decrease in the amount of the expected tax benefit. The use of a valuation allowance is not allowed. [9]

Subsequent recognition, derecognition, or change in measurement is based on management’s best judgment of the facts, circumstances and information available at the reporting date. A change in judgment derives specifically from the evaluation of new information and not from a new evaluation or interpretation of previously available information. [9] Thus, there is another compelling reason to be certain that the initial analysis of the tax position is thorough and not done in a hasty manner.

INTEREST AND PENALTIES

The Interpretation provides for the recognition of interest and penalties that may accrue under certain circumstances. If the tax law requires that interest be paid on an underpayment of income taxes, interest expense should be accrued in the first period interest would begin accumulating. This is treated as a period cost. [9] The Interpretation gives the enterprise the latitude to classify interest as income tax expense or interest expense. [23]

FIN 48 apparently considers an unrecognized tax benefit as a loan from the government, with the resultant interest charges. Therefore the basis for the interest charge is the difference between the tax position recognized in the financial statements and the amount claimed on the tax return. [23] It should be noted that, due to net operating loss carryforwards and tax credit carryforwards, it is possible that no interest would be due. However, this is a provision in the United States tax code, and may not be present in the codes of other nations. [23] If the tax code of a particular country does not recognize net operating loss carryforwards, it would be in the position of recognizing interest payable to the foreign country, but not recognize any in the United States.

Likewise, if the position does not meet the minimum statutory threshold to avoid penalties, an expense shall be recognized for the amount of the penalty. This penalty is to be recognized in the period that the enterprise claims the position on the tax return. [9] It should be noted that this penalty is recognized only for financial statement purposes, as penalties are not deductible items for tax returns.

Unrecognized tax benefits and the related penalty and interest exposures usually result in a FIN 48 liability, as the company may be obligated to make those payments to the taxing authority. Due to the nature of the process, this will most often be a long-term liability. The Interpretation is very specific in stating that this liability is not a component of deferred taxes. [9]

DISCLOSURES

The most controversial area of FIN 48 is in the area of disclosures. There is obviously a reluctance on the part of taxpayers to disclose uncertain tax positions. It is not an unfounded fear that the taxing authorities may use these disclosures against the enterprise. It is not unlike a poker player showing his hand – the other side knows your position. On the other hand, these same financial statements and disclosures are read by investors, who make decisions based on these (as well as other) disclosures. So this highly sensitive area of disclosures requires a great deal of judgment on the part of standard setters in determining what must be disclosed and upon management in determining just what will be disclosed. All of this must be done while fulfilling GAAP requirements and satisfying investors with a proper level of disclosure.

Several of the disclosures are of little consequence. One disclosure requires the enterprise to disclose its policy on classification of interest and penalties in the footnotes to the financial statements. [9] As mentioned, the Interpretation does give enterprises a choice in classification of interest as interest expense or as income tax expense.

Secondly, FIN 48 requires that the current amount of interest and penalties shall be recognized on the statement of financial position and the total amount shall be aggregated on the balance sheet. [9] One issue here is in the area of preferability letters. The SEC Regulations Committee has stated that any changes in the income statement classification of interest and penalties connected with the adoption of FIN 48 will not require a preferability letter. However, any subsequent change in classification of these items will require such a letter. [20]

An additional disclosure requires the enterprise to report the total amount of unrecognized tax benefits that, if recognized, would change the effective tax rate. [9] In discussions with the FASB staff, PriceWaterhouseCoopers inferred that one purpose of this disclosure is to identify uncertainties not solely related to timing differences, but to permanent differences. This is in line with the wording given in the sample disclosure in the appendix to FIN 48. [17] This disclosure will require management to make a judgment of the effects that recognizing any unrecognized tax benefits will have on the effective tax rate, and should be supported by documentation. [19]

OPEN TAX YEARS

A fourth disclosure that does not seem to be very controversial requires the company to describe tax years that remain subject to examination by major tax jurisdictions. [9] Unless a company has committed fraudulent acts with no statute of limitations, this is a rather straightforward disclosure. However, care must be taken to correctly identify any open tax years and to properly identify “major tax jurisdictions.”

Even though this is a non-controversial area, it could lead to an increase in the filing of returns. It is not always completely clear if a company has a nexus in a certain tax jurisdiction. As a result of this uncertainty, along with a perceived low-risk if it is determined that the enterprise has a nexus, companies have opted not to file returns in many instances. [24] However, under FIN 48 companies may be rethinking this strategy. First, the required disclosures could alert the taxing authority to areas that are fertile grounds for successful audits. In essence providing the taxing authorities with a roadmap directing them to areas where additional tax dollars can be obtained. Second, if the enterprise makes a judgment not to file a return in a certain jurisdiction, that becomes an open tax position. Even though the position does not meet the “more likely than not” criteria, it must still be disclosed. The decision not to file a return means that the tax position will remain open, as there is no statute of limitations associated with not filing a return.

Faced with a long list of unresolved, open tax positions some companies are seeking to shorten this list. As a result, certain companies are making anonymous inquiries to state departments of revenue regarding the state's willingness to resolve the matter on a compromise basis in terms of taxes, interest, and penalties. If the state is willing to compromise, the companies are coming forward, resolving the issue, and not being forced to disclose an uncertain tax position. [15]

In an effort to assist taxpayers, the IRS offered a "fast track" resolution of uncertain tax positions. This initiative gave taxpayers a mechanism for resolving uncertain tax positions prior to the publication of its financial statements for years ending on or before March 31, 2007. [14] Although this did not introduce any new dispute resolution methods, it did require IRS personnel to attempt to follow procedures to speed up the resolution of the issue. IRS personnel were required to respond within one day of receiving the request. One negative aspect of this initiative is that the IRS insisted that the taxpayer disclose all "original documents" relating to the taxpayer's risk assessment of the issue. [15] Obviously, this would inhibit some from proceeding along this route.

Obviously, companies must be very proactive in its identification of open tax positions. These positions will require continual monitoring and assessment of each position. Additionally, companies should seek opportunities to resolve any such issues to avoid excessive exposure to open tax positions.

CHANGES IN UNRECOGNIZED TAX BENEFITS

One disclosure that may require management to consult its crystal ball requires the enterprise to disclose positions where it is reasonably possible that the total amount of unrecognized tax benefits will significantly increase or decrease within 12 months of the reporting date. [9] This disclosure must include:

- The nature of the uncertainty
- The nature of the event that could occur in the next 12 months that would cause the change
- An estimate of the range of the reasonably possible change or a statement that an estimate of the range cannot be made. [9]

For this qualitative and quantitative disclosure, management is charged with the task of determining that there is an uncertainty in a tax position, of identifying the nature of an event that could occur, and then estimating the financial impact of that uncertain change from a possible event.

There are at least three areas of difficulty in this disclosure. First is the concept of "reasonably possible." In its policy manual under accounting for contingencies, Harvard University defines reasonably possible as "the chance of the future event or events occurring is more than remote, but less than likely." [11] Others define this term in a similar manner. In an article entitled "Probability and Materiality" Price and Wallace observe that in using terms such as reasonably possible, the FASB may have an "intended symmetry" of likelihood. They suggest an eight-point likelihood continuum from remote to probable. [16]

This second area of difficulty with this disclosure is the amount of the change. If one determines that there is a reasonable possibility that a change will occur, management must then turn to the task of measuring that change.

Price and Wallace suggest taking the probability measurement one step further and map likelihood with materiality. Under this approach, the decision-maker would analyze the likelihood of an event, but intersect that likelihood with materiality. [16] This would allow management to evaluate disclosures in terms of a combination of materiality and probability. It would seem that this approach would be well suited to disclosing reasonably possible changes in unrecognized tax benefits. However, it does carry the burden of significant judgment and uncertainty on the part of management. This is not an approach that lends itself to casual use.

A third area of concern deals with the extent to which financial auditors will require disclosures of individual positions and jurisdictions. Some are of the opinion that no disaggregated information for individual tax positions or jurisdictions is required. [23] Others disagree. In discussing “reasonably possible” changes in recognized tax benefits for the coming 12 months, there is concern that more specificity will be required even to the extent of identifying specific jurisdictions. [15]

RECONCILIATION OF UNRECOGNIZED TAX BENEFITS

The final disclosure is probably the most controversial. The enterprise is required to disclose at the end of each accounting period a tabular reconciliation of the total amount of unrecognized tax benefits at the beginning of the period and the end of the period. This disclosure is on a world-wide aggregated basis and must include at a minimum:

- The gross amounts of the increases and decreases in unrecognized tax benefits as a result of tax positions taken during a prior period.
- The gross amounts of increases and decreases in unrecognized tax benefits as a result of tax positions taken during the current period.
- The amounts of decreases in the unrecognized tax benefits as a result of settlements with taxing authorities.
- Reductions to unrecognized tax benefits as a result of a lapse of the applicable statute of limitations. [9]

Even though these are unrecognized disclosures, those that do not meet the “more likely than not threshold,” management is required to disclose any and all of these unrecognized tax benefits.

Once it is determined that a portion or all of a material tax benefit that was claimed on a return is not likely to be sustained, the expense must be booked or disclosed in the notes to the financial statements. There is a great deal of concern that these disclosures could provide a roadmap for examination by the IRS or other taxing authorities. [15] This issue of uncertain tax positions and the determination of an enterprise’s tax reserves has a potential impact on auditor independence. Company auditors are not likely to blindly accept a company’s analysis of its uncertain tax positions without viewing the detail behind the amount. Since the auditor certifies the tax reserves, the firm will likely need tax advice from a firm other than its auditor. [22] This can remove the auditor from a detailed examination of the tax reserve issue.

Lurking behind this concern of providing the IRS with a roadmap of the tax positions of an enterprise is the long-held IRS Policy of Restraint. In *U. S. v. Arthur Young & Co.* in 1984, the Supreme Court affirmed the right of the IRS to obtain tax accrual workpapers. Following this ruling, the IRS announced a policy of voluntary restraint with procedural safeguards regarding workpapers. The IRS stated that they would continue its current policy of requesting tax accrual workpapers only in unusual circumstances. Enterprises and auditors are concerned, however, what appears to be an erosion of this policy. In 2002, the IRS issued announcement 2002-63, stating that the IRS may request the workpapers when it audits returns that claim a tax benefit from tax-avoidance transactions that have been identified as abusive. As explanation, the IRS justified this “limited expansion” of the Policy of Restraint on the grounds that it is “necessary to allow the Service to fulfill its obligation to the public to curb abusive tax avoidance transactions *and to ensure that taxpayers are in compliance with the tax laws.*” (Emphasis added) [13] It is the latter portion of this statement that gives concern in light of FIN 48.

Donald Korb, IRS Chief Counsel stated that this does not signal a move by the IRS to more aggressively pursue tax accrual workpapers, stating that the IRS has limited the policy at what it was intended for. It has had a prophylactic effect of tax shelters, he continued. [4] However, seven months later, Korb said that the IRS plans to continue issuing summonses and requests for tax accrual workpapers in cases where taxpayers refuse to turn over information based on privilege claims. He added that the “so-called privilege in tax cases is not very broad. [3]

IRS Chief Counsel Notice CC-2007-15, issued in June, concludes that effective tax rate reconciliation workpapers are neither tax accrual workpapers nor audit workpapers. These will not be routinely requested during an audit. The Notice also concludes that documents produced by a taxpayer or the auditors of the taxpayer to substantiate uncertain tax positions in compliance with FIN 48 are treated as tax accrual workpapers. On its face, this should give us some reassurance. [14a]

On the other hand, tax reconciliation workpapers may be routinely requested during an audit. Tax reconciliation workpapers are defined as “workpapers that are used in assembling and compiling financial data preparatory to placement on a tax return.” These typically include trial balances, a schedule of consolidating and adjusting entries, and information used to trace financial information to the tax return. Any tax return preparation documents that reconcile net income to taxable income are also included in this category. [14a]

Tax accrual workpapers are defined as “those audit workpapers, whether prepared by the taxpayer or the independent auditor, that relate to the tax reserve for the current, deferred, and potential or contingent tax liabilities, however classified or reported on audited financial statements, and to footnotes disclosing those tax reserves on audited financial statements.” [14a]

However, this Chief Counsel Notice states that effective tax reconciliation workpapers are not tax accrual workpapers because they are not prepared to determine the proper amount of the reserve for contingent tax liabilities. Nor are they audit workpapers in the sense of workpapers retained by the auditor to document the performance of the audit. [14a]

This Notice appears to be in conflict with statement made by the Korb shortly before its issuance. He stated that the IRS is “not going to turn a blind eye” to the tax reserve details disclosed under FIN 48. Repeating this no less than four times during his speech, he made it abundantly clear that IRS field agents will be reviewing the disclosures describing the nature and size of corporate tax reserves. [14b]

Two recent court cases indicate an aggressiveness on the part of the IRS. In the U.S. v. Roxworthy case, the IRS sought enforcement of a summons for two tax opinions in the possession of the taxpayer, Yum! Brands, Inc. The IRS argued that these papers were not protected under the work-product doctrine and had been prepared for penalty protection and not in anticipation of litigation. The Sixth Circuit court held that a document can be created for use in the ordinary course of business and in anticipation of litigation. Of note was the two-part standard adopted by the court. Part one (subjective) is a determination of whether the document was prepared in anticipation of litigation. Part two is whether the anticipation of litigation was objectively reasonable. [12]

In the second recent case, U.S. v. Textron, the IRS took a much more aggressive approach, seeking all of the tax accrual workpapers of Textron, Inc. and its subsidiaries. They asserted that Textron Financial Corp. engaged in six separate sale-in, lease-out transactions in 2001, and that these were listed transactions under Notice 2005-13. [12] In the Textron case, the facts are fairly straightforward: Textron’s in-house counsel provided the accountants a spreadsheet that lists the issues identified by the tax advisors, and the hazards of litigation percentage for each issue. The IRS is asserting a right to these documents. Textron is asserting three privileges:

- Attorney-client.
- Section 7525 which provides a client with a privilege similar to an attorney-client privilege when they make certain tax-related disclosures.
- Work-product [5]

Regardless of the results of this case, the important point to note about this case is the new aggressiveness of the IRS in pursuing tax accrual workpapers. There is some thought that the IRS is taking this approach to use it as a “bargaining chip” to force Textron accept certain settlement terms. [12] There is an additional concern at this juncture. Concerning the attorney-client privilege, if a tax attorney prepares a tax position for reporting purposes, this becomes a part of the auditor’s work papers. Since the

work of the tax attorney has been shared with the auditors and made a part of their report, the attorney-client privilege is lost. [24]

An indication of the concern regarding the erosion of the Policy of Restraint is an action by the American Bar Association's House of Delegates. In August, 2006, this policy-making body voted unanimously in favor of a resolution urging federal regulators and the accounting and legal profession to adopt standards, policies, practices, and procedures to ensure that attorney-client privilege and work-product protections are preserved through the audit process. [6]

One reason given for the new aggressiveness by the IRS in pursuing tax accrual workpapers is the pressure on the IRS to close the tax gap; to collect more tax through the audit process. As this pressure mounts, the IRS may very well reconsider their Policy of Restraint. [24] Regardless of the reason for the IRS to reconsider their Policy of Restraint, the fact is companies will be very reluctant to disclose anything that the IRS could use against them in an audit or other proceeding. It could be that FIN 48 disclosures would give the IRS a roadmap in the pursuit of more successful audits (from the IRS view of a successful audit).

SUMMARY

FIN 48 is a step in the right direction. It does clarify accounting for income taxes and moves the accounting community toward conformity in reporting uncertain tax positions. However, the third objective expressed by the FASB may not have been achieved. While FIN 48 establishes consistent thresholds it does not appear to improve financial statement reporting

A company may have an uncertain tax position that does not meet the more likely than not threshold. Under this FIN 48, this position is not included in the financial statements but is disclosed. However, consider the scenario in which a company has such a position, but is almost certain to realize some tax benefit from it. The enterprise is prohibited from recognizing this benefit due to the failure of the position to meet MLTN. By omitting certain assets or liabilities from the balance sheet, one question is if there is improved financial reporting.

A second area of concern is with the required disclosures in FIN 48. There is a fear that the disclosures of unrecognized tax positions may serve as a roadmap to guide tax authorities to areas that may yield productive audit activity. Coupled with the apparent erosion in the IRS policy of constraint this is no small matter for concern. In addition the disclosures require management to exercise judgment regarding changes in the unrecognized tax benefits. It seems that the FASB has placed an inordinate amount of focus on the unrecognized tax benefits to the point where the cost of complying with FIN 48 exceeds the benefits that are derived from its implementation.

Once companies have worked through a year of FIN 48 implementation the road ahead should be less difficult. Make no mistake, however. The costs and efforts of maintaining the enterprise's FIN 48 position will be difficult and costly. One can hope that the FASB will be forthcoming with additional guidance as well as adjustments making FIN 48 a more useful interpretation.

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2007 U.S. Supreme Court Decision Clarifies IRS Collection Powers in Cases of Transferee Liability

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ABSTRACT

The authors' paper will focus on recent court decisions concerning the I.R.S. power to enforce and collect a tax assessment against third parties where the basis for liability are taxes owed by another person or entity. The foregoing commentary is directed to the tax practitioners. The objective is to provide a practical guide for tax professional who focus on IRS collection cases.

The Supreme Court's decision on April 30, 2007 has provided needed clarity for practitioners that are engaged in a tax practice that includes the defense of taxpayers that are subject to I.R.S. enforced collection efforts.

In a 9-0 decision the Court ruled that a transferee challenge to a Levy action by the I.R.S. must commence an action against the I.R.S. within 9 months of the date of the Levy. The decision in EC Term of Years Trust v. The United States (herein after referred to as E < trust) affirms the U.S. Court of Appeals (5th Circuit decision). Because the 9th Circuit had ruled contrary to the 5th Circuit,(see WWSM Investors v. United States, 64F.3d 456 (1995)) The court granted Certiorari to resolve the conflict 549 U.S. _____ (2006).¹

The facts of E < trust are an example of a classic case of transferee liability. The transferors, Elmer and Dorothy Cullers created E < trust in 1991. The Cullers transferred a substantial portion of their assets to the trust. Shortly thereafter the I.R.S. assessed back taxes against the Culler's for unallowed deductions the Culler's claimed in the 1980s. The I.R.S. Levied against the transferee (the trustee of the E < trust) for taxes owed by the Culler's.² The trustee initially resisted the I.R.S. Levy. However after negotiations with the I.R.S., the trustee deposited \$3,000,000 into a separate bank account in the name of the trustee. The I.R.S. levied against the bank account. One year after the Levy, the trustee commenced a refund claim against the I.R.S. to reclaim the \$3,000,000.

The I.R.S. opposed the refund claim citing the 9 month statute of limitation set forth in I.R.C. Section 6532(c)(1).

The trustee argued that under the 9th Circuit decision in WWSM Investors v. United States the trustee could commence a refund claim under 28 U.S.C. 1346 (a)(1) which grants a 2 year statute of limitations.

The Supreme Court sided with the 5th Circuit and ruled that a suit to contest an I.R.S. Levy must be commenced exclusively under the provisions of IRC Section 7426(a)(1); therefore, the 9 month statute of limitation forever bars the trustee's refund claim.³ The Supreme Court's decision provides an opportunity to focus on the I.R.S. power to use enforced collection action against the taxpayer and transferees. This paper will explore the following topics:

1. The I.R.S. source of power to use enforced collection action
2. A review of Lien, Levy and other distraint procedures the I.R.S. has available
3. Transferee liability under the I.R.S. Code and under state fraudulent transfer statues
4. The I.R.S. Administrative avenues for relief will be explored and the I.R.S. forms and policies will be reviewed

I.R.S. POWER TO USE ENFORCE COLLECTIONS

The I.R.S. is authorized by IRC 6331 of the Internal Revenue Code to collect delinquent taxes through levy, lien and distraint. Many practitioners and some courts do not have a clear understanding of the collection powers and sometimes confuse the three enforcement tools.

Levy: A levy is a notice to a third party that commands the third party to payover a taxpayer's property owned by the taxpayer but in the possession of the third party, to the Internal Revenue Service.⁴ The most common form of levy include a demand to a bank that the taxpayer's checking account be paid over to the I.R.S. Another common form of levy is a levy directed to the taxpayer's employer to pay over accrued but unpaid wages of the taxpayer to the I.R.S.

Any property of the taxpayer can be levied to collect delinquent taxes, unless the property is exempt.⁵ The exempt property list is limited and short. Property that is immune from Levy include unemployment benefits and special pensions for Medal of Honor winners.

The I.R.S. must notify the taxpayer of the following:

1. a notice and demand for payment
2. a notice of intent to Levy
3. a notice of a right to a hearing⁶

The notice must be given to the taxpayer:⁷

1. in person
2. delivered at the taxpayer's home or business
3. sent to the taxpayer's last known address by certified mail

IRS letter #3174(p) sets forth the formal requirement of steps 2 and 3 above. (Exhibit A)

Upon receipt of the notice of intent to Levy if the taxpayer disagrees, the taxpayer must immediately file a request for a collection due process hearing **form 12153**.(Exhibit B) If after the hearing, the taxpayer remains unsatisfied with the I.R.S. response the taxpayer may file a collection appeal request on **I.R.S. form 9423**.(Exhibit C) The forms can be downloaded from the I.R.S. website. The request for a collection appeal must be filed within two days from the conclusion of the collection due process hearing.⁸ It is very important for the practitioner to maintain a record of the correspondence with the I.R.S. Therefore as a matter of good practice all forms should be faxed to the designated I.R.S. officer and mailed to that officer by certified mail return receipt requested. The precaution is necessary because on many occasions a case can be shifted to I.R.S. offices with the various I.R.S. service centers. It is possible that the current case officer may not have the taxpayer's entire file. Assuming that the I.R.S. rejects the taxpayer requests at a due process hearing and on appeal the I.R.S. can then Levy on the third party for the taxpayer assets.

Lien: A lien (a priority claim) arises in favor of the United States thirty days after the I.R.S. has recorded an assessment of a tax on its records and the taxpayer has refused to pay the tax within 10 days after the demand for payment.⁹ When a taxpayer has not fully paid a tax that is due and owing the lien will attach to all of the taxpayer's property.¹⁰ This lien is an unpublished lien that cannot defeat the claim of senior lien creditors, i.e., the recorded mortgage holder that has a lien against the taxpayer's residence. So long as the I.R.S. lien remains unrecorded, the taxpayer has the power to grant third party lenders lien priority that will be senior to the I.R.S. lien.¹¹

The I.R.S. may file a notice of federal tax lien with the clerk of the court for the county in which the taxpayer resides and/or owns property.¹² Once recorded, the lien will be senior to future third parties that seek priority over the taxpayer's assets through the recording of mortgages and or money purchase liens. The filing of notice of a federal tax lien is not a seizure of the taxpayer's assets. However, the filing of the notice of the tax lien can have a devastating impact on the taxpayer's credit record and his ability to secure future financing.

The filing of notice of federal tax lien protects the IRS' right to priority against future third party creditors i.e. a purchaser, a holder of a security interest or a judgment lien creditor. The federal tax lien will expire by operations of law. Ordinarily in the absence of a refiling by the I.R.S. the lien expires ten years after the I.R.S. has assessed the tax that is secured by the lien. The notice of tax lien is filed on **I.R.S. form 668** with the clerk of court in the county where the property is physically located.¹³

DISTRAIT/SEIZURE BY THE I.R.S.

The I.R.S. has the power to directly seize assets under the control of the taxpayer. This power granted to the I.R.S. to seize personal property, real estate and to close a business activity of the taxpayer. This power is the most intrusive as it relates to the direct confrontation by the I.R.S. with the taxpayer. The fruits of the I.R.S. distraint action can be viewed and enjoyed by third parties through the I.R.S. auction of the taxpayer's assets. Visit the I.R.S. Auction website www.ustreas.gov/auctions/irs/.

In a seizure action the I.R.S. physically removes an asset from the control of the taxpayer.¹⁴ In cases where the asset cannot be removed from its physical location i.e. a going concern business the I.R.S. will lock the business and take control of the business assets.

Because a seizure involves the physical removal of an asset from the control of the taxpayer, the Internal Revenue Code and I.R.S. procedure require that the revenue officer verify certain facts.

IRC Section 6331 (j) requires

- A. The tax liability must be verified
- B. all other collection methods must be considered before a seizure action
- C. prior to the seizure the I.R.S. must verify that the sale of the seized asset will result in proceeds that exceed the expenses of sale and existing priority claims by third parties.

Internal Revenue Manual section 5.10.1.3.3.1. (10-01-2004) requires the revenue officer to include in his/her evaluation of the net equity potential, the actual costs of the asset seizure (towing fees, storage costs, transportation costs, lock smith fees, etc.)

In summary a seizure by the I.R.S. is a last resort action, in which the revenue officer and his/her manager must carefully evaluate the cost benefit of the seizure.

TRANSFEEE LIABILITY

Transferee liability occurs when the I.R.S. seeks to collect a tax owed by a taxpayer from a third party. If successful the I.R.S. may collect the tax from the third party or the I.R.S. may use enforced collection action to gain control over the property transferred to the third party.

There are a number of theories relied upon by the I.R.S. to pursue tax collections from third party owners. This paper will focus on three of the most common forms of transferee liability.

Statutory Transferee Liability

The Internal Revenue Code Section 6901 provides a formal statutory frame work whereby the I.R.S. may assess against a third party for taxes that are owed by the original taxpayer. Under statutory transferee liability the I.R.S. may assess and collect taxes from a third party in cases where the original taxpayer has transferred his assets to a third party in a tax year in which a tax liability is assessed and remains unpaid, i.e., in 2000 the taxpayer transferred \$300,000 to a third party two years later in 2002 the I.R.S. assesses a tax against the taxpayer in the amount of \$300,000 based upon unreported income in 2000. Under the I.R.C Section 6901 the I.R.S. may also assess and collect the tax due from the third party.

The statutory procedure grants to the third party the right to contest the transferee assessment in U.S. tax court. Section 6901 codifies the power of the I.R.S. to assess a tax against a third party. The statutory scheme follows the same pattern that is required for the assessment of a tax against the taxpayer. Section 6901 is not limited to the assessment of income taxes. This section has been applied to beneficiaries of estates and to Donees where an unpaid gift tax has arisen as a result of a transfer for less than full consideration, Sec IRC Sec 6901 (h). Section 6901 has been applied to the acquiring corporation in mergers and reorganizations to collect a tax owed by the acquired corporation.¹⁵

Section 6901 requires three preconditions before transferee liability can be asserted.

1. There must be a transferee as defined in the Treasury regulations.
 - a. a distributee of an estate
 - b. a shareholder or partner of a dissolved corporation or partnership
 - c. a donee
 - d. a successor or surviving corporation
 - e. a fiduciary
2. The proposed assessment by the I.R.S. must be timely made. The Service has one year after the application of the pursuant to IRC 6901 statute of limitations for the assessment of the tax against the taxpayer to assess against a transferee.
3. The transfer of the property to the third party must occur after the accrual of a tax liability.¹⁶ The terms accrual and assessment must be distinguished. Assume that in the year 2000 a taxpayer has earned income that is not reported on his 2000 return which was timely filed on April 15, 2001. The I.R.S. subsequently assesses a deficiency for the unreported income on April 15, 2003. Assume that the taxpayer transferred property to his brother in the year 2000 and that the transferee is a person described under IRC 6901. The I.R.S. may assess against the brother because the tax liability accrued in 2000. The fact that the I.R.S. did not assess the tax against the taxpayer until 2003 is irrelevant.

In a case where a taxpayer files a fraudulent return the I.R.S. has no statute of limitation bar.¹⁷ Under IRC Section 6501 the I.R.S. may assess a tax against the taxpayer at anytime. Therefore, a transferee may find himself in a situation where he has owned the transferred asset for more than a decade yet be subject to a transferee liability assessment. Under Section 6901 the I.R.S. is not restricted to the enforced collection action against the transferred asset. The I.R.S. may assess and collect against any property of the transferee.¹⁸

The authors were recently involved in a case where the taxpayer filed fraudulent returns for the year 1982 through 1989. The I.R.S. prosecuted the taxpayer under the evasion statute IRC Section 7201. Subsequently in 1992 the I.R.S. assess taxes against the taxpayer for the open year.

The father of the taxpayer was provided title to a residence in 1982 by the taxpayer. In 1993 the I.R.S. assessed transferee liability against the father.

TAX COURT RELIEF.

If the I.R.S. elects to pursue the transferee under Section 6901 it must issue a statutory notice of deficiency.¹⁹ Therefore the transferee may petition the United States tax court for relief.

NOMINEE TRANSFEREE LIABILITY

The I.R.S. may levy or file a notice of federal tax lien against a third party who holds title to an asset transferred to the third party by the taxpayer. The government's theory is based upon the concept of fraudulent conveyance and the purported fact that the third party is acting merely as an agent of the taxpayer. The I.R.S. may levy against the third party, as it did in the E < trust case or it may file notice of a federal tax lien to encumber real property transferred to the nominee. The third party can resist the levy through the procedure set forth in IRC Section 7426(a)(1) or in the case of the tax lien through a quiet title action to extinguish the lien.²⁰

A nominee case can arise when a taxpayer has transferred title to a third party. However, the taxpayer has retained control over the asset. A nominee theory involves the determination of the true beneficial ownership of the property. Oxford Capital Corp. vs. United States.²¹

Example: Reverend Billy Bob has under reported his income for the year 2006. To avoid future I.R.S. action against his assets he transfers his personal residence to his parents. Billy Bob continues to reside in the home. Billy Bob also pays the household expenses i.e. gas, electricity, homeowner insurance. If the I.R.S. determines that additional taxes are due from Billy Bob for the year 2006 and Billy Bob fails to pay the tax after a demand, the I.R.S. may take collection action against Billy Bob. The I.R.S. may also take action against the parents of Billy Bob as his nominee.

The I.R.S. may elect to file a notice of federal tax lien against the parents. Form 668 Notice of Federal Tax lien will indicate that the lien is filed against the parents as nominees of the taxpayer. The lien notice will identify the property that is the subject of the lien.

The 10 years collection statute that applies to Billy Bob will also apply to the nominee.

Therefore, should Billy Bob agree to extend the collection statute of limitation by signing I.R.S. form 900 or extend the collection statute by some other action i.e. tender an offer to comprise the tax liability. The statute of limitation will also apply to extend the collection period against the nominee.

Where a taxpayer transfers assets to a third party but retains control over the assets, the federal tax lien will attach to the specific property transferred and not to all of the assets of the nominee.

In a nominee case the I.R.S. may in addition to the filing of a federal tax lien, file a suit to set aside a fraudulent conveyance. The I.R.S. must prove that the taxpayer transferred to a nominee property in an effort to defeat the collection of a tax due to the United States. If the United States prevails, the title of the property is reinstated in the name of the taxpayer.

The potential liability of the transferee is limited to the property held by the transferee. The tax liability will not extend to the transferee's other property unless it can be proven by the United States that the transferee:

1. allowed the property to depreciate in value
2. sold, concealed or transferred the property
3. co-mingled the property

However, the amount of the personal judgment against the transferee cannot exceed the value of the property at the time of the transfer to the nominee.

In a case decided in the Sixth Circuit, the United States Court of Appeals (Spotts vs. U.S.) reviewed a case in which the former wife of a taxpayer had brought a quiet title action against the United States in which she sought to remove a nominee federal tax lien filed by the I.R.S. for taxes owed by her former husband. In the United States District Court the I.R.S. had prevailed on a summary judgment. The Court of Appeals reversed the district court and returned the case to the District Court for a hearing on the issue of whether the former husband had an interest in the residence at the time the tax deficiency accrued.²²

In Spotts, Ray and Peggy Spotts were invested in an offshore tax shelter in which all of Mr. Spotts' income from his business activity were deposited in an offshore bank. Mr. Spotts was given a debit card by the offshore bank to access his income. Two years later the Spotts decided to buy a home for \$275,000. \$200,000 of the purchase price came from the income earned by Mr. Spotts that was on deposit at the offshore bank. In an effort to conceal the \$200,000 payment, the Spotts signed a \$200,000 mortgage in favor of the offshore bank.

In 1998, two years after the purchase Mrs. Spotts filed for divorce and the I.R.S. assessed a \$375,000 liability for taxes that accrued during the year that the house was purchased. The assessment was against Mr. Spotts (Evidently Mrs. Spotts had no income during the tax periods and did not file a joint return.)

After the assessments against Mr. Spotts the I.R.S. filed a notice of a nominee federal tax lien against the house owned by Mrs. Spotts.

The Court of Appeals ruled that a nominee tax lien can only attach to property in which the taxpayer (Mr. Spotts) had an interest.

The court concluded that the mere fact that the house was titled in Mrs. Spotts name does not render the transfer suspect. The court cited the Kentucky Supreme Court for the position that legal title to the property raises a presumption of true ownership. Further the Appeals Court cited 54 AM Jur., Trusts Section 205 for the proposition that a conveyance from a husband to the wife, generally does not raise a presumption of a resulting trust (The wife holding the title for the husband) which is the essential element of a nominee theory of liability.

Spotts is a cautionary case for the government, because it is not sufficient in a nominee case to prove that the transfer was without consideration at a time when a tax has accrued. The essential element of nominee liability is that the transferor - taxpayer must remain the true beneficial owner of the property.

It is dangerous for practitioners to place too much reliance on the Spotts' case for the following reasons:

1. State law and federal fraudulent conveyance statutes will be determinative if a transferee is a nominee. There is no uniformity with respect to state laws. An analysis of the specific state law is required.
2. The United States is not restricted to the use of nominee liability. The I.R.S. may pursue the case under the deficiency procedures set forth under Section 6901.

Alter Ego Transfers. The E < trust case is a classic example of alter ego transfer. In the E < trust case, the Cullers created a trust with a bank trustee. The Cullers then transferred a substantial portion of their assets to the trust. At the time of the transfer the Cullers has reason to know that the I.R.S. would seek an assessment of taxes for years that preceded the year of the transfer.

In an Alter Ego case, the I.R.S. may disregard the entity i.e. the trust, corporation, partnership or LLC and pursue the claim against the transferee. In a case where the third party resists the I.R.S. Levy, lien or seizure, the I.R.S. must prove

1. The interest of the taxpayer and the entity (trust) are the same and are not divisible.
2. That an inequitable or fraudulent result would occur if the third party is allowed to retain the property.

Where the I.R.S. seeks to use an Alter Ego theory of liability the I.R.S. must rely on the fraudulent conveyance statute of the state where the property is located. Also under federal law, The Federal Debt Collection Procedures Act provides a federal cause of action for setting aside a fraudulent conveyance. (28 U.S.C. Sec. 3301)

PROCEDURES AVAILABLE TO TRANSFEREES WHERE PROPERTY THAT THEY CLAIM THEY OWN IS SEIZED OR IS THE SUBJECT OF A LEVY.

1. Administrative Remedy
A transferee may under IRC Section 6343(b) request that the I.R.S. release a Levy where it can be demonstrated the property has been wrongfully levied.
 - (a) Transferee. The taxpayer may not avail himself to this remedy. Only the transferee may make the request.
 - (b) I.R.S. publication. 594 provides the format for the request for release from a wrongful Levy. A transferee who has received I.R.S. Form CP-90-Final Notice of Intent to Levy must timely file Form 12153 a request for a collection due process hearing. The due process request must be filed within 30 days from the date of the CP-90 letter. The notice must be sent to the I.R.S. address listed on the Levy notice.
 - (c) The transferee must be able to show that he is not a transferee within the meaning of Section 6901, an Alter Ego or a nominee.
 - (d) If the due process hearing results in the I.R.S. declining to release the Levy the transferee must appeal the adverse decision within two days of the adverse due process hearing.
 - (e) The transferee must be aware that the use of the I.R.S. administrative process does not toll the 9 month statute of limitations.
2. U.S. District Court. After the conclusion of a due process hearing the taxpayer may seek a judicial review under IRC Section 7426(a) which provides that a third party may bring a Civil Action against the United States in a United States District Court. The form of the litigation is beyond the scope of this article. However the practitioner must be cognizant that the

statute of limitations has a very short fuse in cases where a transferee seeks to avoid a Levy or seizure against property that the transferee claims that is his property. Therefore, the 9 month statute of limitations must be monitored.

Procedures available to transferees where the property that is claimed is the subject of a federal tax lien.

1. Administrative Remedy
 - (a) To whom is the request directed. A request for a release of a tax lien against a transferee's property is directed to: **IRS, Attention: Technical Services Advisory Group Manager.** IRS Publication 4235 provides the address of the TSG Group for the geographical areas of the real property subject to the lien.
 - (b) Format. There is no specific form that is required to be used by the requestor.

IRS publication 487 provides the general instructions for the request. The request should include:

1. Name and address of the requestor
 2. A legal description of the property. This can be obtained from the real estate deed or real estate mortgage (A copy of the deed should be attached to the request)
 3. A copy of the tax lien
 4. The legal basis for the transferee's requested release.
 5. The transferee must sign the request and include the words above your signature "Under penalties of perjury, I declare that I have examined this application and to the best of my knowledge and belief it is true correct and complete."
2. Judicial Remedy. While beyond the scope of this article, the transferee may commence a quiet title action against the United States to remove the federal tax lien, under the provisions of 28 U.S.C. Section 2410(a). In a quiet title action the transferee seeks to perfect his title in parcels of real estate that are subject to a notice of a federal tax lien. If granted the transferee's title to the real property will be cleared of the tax liens that have been filed by I.R.S.

SECTION 6901 TRANSFEREE LIABILITY PROCEDURES

Where the I.R.S. has elected to pursue a transferee under IRC Section 6901, the I.R.S. must as a precondition to the collection action follow the assessment procedure that are set forth in IRC Section 6901. There can be no transferee liability until the transferee has either waived the assessment procedure by the execution of I.R.S. form 870 or if the I.R.S. has issued a statutory notice of deficiency and the 90 day period for the assessment of the liability has elapsed and the taxpayer has not filed a petition to challenge the assessment in the U.S. tax court. Therefore, unlike a Levy, lien or seizure action that is based upon nominee or alter ego liability where the I.R.S. is seeking enforced collection against the transferee, a 6901 procedure is a two step process.

First, the I.R.S. must administratively conclude that the transferee liability should apply to the transferee. Once the determination has been made, the tax payer must agree with the I.R.S. position by execution of a form 870 (waiver of restriction on the assessment of the liability) or the I.R.S. must prevail in the U.S. tax court. Only after the 870 is signed; the statutory notice period has expired, or the I.R.S. prevails in court can the I.R.S. commence the collection action against the transferee. Therefore, the practitioner who seeks to defend the transferee under a 6901 case will have the benefit and the option to follow the normal I.R.S. internal review procedure that would include a review at the agent/manager level and the appeals office of the I.R.S. and the U.S. tax court.

Endnotes

This paper is a work in progress. The authors will provide end notes, amendments and editorial changes at the conference.

1. EC Term of years Trust vs. United States No.05-1541 (April 30, 2007)
2. Internal Revenue Code Section 7426(a)(1)
3. See pages 3 and 4 of the Supreme Court opinion
4. U.S. National Bank of Commerce, 472 U.S. 713, 720 (1985)
5. IRC Sec 6334(a) and Internal Revenue Manual Revenue Officers Handbook Section 1 5.11
6. I.R.S. Form CP-90
7. I.R.S. Publication 594 The I.R.S. Collection Process
8. I.R.S. Collection Appeal Rights (Page 2 form 9423)
9. IRC Section 6321, Section 6322 United Sates vs. Fidelity Philadelphia Trust Company 459 F.2d 771 (3rd cir 1972)
10. Treas. Reg. 301.6321-1
11. IRC Section 6323(a)
12. IRC Section 6323(f)
13. Id note 12
14. I.R.S. Seizures (GAO/GGD-00-4) Nov. 1999 pages 2 and 3
15. Internal Revenue Manual Section 5.17.14
16. Bartner Automatic Self Serv. Laundry Inc. V. Commissioner 35 T.C. 317 (1960) and IRM 4.11.52.4 (11-01-2004)
17. Harvey M. Pert vs. Commissioner, 105 T.C. 370 (1995)
18. I.R.C. 6901(a)
19. Id Note 18
20. Spotts vs. United States No. 04-5955 (6th circuit 2005)
21. 211 F.3d 280 (5th Cir. 2000)
22. Id Note 20

Section 1
5.11 Notice of Levy

Exhibit 5.11.1-3
Letter 3174 (P) (Rev 1-1999)

(Reference 1.2.2.4)

Letter Number: 3174(P)
Letter Date:
Social Security Number or Employer
Identification Number:
Person to Contact:
Telephone Number:

Taxpayer Name
Address

Dear (name)

Although we previously sent you a notice of our intention to collect your unpaid tax through enforced collection, our records show that you still have not paid the amount you owe. Enforced collection may include placing a levy on your bank accounts, wages, receivables, commissions, etc. It could also involved seizing and selling your property, such as real estate, vehicles, or business assets.

To prevent collection action, please pay the amount you owe, now. Make your check or money order payable to United States Treasury, and write your social security number or employer identification number on it. Send your payment to us in the enclosed envelope with a copy of this letter. The amount you owe is:

Form Number	Tax Period	Unpaid Amount from prior Notices	Additional Penalty & Interest	Amount You Owe
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If you recently paid this or if you can't pay it, call as soon as you get this letter. Our telephone number is at the top of this letter. If you disagree with our taking enforcement action, you may be able to work out another solution. If you disagree with our taking enforcement action, you may be able to work out another solution. Speak to the person whose name appears at the top of this letter, or ask for that person's manager. If you do not agree with the results, you may fill out Form 9423, Collection Appeals Request, to ask for Appeals consideration.

The unpaid amount from prior notices may include tax, penalties, and interest you still owe. It also includes credits and payments we have received since our last notice to you.

Sincerely,

Title

Enclosures:
Copy of Letter
Envelope

Information You Need To Know When Requesting A Collection Due Process Hearing

What Is the Deadline for Requesting a Collection Due Process (CDP) Hearing?

- Your request for a CDP hearing about a Federal Tax Lien filing must be postmarked by the date indicated in the *Notice of Federal Tax Lien Filing and Your Right to a Hearing under IRC 6320* (lien notice).
- Your request for a CDP hearing about a proposed levy must be postmarked within 30 days after the date of the *Notice of Intent to Levy and Notice of Your Right to a Hearing* (levy notice).

Your timely request for a CDP hearing will prohibit levy action in most cases. A timely request for CDP hearing will also suspend the 10-year period we have, by law, to collect your taxes. Both the prohibition on levy and the suspension of the 10-year period will last until the determination the IRS Office of Appeals makes about your disagreement is final. The amount of time the suspension is in effect will be added to the time remaining in the 10-year period. For example, if the 10-year period is suspended for six months, the time left in the period we have to collect taxes will increase by six months.

You can go to court to appeal the CDP determination the IRS Office of Appeals makes about your disagreement.

What Is an Equivalent Hearing?

If you still want a hearing with the IRS Office of Appeals after the deadline for requesting a CDP hearing has passed, you can use this form to request an equivalent hearing. You must check the Equivalent Hearing box on line 6 of the form to request an equivalent hearing. **An equivalent hearing request does not prohibit levy or suspend the 10-year period for collecting your taxes; also, you cannot go to court to appeal the IRS Office of Appeals' decision about your disagreement.** You must request an equivalent hearing within the following timeframe:

- Lien Notice-- one year plus five business days from the filing date of the Federal Tax Lien.
- Levy Notice-- one year from the date of the levy notice.

Where Should You File Your CDP or Equivalent Hearing Request?

File your request by mail at the address on your lien notice or levy notice. You may also fax your request. Call the telephone number on the lien or levy notice to ask for the fax number. **Do not send your CDP or equivalent hearing request directly to the IRS Office of Appeals.**

Where Can You Get Help?

You can call the telephone number on the lien or levy notice with your questions about requesting a hearing. The contact person listed on the notice or other representative can access your tax information and answer your questions.

In addition, you may qualify for representation by a low-income taxpayer clinic for a free or nominal charge. Our Publication 4134, *Low Income Taxpayer Clinic List*, provides information on clinics in your area.

If you are experiencing economic harm, the Taxpayer Advocate Service (TAS) may be able to help you resolve your problems with the IRS. TAS cannot extend the time you have to request a CDP or equivalent hearing. See page five of Publication 594, *The IRS Collection Process*, or visit www.irs.gov/advocate/index.html. You also can call 1-877-777-4778 for TAS assistance.

Note— The IRS Office of Appeals will not consider frivolous requests. You can find examples of frivolous reasons for requesting a hearing or disagreeing with a tax assessment in Publication 2105, *Why do I have to Pay Taxes?*, or at www.irs.gov/pub/irs-util/friv_tax.pdf

You can get copies of tax forms, schedules, instructions, publications, and notices at www.irs.gov, at your local IRS office, or by calling toll-free 1-800-TAX-FORM (829-3676).

Request for a Collection Due Process or Equivalent Hearing

Use this form to request a Collection Due Process (CDP) or equivalent hearing with the IRS Office of Appeals if you have been issued one of the following lien or levy notices:

- *Notice of Federal Tax Lien Filing and Your Right to a Hearing under IRC 6320,*
- *Notice of Intent to Levy and Notice of Your Right to a Hearing,*
- *Notice of Jeopardy Levy and Right of Appeal,*
- *Notice of Levy on Your State Tax Refund- Notice of Your Right to a Hearing.*

Complete this form and send it to the address shown on your lien or levy notice. Include a copy of your lien or levy notice to ensure proper handling of your request.

Call the phone number on the notice or 1-800-829-1040 if you are not sure about the correct address or if you want to fax your request.

You can find a section explaining the deadline for requesting a Collection Due Process hearing in this form's instructions. If you've missed the deadline for requesting a CDP hearing, you must check line 6 (Equivalent Hearing) to request an equivalent hearing.

1. Print Name: _____

If a husband and wife owe the tax liability jointly, please print both names if both want a hearing.

Address: _____

City: _____ State: _____ Zip Code: _____

2. Social Security Number or Numbers

SSN 1 ____ - ____	SSN 2 ____ - ____
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Employer Identification Number

3. Daytime Telephone Number and Best Time to Call

() _____ - _____ am. pm.

4. Tax Information

Type of Tax (Income, Employment, Excise, etc. or Civil Penalty)	Tax Form Number (1040, 941, 720, etc)	Tax Period or Periods

Request for a Collection Due Process or Equivalent Hearing

5. Basis for Hearing Request (Both boxes can be checked if you have received both a lien and levy notice)

- Filed Notice of Federal Tax Lien Proposed Levy or Actual Levy

6. Equivalent Hearing (See the instructions for more information on Equivalent Hearings)

- I would like an Equivalent Hearing - I would like a hearing equivalent to a CDP Hearing if my request for a CDP hearing is too late.

7. Check the most appropriate box for the reason you disagree with the filing of the lien or the levy. **See page 4 of this form for examples.** You can add more pages if you don't have enough space.

Collection Alternative Installment Agreement Offer in Compromise

Lien Subordination Discharge Withdrawal
Please explain:

My Spouse Is Responsible Innocent Spouse Relief (Please attach Form 8857, *Request for Innocent Spouse Relief*, to your request.)

Other Reason:

(Use as much space as you need to explain the reason for your request. Attach extra pages if necessary.)

I understand the CDP hearing and any subsequent judicial review will suspend the statutory period of limitations for collection action. I also understand my representative or I must sign and date this request before the IRS Office of Appeals can accept it.

SIGN HERE

Your Signature	Date
Spouse's Signature (if a joint request, both must sign)	Date

IRS Use Only

IRS Employee (Print)	Employee Telephone Number	IRS Received Date
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Collection Appeal Request

1. Taxpayer's Name		2. Representative: (Form 2848, Power of Attorney Attached)	
3. SSN/EIN	4. Taxpayer's Business Phone	5. Taxpayer's Home Phone	6. Representative's Phone
7. Taxpayer's Street Address			
8. City		9. State	10. Zip Code
11. Type of Tax (Tax Form)	12. Tax Periods Being Appealed	13. Tax Due	

Collection Action(s) Appealed

14. Please Check the Collection Action(s) You're Appealing:

- | | |
|---|---|
| <input type="checkbox"/> Federal Tax Lien | <input type="checkbox"/> Denial of Installment Agreement |
| <input type="checkbox"/> Levy or Notice of Levy | <input type="checkbox"/> Termination of Installment Agreement |
| <input type="checkbox"/> Seizure | |

Explanation

15. Please explain why you disagree with the collection action(s) you checked above and explain how you would resolve your tax problem. Attach additional pages if needed. Attach copies of any documents that you think will support your position.

Under penalties of perjury, I declare that I have examined this request and the attached documents, and to the best of my knowledge and belief, they are true, correct and complete. A submission by a representative, other than the taxpayer, is based on all information of which preparer has any knowledge.

16. Taxpayer's or Authorized Representative's Signature	17. Date
18. Collection Manager's Signature	19. Date Received

Collection Appeal Rights

FOR LIENS, LEVIES, SEIZURES, AND DENIAL OR TERMINATION OF INSTALLMENT AGREEMENT

You may appeal a Notice of Federal Tax Lien, levy, seizure, or denial or termination of an installment agreement under these procedures. However, if you request an appeal after IRS makes a seizure, you must appeal to the Collection manager within 10 business days after the Notice of Seizure is provided to you or left at your home or business.

How to Appeal If You Disagree With One of These Actions

1. If you disagree with the decision of the Revenue Officer, and wish to appeal, you must first request a conference with a Collection manager.
2. If you do not resolve your disagreement with the Collection manager, you may request Appeals consideration by completing Form 9423, Collection Appeal Request.
3. On the Form 9423, check the Collection action(s) you disagree with and explain why you disagree. You must also explain your solution to resolve your tax problem. **THE COLLECTION OFFICE MUST RECEIVE YOUR REQUEST FOR AN APPEAL WITHIN 2 DAYS OF YOUR CONFERENCE WITH THE COLLECTION MANAGER OR WE WILL RESUME COLLECTION ACTION.**

What will happen when you appeal your case

Normally, we will stop the collection action(s) you disagree with until your appeal is settled, unless we have reason to believe that collection of the amount owed is at risk.

You may have a representative

You may represent yourself at your Appeals conference or you may be represented by an attorney, certified public accountant, or a person enrolled to practice before the IRS. If you want your representative to appear without you, you must provide a properly completed Form 2848, Power of Attorney and Declaration of Representative. You can obtain Form 2848 from your local IRS office or by calling 1-800-829-3676.

Decision on the appeal

Once the Appeals Officer makes a decision on your case, that decision is binding on both you and the IRS. This means that both you and the IRS are required to accept the decision and live up to its terms.

Note: Providing false information, failing to provide all pertinent information, or fraud will void Appeal's decision.

McEuen vs. Allemeier: M.B.A. Educational Deductions at the Crossroads

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INTRODUCTION

McEuen

Over the course of time, trends in tax interpretation evolve. One recent example of evolution is the “bombshell” court decision in *McEuen vs. Commissioner* in which Tracy McEuen lost in her deduction bid. Writing on August 17, 2004 in *The Wall Street Journal* about the *McEuen* case, Jane J. Kim made the following gloomy forecast:

M.B.A. students could be at risk of losing one of their biggest breaks thanks to recent tax-court decisions.¹

Further in the same article, Robert Willens stated:

It’s going to be virtually impossible to take a deduction for education expenses. ... I’m having a hard time coming up with a scenario where you can claim a deduction.²

Did those dire predictions portend the end of educational deductions for M.B.A. degrees or were there other decisions to come which would bring the concept of *stare decisis* back to a more logical and realistic “common sense” position?

Allemeier

Slightly over one year later, the Tax Court decided in favor of the M.B.A. deductions for Daniel R. Allemeier, Jr. in *Daniel R. Allemeier, Jr., v. Commissioner*. While the facts and circumstances were slightly different in *McEuen* compared to *Allemeier*, there were many similarities which made it difficult to reconcile the opposite conclusions in each case.

Once again, Jane J. Kim was assigned to cover the *Allemeier* case in *The Wall Street Journal*. In the lead-in for her report, she exclaimed:

Business-school students may soon have better luck deducting their tuition expenses thanks to a new tax-court ruling.³

That statement was the exact opposite of what was written earlier about the *McEuen* case. What criteria will the courts use for future cases in this area? This article will address that issue, along with related items, and draw conclusions concerning those deductions.

Internal Revenue Code (I.R.C.)

I.R.C. Section 162(a) states: “In General—There shall be allowed as a deduction all the ordinary and necessary expenses paid or incurred during the taxable year in carrying on any trade or business...”

While I.R.C. Section 162 does not explicitly mention educational expenses, Income Tax Regulations cover educational expenses and provide tests for deductions in Reg. Sec. 1.162-5.

Income Tax Regulations

Reg. Sec. 162-5 (a) *General rule*. Expenditures made by an individual for education (including research undertaken as part of his educational program) which are not expenditures of a type described in paragraph (b)(2) or (3) of this section are deductible as ordinary and necessary business expenses (**even though the education may lead to a degree**) [emphasis added.]

The prohibition for deductions in Reg. Sec. 162-5(b)(2) deals with minimum educational requirements. In general, those requirements state: “expenditures made by an individual for education which is required of him in order to meet the minimum educational requirements for qualification in his employment or other trade or business” will not be deductible. In most cases, that restriction will eliminate almost all expenses of an undergraduate degree.

However, once a person has met the minimum requirements for a given field of endeavor with an undergraduate degree, any additional preparation in the same field will generally be deductible because it “maintains or improves skills required by the individual in his employment or other trade or business.” As an example, preparation to become a C.P.A. is not deductible because the individual is meeting the minimum requirements of the profession. But, once an individual has become a C.P.A., additional accounting studies are generally deductible because the individual has met the minimum requirements of the profession.

On the other hand, when a C.P.A. takes courses from a law school, Reg. Sec. 162-5(b)(2) ii clearly states that the C.P.A. could be entering the profession of law and disallows the deductions even if the C.P.A. has no intention of going into the legal profession. Law school tax courses are considered to be potential preparation for a new professional field for which the C.P.A. does not meet the minimum requirements and; hence, those expenses are not deductible even though the law school courses could benefit the C.P.A. in professional practice without going into a new profession.

Inconsistencies Within the Regulations

There are some inconsistencies within the Regulations. Reg. Sec. 1.162-5(b) (3)(i)(a) through (d) states:

The following are examples of changes in duties which do not constitute new trades or businesses:

- (a) Elementary to secondary school classroom teacher.
- (b) Classroom teacher in one subject (such as mathematics) to classroom teacher in another subject (such as science).
- (c) Classroom teacher to guidance counselor.
- (d) Classroom teacher to principal.

In other words, a teacher is a teacher is a teacher. That stance is the official Regulation position in spite of the fact that some school districts will not consider teachers for the position of principal until they have received additional training and obtained a higher credential. In effect, many school districts do not believe that a classroom teacher has the minimum credential for the position of principal while the Regulations take exactly the opposite position, but only for educators. This extreme Regulation position,

only for educators, has put a shadow of controversy over what constitutes *minimum educational requirements*.⁴ That shadow of controversy has spilled over into other areas including deductions for the M.B.A. degree. The question to ask in some cases is: *What are the minimum educational requirements for this field?*

If the Regulations stated that a businessperson is a businessperson in the same way that a teacher is a teacher is a teacher, then there would be no doubt about the deductibility of the expenses of Tracy McEuen's graduate degree. As it stands currently, there is a shadow of controversy over what constitutes the minimum educational requirements for the field of business.

W. M., III, and T. L. McEuen vs. Commissioner of Internal Revenue

While this is a very interesting ruling from the Small Cases Division of the Tax Court, it may not be treated as precedent under I.R.C. Section 7463(b). However, it does provide some valuable insight into current IRS philosophy. Because of the relatively small amount of money involved, Mr. & Mrs. McEuen represented themselves. On the other hand, the IRS was represented by a trained professional, Timothy A. Lohrstorfer. As a result of that representation combination, the McEuen's may have participated in a court case where the playing field was not completely "level."

Summary of the McEuen Case

Tracy L. McEuen (petitioner) [hereafter T. McEuen] earned a B.A. degree, with distinction, in mathematics and economics, from Indiana University in 1992 and began working as a "financial analyst" at Merrill Lynch (M-L) the same year. In order to progress from "financial analyst" to "associate," an employee had to have an M.B.A. degree and was given three years by M-L to obtain the degree.

At the end of the three year period, T. McEuen had not received an M.B.A. degree and went to work as a financial analyst with the corporate finance department of Raymond James Financial, Inc. (James) in June, 1995. After only year at James, T. McEuen was accepted into the Kellogg School of Management (Kellogg) at Northwestern University in June, 1996 and resigned from James to attend Kellogg.

In June, 1998, T. McEuen received her Master of Management (M.M.) degree from Kellogg. According to the court record, that degree was considered the equivalent of the M.B.A. degree from other institutions. After her graduation, T. McEuen "did not return to an investment banking firm as an analyst or associate." According to the court documents, she was hired by Spring Industries (sic) in September, 1998. [The actual name of the company is Springs Industries, Inc.]

Springs Industries is a diversified company which traces its origins back to 1887 when Samuel E. White formed Fort Mill Manufacturing Co. The name Springs Industries, Inc. (SII) comes from the fact that Leroy Springs assumed control of the Fort Mill operations in 1914. Currently, SII has recognized brand names such as Wamsutta, Springmaid, and others.

At the time T. McEuen was hired into the "General Management Program" of SII, candidates for the position "were required to have an M.B.A. or equivalent." In that context, what would an equivalent be? There is no discussion of this factor in the court proceedings.

Is it possible that SII could have considered a degree in economics which contains the underlying framework for all business plus four years of experience with two major brokerage firms to be the equivalent of an M.B.A.? If so, T. McEuen could have argued that she already met the minimum requirements for her position and that her studies for the Masters degree at Kellogg were actually in a program that maintained and improved her skills. Furthermore, the M.M. degree would not have enabled her to go into a new field because she had already met the minimum requirements for the field of business.

Other Issues with the *McEuen* Case

IRS Audit Selection

In the court proceedings, the McEuen's claimed a deduction of \$20,317 for "required education" on Schedule A of their 1998 U. S. Form 1040. After reducing the total educational expenses of \$21,125 by 2% of AGI (\$808), the McEuen's computed their deduction of \$20,317. If 2% of AGI is \$808, then it can be calculated algebraically that the McEuen's had AGI of \$40,400. In effect, one of their "miscellaneous itemized deductions" of \$20,317 was more than 50% of AGI.

With around 1% of individual returns selected for IRS audit annually, why was the McEuen's return selected in the first place? While there are many possibilities for a return being selected for audit, one high probability for audit selection for the McEuen's would be the Discriminate Function (DIF). In this system, returns are scored using statistical information to select returns with the greatest probability of error and; hence, the greatest probability for additional tax assessments.

Because the relationship between "miscellaneous itemized deductions" and AGI was materially out of line, a "red flag" in the system could have triggered the McEuen's return for audit. While the IRS has been successful in maintaining the secrecy of the exact scoring formula for the DIF, it is very reasonable to believe that the DIF score may have triggered the McEuen's audit.

Burden of Proof—Internal Revenue Section 7491

I.R.C. Section 7491 deal with the burden of proof and states:

- (1) General Rule—If, in any court proceeding, a taxpayer introduces credible evidence with respect to any factual issue relevant to ascertaining the liability of the taxpayer for any tax imposed by subtitle A or B, the Secretary shall have the burden of proof with respect to such issue.
- (2) Limitations—Paragraph (1) shall apply with respect to an issue only if-
 - (A) the taxpayer has complied with the requirements under this title to substantiate any item;
 - (B) the taxpayer has maintained all records required under this title and has cooperated with all reasonable requests by the Secretary for witnesses, information, documents, meetings, interviews...

In the discussion portion of the case, the court propounded the following statement:

The Court decides this case on the preponderance of the evidence, regardless of the allocation of the burden of proof. Section 7491 is therefore inoperative.

A terse one sentence "discussion" by the Court negates I.R.C. Section 7491. Did the taxpayers violate Sec. 7491(1) by not providing credible evidence or was there a violation of Sec. 7491(2)(A) or (B) requirements? The court record discusses none of those potential violations and simple states that Sec. 7491 "is therefore inoperative." Is it possible that the court simply finessed that issue because the petitioners were pro sese and did not realize what had happened to them? It is probably a distinct benefit to the Internal Revenue Service that a decision of the Small Cases Judge is final and cannot be appealed.

Summary of the *McEuen Case*

The McEuen's, while very intelligent by virtue of their jobs and educational attainments, were not formally trained in tax matters and missed some golden opportunities to win their case. Does the I.R.S. victory in the *McEuen* case pronounce the end of "M.B.A. deductions"? Hardly!

Summary of the *Allemeier Case*

On August 31, 2005, the Tax Court issued a Memorandum Decision allowing Daniel R. Allemeier, Jr. (pro se) to deduct the M.B.A. expenses of attending Pepperdine University. Concurrently, Mr. Allemeier lost on some other issues which were not related directly to the deduction of the M.B.A. expenses. The facts of the *Allemeier* case follow.

Before he had completed his undergraduate degree, D. R. Allemeier (Allemeier) began selling a single product, a protective mouthguard, for Selane Products, Inc. (Selane) in 1996 on a part-time basis. Selane is an orthodontic and pediatric laboratory that specializes in making removable orthodontic appliances.

Upon graduation from Wingate University with a bachelor's degree in sports medicine, Allemeier began working full-time for Selane. His work duties were expanded significantly and his "responsibilities ranged from making sales calls by phone and managing small budgets to working directly with dentists and athletic trainers..."

His C.E.O., Dr. Rob Veis, testified that by all accounts, petitioner excelled in his duties at Selane Products, and in a few years he became a leading salesman for the company. Because of his skills and abilities, Allemeier was given more responsibilities and duties before obtaining a graduate degree.

After being in a full-time position for about three years, Allemeier decided to obtain an M.B.A. degree. Dr. Veis told Allemeier that an M.B.A. degree would "speed his advancement within the company" but Selane did not require petitioner to obtain the M.B.A. degree for advancement. Also, Selane had a strict policy of not reimbursing employee educational costs.

The following paragraph directly from the court record should prove conclusively that:

1. Allemeier met the "minimum requirements" for his position;
2. He was not going into a "new profession"; and
3. He was simply maintaining and improving the "minimum requirements" which he had already attained.

Shortly after petitioner enrolled in, but before he completed, the MBA program, he was promoted to several new positions at Selane Products. Petitioner was promoted to Marketing Manager, Managing Director of the Appliance Therapy Practitioners Association, Head of the SMILE Foundation, Practice Development Consultant, and Project Development Consultant. In these new capacities, petitioner's duties expanded and included analyzing financial reports, designing action plans for sales, and evaluating the effectiveness of marketing campaigns. Petitioner performed many of these same functions before he earned his MBA. Petitioner remained a full-time employee of Selane Products while in the MBA program.

Why Do Some Firms Require an M.B.A. Degree?

An excellent question to pose is this: "Why do some firms require an M.B.A. degree?" Is it because they desire additional depth and breadth of knowledge and other sophistication that is inherent in the degree? Or, are there other factors which come into play?

In both Merrill Lynch and Raymond James (the two firms in the *McEuen* case), there have been numerous high level producing associates who did not obtain M.B.A. degrees. By requiring M.B.A. degrees, are they artificially raising standards to appeal to the ego of “select” individuals?

Another factor which has caused some firms to seek an M.B.A. is that global academic standards have deteriorated. Many college and university administrators worship at the shrine of the “SCH” or Student Credit Hour. That factor trumps all other considerations in a “quality education” in far too many cases in the educational process. In order to recruit an employee candidate with the skills that a bachelor’s degree holder used to have, some firms are seeking M.B.A.’s. The M.B.A. degree may be the equivalent of what a bachelor’s degree was a few years ago.⁵

However, the lowering of standards should not be used as an excuse to set the minimum standards for the field of business as the M.B.A. There are still many bachelor’s degree holders who are well trained for the field of business. Therefore, the bachelor’s degree should remain the minimum requirements for the field of business just as the Regulations declare that teacher certification is the minimum requirement for any teacher or principal at kindergarten through twelfth grade level.

Insights from Other Cases for M.B.A. Deductions

Steven G. Sherman v. Commissioner of Internal Revenue

In June, 1965, Mr. Sherman (petitioner) received a Bachelor of Arts degree in *English* from Tufts University. Subsequently, he served as an officer in the U.S. Army until June, 1968 when he was discharged. While in the Army, he held three top-level positions. After his Army tour-of-duty, he was employed by the Army and Air Force Exchange Service, (AAFES) as Chief, Plans and Programs Office in Viet Nam. While in that position:

His duties in this position involved formulating and monitoring management, contingency, and emergency plans for the Viet Nam region. He coordinated the phase-down of the Viet Nam exchanges (PX’s) concurrent with troop redeployment. He also represented his region in discussions about exchange operations with high-level Department of Defense, Department of State and legislative officials.

“At some point prior to May, 1971,” Sherman was accepted into the Harvard M.B.A. program and completed his degree in June, 1973, when “petitioner was not under an employment agreement and did not receive a salary from any source.”

At the conclusion of the case, the ruling was: “Decision will be entered for the petitioner.” The decision was declared even though the I.R.S. was represented by Lawrence Becker and Joyce Britt while Sherman was represented pro se.

What is the significance of the *Sherman* case? First, the case demonstrated that Sherman could deduct M.B.A. Expense even though he did not have an undergraduate in business. The case is silent on the issue of minimum requirements for a career in business. The fact that Sherman held very high level jobs in the Army and also with AAFES would indicate that Sherman had met the minimum requirements for the field of business *even without an undergraduate degree in business administration.*

Second, *Sherman* was able to overcome the “one-year-rule” in *Furner*. After the *Furner* case, the I.R.S. issued a Revenue Ruling stating that: “Ordinarily a suspension for a period of a year or less, after which the taxpayer resumes the same employment or trade or business, will be considered temporary.” Sherman spent two years in his M.B.A. studies and the court decreed that the time was still “temporary” and that

the expenses were deductible. In effect, *Sherman* negated Revenue Ruling 68-591 with regard to time requirements.

Last, what is the relationship of the *Sherman* case to the *McEuen* case? While it would appear that the *Sherman* case was directly on target for *McEuen*, that case was not included in the cases considered by the court. Is it possible that the *McEuen*'s did not know of its existence and the I.R.S. did not want to introduce it because of the potential damage that it would have done to their position? The answer to that question may never be known because of the non-appeal position of the Small Cases Division of the Tax Court. Was the Small Cases Division of the Tax Court negligent in its administration of the *McEuen* case? Its decision left much to be desired.

Ross L. Link vs. Commissioner of Internal Revenue

Ross Link graduated from Cornell University in May, 1981 with a bachelor's degree in operations research. In September, 1981, Link began graduate school and was awarded an M.B.A. degree in May, 1983. When he attempted to deduct his M.B.A. expenses, the court stated: "he had not established himself in his trade or business." The facts of the case indicate the Link had not met the minimum requirements for his field and; hence, the expenses were not deductible.

Unlike *McEuen*, Link worked for Xerox Corp. for only three months from "June, 1981 to September, 1981." In effect, he had a "summer job" and then started his M.B.A. An operations research degree is, at best, only tangentially related to the field of business. On the other hand, *McEuen* earned a bachelor's degree in economics at a major university and gained four years experience at two major brokerage firms. That should be the equivalent of a bachelor's degree in business administration and should have satisfied the minimum requirement for the field of business.

Who Is Responsible for the Shadow of Controversy Concerning M.B.A. Deductions?

The Department of Treasury

There are many parties who share responsibility for the controversy concerning M.B.A. deductions. First, the Department of Treasury has committed a disservice by providing negligible guidance in the Income Tax Regulations concerning the minimum requirements for the field of business. According to the Regulations for education, a teacher has met the minimum requirements when the educator is initially certified. If the educator is promoted from:

classroom teacher to
assistant principal to
principal, and subsequently,
to superintendent of schools,

that educator can deduct all educational expenses incurred after being initially certified even though there may be different credentials required for every promotion. In effect, many school boards maintain that each promotion requires a different level and type of training, whereas the Regulations propound that each one is essentially the same with no substantive difference between each level.

If the same Regulations were in effect for business that are in place for education, then a person with a bachelor's degree in any area of business would meet the minimum requirements for the field. It is possible that a bachelor's degree in any field would be sufficient because many people with degrees outside of business, such as physical education, go into business and have very successful careers. The *Sherman* case demonstrated that a bachelor's degree in English can provide the minimum requirements for the field of business when it is supplemented with additional high-level training. The Department of Treasury bears some responsibility for the controversy concerning deductions for the M.B.A. degree.

U. S. Congress

Of course, if it is the intent of Congress for the minimum requirements for business to be an M.B.A. (or equivalent), then they should pass legislation which clarifies that point for the Department of Treasury. However, if Congress did that, then it would be inconsistent with position for education and that issue should be addressed as well. The U. S. Congress has, to some degree, contributed to the lack of certainty dealing with deductions for the M.B.A. degree.

The Judiciary

Perhaps the greatest share of responsibility for the current confusion concerning M.B.A. deductions is the U.S. Judiciary. Judges have taken the extreme position that the M.B.A. is the minimum requirement for business in some cases. To champion that argument in light of current business operations is a huge stretch of the imagination and totally inconsistent with the field of education cases.

Actually, the *McEuen* controversy came from the Small Cases Division of the Tax Court. There was a great deal of room for improvement in the administration of the *McEuen* case. That decision may have created a controversy where none would have been present otherwise. Perhaps *Allemeier* will cause the pendulum of justice to swing back to a more realistic position in the future.

What Should Be Done About the M.B.A. Deduction Conflict?

If the Executive (Department of Treasury), Legislative (Congress), or Judicial Branches were to make some slight modifications, then the entire issue should evaporate. If the Department of Treasury were to review their Regulations and modify them to state that a bachelor's degree in business met the minimum requirement for subsequent business education deductions, then the M.B.A. controversy should be resolved. However, if Treasury Officials took the position that the M.B.A. degree is the minimum requirement for the field of business, then that position would completely contradict their position for the field of education. While Treasury is working on that task, they should also state that the acquisition of an M.B.A. degree for a person in business does not constitute a new profession. That was clearly the stance taken in the *Allemeier* and *Sherman* cases and the correct position regarding the issue.

On the other hand, if Congress were to amend I.R.C. Section 162 to state that a bachelor's degree in business meets the minimum requirements for future business educational deductions, then the M.B.A. deduction controversy should cease. But, if Congress stipulated that an M.B.A. was the minimum requirement, then it would defy all logic and be completely inconsistent with the Regulations for the field of education.

Last, but the easiest to implement, would be for the judiciary to admit that the minimum requirement for business education deductions is the bachelor's degree in business from an AACSB accredited school [or equivalent accrediting body]. Perhaps, any bachelor's degree from an accredited school (as was the case in *Sherman* when there is significant prior business experience) would be sufficient to meet the minimum requirements for entry into the field of business and; thereby, allow deductions for advanced studies in business.

Summary and Conclusions

The *McEuen* case stirred up a hornet's nest. Was it really necessary? The evidence presented in this article suggests strongly that the McEuen's could have prevailed in their endeavor to deduct M.B.A. expenses with just a little bit of coaching or personal advocacy. Tracy McEuen certainly satisfied the requirements for the deduction according to the Regulations. She met the minimum requirements for the field of business with a bachelor's degree in economics and four years of experience at two major brokerage firms. Also, she was not going into a new field but was maintaining and improving her

business skills. It could be persuasively argued that T. McEuen had more formal training in business than Steven Sherman did but *Sherman* triumphed and deducted his M.B.A. expenses while *McEuen* lost and could not deduct her M.B.A. expenses. Ideally, the principle of *stare decisis* in *Sherman* and *Allemeier* will set the precedent for future decisions in that area. There are many scenarios where M.B.A. expenses will be deductible in the future.

Endnotes

1. Kim, Jane J., "M.B.A. Students May Lose Tax Break," *The Wall Street Journal*, August 17, 2004, p. D2.
2. *Ibid.*
3. Kim, Jane J., "Tax Court Ruling Allows Deduction on M.B.A. Degree," *The Wall Street Journal*, September 8, 2005, p. D2.
4. Please see: Posey, Clyde L., "Educational Expense Deductions: Issues at the Crossroads," *The Journal of Higher Education*, Vol. 52, No. 6, pp. 624-639.
5. For a complete discussion of this phenomenon, please see M. I. Rapert, S. Smith, A. Velliquette and J. A. Garretson, "The Meaning of Quality: Expectations of Students in Pursuit of an MBA," *Journal of Education for Business*, September/October, 2004, pp. 17-24.

IS SAS NO. 99 WORKING: A SURVEY OF CPAS

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ABSTRACT

The major financial scandals surrounding Enron and Worldcom led to changes in legislation and standards. One of the major standard changes was Statement on Auditing Standard No. 99, "Consideration of Fraud in a Financial Audit" issued in December 2002. This research attempts to answer questions about the readiness of financial auditors to perform anti-fraud duties effectively, and the perceived effectiveness of SAS 99. Twenty-five professionals were surveyed. The results show some readiness on the part of the CPAs, and some effectiveness of SAS 99 procedures to potentially detect frauds.

INTRODUCTION

Although management has the ultimate responsibility to design and implement programs and controls to prevent, deter, and detect fraud, the public's expectation of auditors to search for and find fraud has increased drastically over the years. The independent audit function has historically been known as the "public watchdog" with a responsibility to protect the investors, creditors, and general public from materially misstated financial statements of companies. The auditor's responsibility is to ensure there are no material misstatements in the financials, but due to large accounting scandals over the past few years, the scope of the auditor's job has expanded to meet the expectations of the public concerning the detection of fraud.

Even with the revamping of standards through Statement on Auditing Standard (SAS) No. 82 and its successor SAS 99, which both consider fraud in a financial statement audit, frauds continue to occur and the public's confidence in financial audits has diminished over the years. While SAS 99 has taken a more proactive approach than its predecessors to the prevention, deterrence, and detection of fraud in a financial statement audit, measures can still be taken to further increase the effectiveness of financial audits and the public's confidence in the public accounting profession overall.

HISTORY OF FRAUD DETECTION STANDARDS

Fraud detection standards were originally set back in 1988 through SAS 53, "*The Auditor's Responsibility to Detect and Report Errors and Irregularities*." The intent of issuing this standard was to bridge the expectations gap, distinguishing between what the independent auditor's actual responsibilities were to detect financial statement misstatements and what the public thought these responsibilities were. By the early 1990's though, many auditors were not clear on what their fraud detection responsibilities actually were, and the Auditing Standards Board (ASB) sought to clarify this through the release of SAS 82 [3, 42].

Issued in 1997, SAS No. 82, "*Consideration of Fraud in a Financial Statement Audit*," attempted to clarify the auditor's responsibility for detecting and reporting fraud, as well as address the public's criticism of the audit process and audit quality.

Specifically, the standard required independent auditors at the beginning of the audit to make a specific assessment of the risk of material misstatement on financial statements, whether due to fraudulent financial reporting or asset misappropriation and keep this focus throughout the audit. They were also required to make inquiries of management concerning management's knowledge of fraud and fraud risk factors within the entity and their responses to those risk factors. David Landsittel, the ASB fraud task force chair, expressed optimism in this new standard when he said, "I am hopeful that the standard will enhance the likelihood of detection of material misstatement due to fraud, further enabling the Certified Public Accountant (CPA) profession to serve the public interest and increase the value of our services." [3, 43-46]

The expected results of SAS 82 did not ultimately live up to the expected benefits though. While it may have heightened awareness of fraud by both auditors and management, one of the expected benefits was an increase in the discovery of fraud, and in a research study that was conducted, almost all of the auditors said that it had not resulted in this. And while the standard meant to clarify, not increase, the auditor's responsibility to detect fraud, the expectations gap was actually widened and auditors felt that their exposure to legal liability increased. This was due mainly to the auditor's belief that they now had greater responsibility and the client's belief that auditors were now doing more to uncover fraud [3, 46].

RELEASE OF SAS NO. 99

In 2002, the recent corporate and accounting scandals of Enron, WorldCom, and Tyco demanded that something be done quickly to restore investor and public confidence in accounting and reporting practices. The Sarbanes Oxley Act was passed in July of 2002 and shortly after, ASB issued a new fraud standard for auditors, SAS 99. This standard was actually developed prior to the scandals, but its release came in the wake of these frauds. The ASB crafted SAS No. 99, "*Consideration of Fraud in a Financial Statement Audit*" to fix the perceived inadequacies in its predecessor SAS 82. While both standards address the auditor's responsibility to search for fraud, SAS 99 takes a more proactive approach to preventing and deterring fraud, than SAS 82, which focused mainly on the detection of material fraud [1, 38].

SAS 99 nonetheless makes the auditors responsibility to detect fraud very clear stating, "The auditor has a responsibility to plan and perform the audit to obtain reasonable assurance about whether financial statements are free of material misstatement, whether caused by error or fraud." (AU 316.01) In essence, SAS 99 is a "risk-based" approach to fraud detection on the part of the financial auditors, encouraging auditors to design fraud detection audit procedures to detect "significant risks" related to fraud, whether they are expected to be material or not. The determination of significant risks related to fraud is made in a brainstorming session of the audit team during the planning phase of the audit.

KEY PROVISIONS OF SAS NO. 99

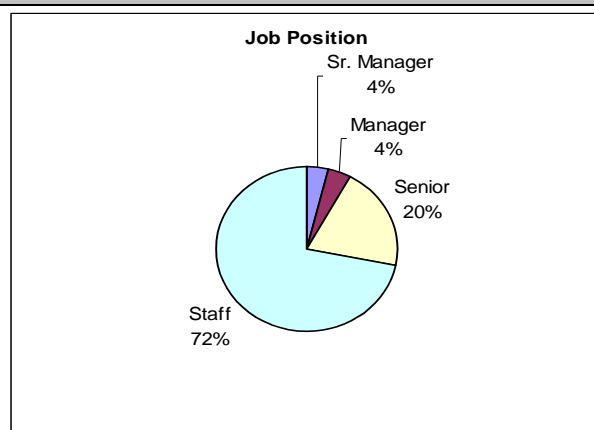
Many debate on whether SAS 99 actually increases the auditor's role in detecting fraud or simply restates SAS 82 in an attempt to convince the public that more is being done to detect fraud. Nonetheless, there are notable changes in SAS 99 that have affected financial statement audits in a positive way. Association of Certified Fraud Examiners (ACFE) founder and chairman, Joseph Wells, who helped draft SAS 99, recognizes that the standard is not a perfect document but does feel that the "brainstorming" feature is a good one. This feature requires that before the audit team begins the audit, they must "brainstorm" how material fraud could occur within the entity and use the information relating to these risks to design the audit [4]. Within the brainstorming process, audit team leaders must also emphasize the importance of maintaining professional skepticism throughout the audit and relay this attitude to the entire audit team (AU 316.16).

Auditors must also make inquiries to management and other appropriate personnel in the entity about the risk of fraud and whether they are aware of any fraud. Although this was previously required in SAS 82, SAS 99 goes into greater detail of what kinds of questions to ask and what areas to focus on. With that said though, the extent of questioning may vary and is ultimately up to the auditor's judgment to whom and how many inquiries are made (AU 316.24). Another feature of SAS 99 that seems to have had a strong impact is incorporating unpredictability in substantive tests. The audit team should design tests that the clients could not predict or expect, whether that means changing testing locations, times, etc. In an article from 2005, a study was conducted regarding CPAs' perceptions of the impact of SAS 99, and the majority of responses noted that there had been important changes in substantive testing, particularly an increase of unpredictability in testing [1, 40].

Whether or not any of the changes in SAS 99 substantially affect the chances of detecting fraud in an audit, the standard does act as a deterrent by itself. Now that companies can clearly see that auditors have a responsibility to actively search for fraud during an audit, the standard increases the perception of detection in a company, thus hopefully serving to discourage fraud in the first place [5, 66].

DATA COLLECTION

FIGURE 1: RESPONDENTS' POSITION



In order to gain a wider perspective on the auditor's responsibility to detect fraud, several local CPAs were surveyed for their opinion on the subject matter. A survey was sent to various levels of auditors at a "Big Four" public accounting firm to get their thoughts on how well current auditing standards are designed to detect and prevent fraud, as well as whether the public accounting profession can do more in spite of the complexity and concealment of fraud in companies today. The positions of the 25 respondents are depicted in Figure 1. The participants were asked to self-assess their knowledge in addressing fraud issues (see Figure 2).

CAN THE PUBLIC ACCOUNTING PROFESSION DO MORE?

The majority of survey respondents felt that auditing standards do an adequate job in detecting fraud, as well as preventing fraud (see Figure 3). The question then arises, though, of whether an adequate job is enough? Is adequate enough for the public's trust? Is adequate enough relating to an auditor's job responsibility?

FIGURE 3: FRAUD KNOWLEDGE OF PARTICIPANTS

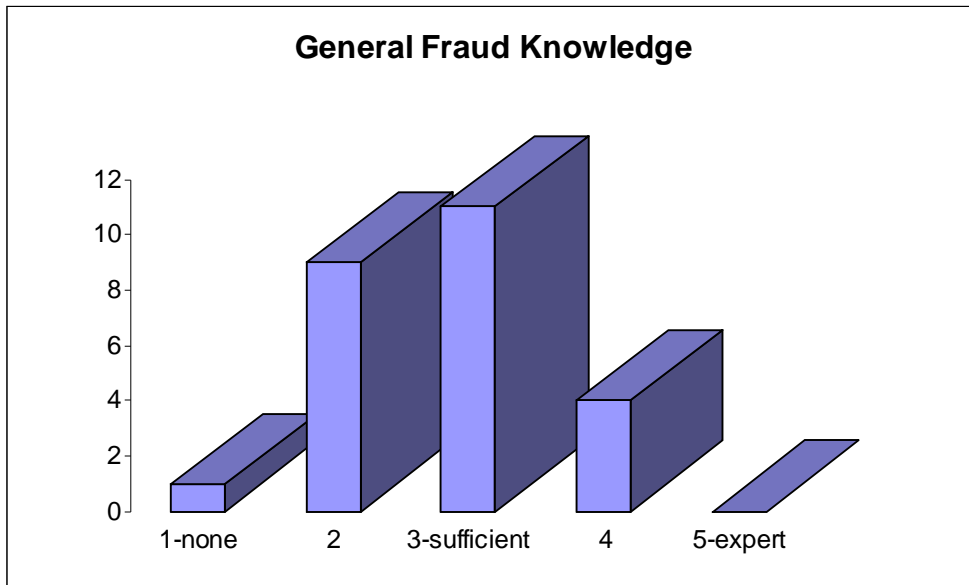
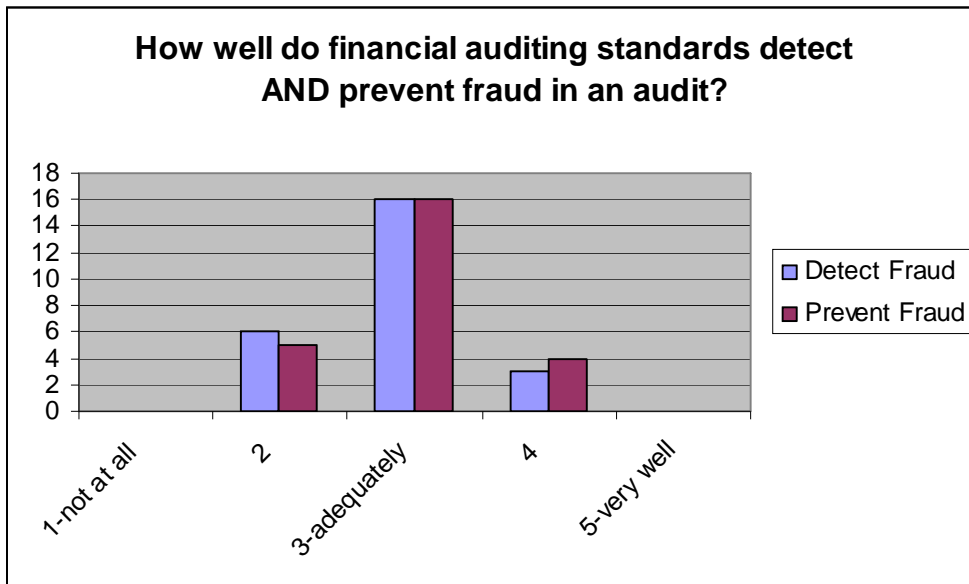


FIGURE 3: EFFECTIVENESS OF CURRENT FRAUD STANDARDS

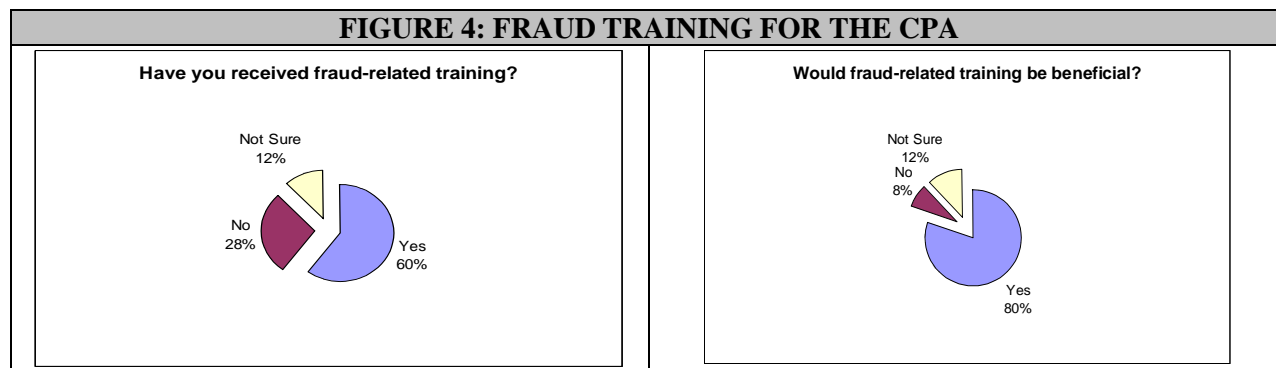


Fraud is often difficult to detect because it frequently involves the concealment through falsification of documents or collusion, and therefore it is more important to place emphasis on prevention and deterrence. Prevention can reduce opportunities for fraud to occur and deterrence can persuade people not to commit fraud because of the likelihood of detection and punishment [6, 2-3]. Joseph Wells particularly feels that the current auditing standards are flawed with respect to the CPA’s responsibilities to detect fraud, but says that it shouldn’t prevent the profession from turning its focus to preventing fraud in the first place. Because fraud is able to be concealed in so many ways, it is hard to determine whether transactions are actually fraud or not, and it seems almost impossible to improve standards to the degree necessary to feel confident in being able to determine that [4].

While detection may seem impossible in many circumstances, Joseph Wells focuses on prevention instead. He advocates a model organizational fraud prevention program. His idea is to develop a list of what the perfect organization does to prevent fraud and then allow the auditors to audit that “perfect organizational model.” Thus, the auditors would express an opinion on whether the company is in compliance with the model rather than that the company is free from material fraud. This would not only encourage organizations to focus on fraud prevention, but would in turn allow the investor’s confidence to strengthen because they would be assured that they are dealing with an honest and ethical organization [4].

Although standards may be flawed in detecting fraud, there are still steps auditors can take to improve the likelihood of detecting fraud, if it is not able to be prevented. To enhance the fraud detection abilities of auditors, accounting education must be expanded. For students in accounting undergraduate and graduate programs, occupational fraud remains a relatively under addressed subject [5, 67]. Auditors need to know the different types of frauds that could occur in order to be able to develop a process to detect them. Almost all occupational frauds can be classified into 11 main categories called the “fraud tree,” and it is vital that CPAs thoroughly understand these categories. In an interview with Joseph Wells, he stated that “CPA’s should be taught the most common fraud schemes so they can recognize the signs when they see them.” He also said, “If we are committed to deterring fraud, let’s begin by ensuring that every accounting student, and every CPA, receives adequate training in this area.”[4] This fraud education should start at an undergraduate level and extend all the way through continuing professional education courses (CPE) for CPAs.

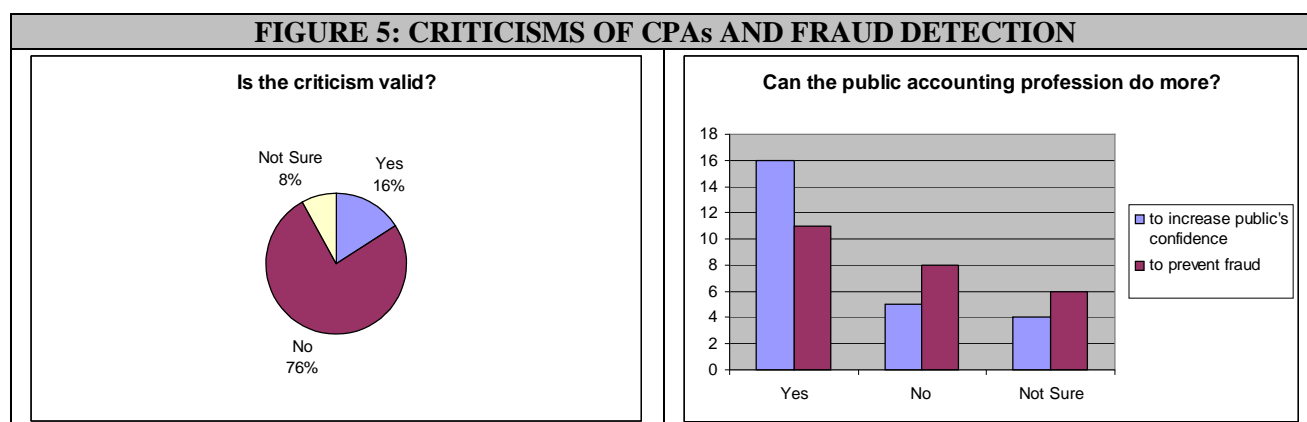
While 60% of the survey respondents noted they have already had some kind of fraud-related training, an overwhelming 80% felt that receiving fraud training or attending a fraud seminar every year would be beneficial to their role as an external auditor (see Figure 4).



Another aspect of education should be proper interviewing skills. With SAS 99’s requirement to ask management as well as others in the company about the risk or prevalence of fraud within the company, interviewing skills are essential. The best clues come from people and if auditors are trained to ask appropriate probing questions, then the risks of fraud, or even the fraud itself, may be discovered at the very onset of the audit [5, 67].

After all that has been done in an effort to improve auditing standards relating to the auditor’s responsibility to detect fraud, the public continues to criticize auditors for not doing enough. People have different views on whether the public’s criticism is in fact valid. Joseph Wells seems to believe the criticism is valid to some extent and stated, “Many CPAs didn’t accept their fraud-related responsibilities willingly, and were dragged into this battle kicking and screaming. It took huge judgments against accounting firms before we started taking fraud seriously.”[4]

The responses of external auditors from the survey do not indicate the same conclusion; 76% of respondents do not think the criticism is valid (see Figure 5). Whether it is valid or not, the majority of respondents feel that the public accounting profession can do more to increase the public's confidence (see Figure 5). When the details about the Enron and WorldCom frauds surfaced, the trust in the public accounting profession was shattered. As years have passed, the "confidence" pendulum is swinging upward again, and effort has to continue to ensure it stays up. Like previously mentioned, individual auditor's fraud knowledge has to increase in order to increase the likelihood of detection, while at the same time the profession should shift a good amount of its focus to preventing fraud in the first place.



Overall, auditors need to take a more aggressive stance against fraud. Companies have to clearly understand the auditor's mission to actively search for fraud. Joseph Wells gives another suggestion that goes back to the requirement of auditors to perform inquiries of management and others within the entity. He suggests that auditors ask three simple questions to the appropriate personnel:

- "You understand that part of my job as an auditor is to detect and deter fraud. Do you think that the company has any particular problem in this regard?"
- "Has anyone in the company ever asked you to do something that you thought was illegal or unethical?"
- "In the future, if you become aware of illegal or unethical conduct, will you please contact me?"

Regardless of whether the employees choose to answer honestly or not, the message becomes clear to the company that auditors are looking for fraud and are not afraid to ask the tough questions [4].

CONCLUSION

With solutions that stem from more intense fraud education, fraud prevention organizational models, and a more aggressive inquiry approach, the public accounting profession can do a better job at not only detecting and preventing fraud, but at continuing to raise the public's confidence in financial audits. As Joseph Wells stated in an interview, "We keep trying to get it right, and I am sure we'll continue trying to improve it."

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FRAUD CONTROLS FOR SMALL, REGIONAL NOT-FOR-PROFITS AND LOCAL GOVERNMENTS

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ABSTRACT

This paper considers whether fraud controls of small not-for-profits and local governments are adequate. Historically society has accepted fewer fraud controls for these entities than those required of larger entities, particularly corporations regulated by the Sarbanes-Oxley Act of 2002. This has occurred through a combination of: consideration of resource constraints, belief that all participants are community members and thus “known,” and trust in individuals’ dedication to the philanthropic mission. Violation of trust in these community based entities has significant consequences. The confluence of this with fewer fraud controls may be more significant than currently recognized in the regulatory process.

INTRODUCTION

Significant changes to US accounting standards and related processes have occurred in recent years as a result of our society’s concern with financial fraud. The collapse of Enron was the impetus for the formation of accounting laws and rules that may eventually be judged revolutionary. The Sarbanes Oxley (SOX) laws are a notable example. Society’s concern with the harm caused to individuals as a result of financial fraud is a major impetus to these changes. This concern will continue to underlie refinements and new regulations implemented over the next years.

Many of the new accounting regulations are designed to address - in a new and more stringent manner - fraudulent financial acts and reporting either by or within a corporations, particularly those who must register with the SEC. In recent years, society’s recognition of serious harm resulting from financial fraud in not-for-profit as well as state and local governments has produced similar results. Accounting principles with similar goals as SOX have been, and continue to be, designed and implemented for these organizations. For example, a national survey of 700 not-for-profits by Grant Thornton LLP found a significant increase from 2003 to 2004 in awareness of SOX and implementation of SOX like controls (Grant Thornton, 2004).

The new accounting requirements are intended to increase transparency in reporting and to decrease fraudulent accounting. It is important to recognize that SOX – for both corporations and the governments and not-for-profits for which it has been imitated– is intended to address more than fraudulent reporting. These new principles certainly share the focus of past legislation such as the Foreign Corrupt Practices Act of 1977 and of the Treadway Commission Report of 1992. It is relevant to note that internal controls for financial institutions have undergone a similar progression. The 2001 US Patriot Act, which

supersedes the 1970 Banking Secrecy Act, has been called “SOX for banks” because of the Act’s strengthened emphasis on internal controls. These diverse regulations share an emphasis on the significance of internal controls to efficient operations and as tools for hindering and uncovering fraud.

From the 1977 through 2007, society through the regulatory process has placed an escalating importance on internal controls as critical fraud controls. And, specific regulations regarding controls have become more comprehensive and more stringent than those of the recent past. When fully implemented and when viewed as a whole, these new accounting principles and processes will result in change in the practice of accounting and reporting that is as significant, in the author’s opinion, as that which occurred as a result of the 1927 stock market crash. Much as practitioners mention accounting “after the crash” they will mention accounting “after Enron.” The accounting changes in the 1930’s and our current accounting changes share a foundation of concern for innocent individuals and the economic harm caused by financial fraud. Thus a similarity exists in the societal goals underlying both the design of accounting rules after the 1927 crash and those of today.

Our society seems to view the acts of corporations as well as not-for-profits and state and local governments (in more recent years) as “good.” These entities are to be allowed or even encouraged to operate as freely as possible – unless and until – individuals both within and outside those organizations suffer economic harm. A heightened concern with harm caused by accounting fraud has existed since the collapse of Enron. Changes that occur in society drive changes in accounting; accounting is indeed a social science. Thus when our society deems that harm to innocent individuals is occurring, our accounting regulations are one of the tools used in an effort to correct the specific issues believed to be contributing to that harm.

Historically this process has generally defined harm to individuals caused by financial fraud in solely economic terms. A purpose of this paper is to begin considering whether constraining the measurement of that harm to direct economic losses/effect has encouraged society to give an inappropriately small weight to accounting as a tool to prevent fraud in certain organizations. This paper is intended to be heuristic. The following constitutes a beginning discussion and exploration, a prelude.

PARAMETERS

For the purposes of this discussion “fraud” will be used to mean financial fraud in both reporting and in conducting the operations of the organization (embezzlement within the organization or defrauding a donor as an example). “Harm” will be used to mean harm to the individual caused by that fraud. “Accounting” will be used to mean accounting reporting and recording and as used in organizations’ operations. “Fraud controls” will refer to accounting rules and regulations that are designed, at least in part, to prevent or minimize fraud.

The “specific organizations” mentioned above, those which are the focus of the questions considered here are: small, regional not-for-profits and governments. These are defined as operating within regions, and with numbers of employees and operations small enough that any interested individual is able to know most of the directors, managers, and employees. In addition, this personal knowledge extends outside of the organization and occurs in many activities in the locality. A sense of community exists. These organizations will be represented by the symbol “SNGs.” When necessary, the terms “not-for-profit SNGs” and “government SNGs” will be employed to distinguish the specific type of entity under discussion. The term “non-SNGs” will be used to designate organizations subject to SOX and SOX like regulations: corporations and large governments and not-for-profits. Other entities, as discussed below, are totally excluded from this discussion, except where mentioned.

SNGs have a criterion that is important to the focus of the questions considered here. This characteristic is central to the discussion of whether the definition of harm should be expanded beyond measuring only direct economic losses. SNGs are not only community based, they exist to fulfill a mission valued by that community. They receive recognition in their communities as providing a good necessary to the quality of life of all society. This recognition includes an understanding that no direct connection need exist between those providing resources and those receiving services. The individuals within the community trust that all involved with the SNG work honestly to benefit others in a manner that profits society, rather than oneself. This criterion does not exist in small, regional for-profit businesses. While a regional business certainly may have the same community interrelationships as SNGs, its mission is not the same. Those who provide the business, the for-profit, with resources are intended to directly receive benefits. For this reason, small for-profits are excluded from the discussion of this paper.

Additional support for excluding for-profits, of all types, exists in recent comments by the Chairman of the Financial Accounting Standards Board, the private sector organization in the US charged with establishing financial accounting and reporting standards. Recently, the Chairman expressed the following rationale for creating differing accounting regulations for not-for-profits and governments and for-profits:

An example of specialized accounting guidance that does seem necessary to properly reflect underlying differences is that for not-for-profit entities. These types of organizations clearly do have different objectives than typical for-profit businesses and the users of the financial statements, such as donors, are looking for different types of information. And though I am not an expert in governmental accounting and reporting, differences between such entities and for-profit enterprises and differences in user needs would also seem to warrant differences in the accounting in this area. (Hertz, 2007)

In recognition that for-profits have different accounting needs and because an altruistic focus is unique to both not-for-profits and governments, this discussion excludes the former but includes both of the latter. The altruistic focus is particularly noted by individuals where the organization is regional and most, if not all, the individuals involved are known within the community. Thus, again, “SNGs” are defined for this discussion as small and regional.

DISCUSSION

Central to this discussion is whether accounting rule makers assess the harm caused by fraud within SNGs solely on a measure of the dollars involved, the direct economic cost. Do significant unrecognized costs that should be measured and included in a concept of total harm, or total cost, exist? This concept would recognize that where fraud causes individuals to question or doubt the altruism of their regional entities, their SNGs, a significant harm can result. Fraudulent acts may cause violation of individuals’ and society’s’ trust. This violation may lead to a harm that outweighs or is as great as the direct economic harm traditionally considered. Inclusion of this type of harm might change fraud related regulatory policies.

If the ability to trust local governments and regional not-for-profits is a central determinant of the quality of life in our society, then the harm caused when trust is violated is potentially great enough to be formally recognized in accounting rule making. This harm is caused to innocent individuals but also threatens the viability of the organization themselves. Viability is particularly threatened where the not-for-profits’ mission is accomplished largely by volunteers. Workforce demographics won’t matter, however, if knowledge of fraud causes donors to cease providing needed resources. An SNG type

government certainly won't cease to exist as a result of fraud. However, there may be great damage to the future operations of that government. The ability to fulfill the mission upon which society relies may be injured. Measurement and inclusion of this type of harm in a concept of total harm might indicate that the decision process relating to required fraud tools for SNGs needs change. If a measure of total harm were used rather than direct economic harm, would SOX like regulations be required?

If the answer is yes, the custom of exempting SNGs from certain fraud controls might be viewed as inappropriate. Traditionally SNGs have either not had to comply with certain accounting rules or have been permitted to implement specific rules later than others. Some measure of size and resources has been the determinant. For example, the author's local government of approximately 20,000 citizens has no audit committee, internal auditor or internal audit function. This is consistent with the historical trend of either not requiring a control or permitting it to be phased in by largest first, smallest several years later. This trend has also existed for IRS requirements of SNG not-for-profits.

Certain accounting regulations are not applied to SNGs in a de facto manner. For example, certain organizations may be excluded by implication of the wording of a regulation. A custom appears to exist of not enforcing certain rules due to resource considerations; the resources considered are those of the enforcement agency or the SNG. Another cause is management's lack of awareness that accounting rules designed to prevent or minimize fraud are lacking or being violated. In recent months, the author's statewide media reported a surprisingly large number of SNGs lacking appropriate fraud controls and experiencing fraud. These are predominately volunteer directed organizations such as local recreational leagues or churches. Those involved with the organization seemed to have no knowledge that important fraud controls were absent. Unfortunately, it is not unusual in such a setting for a single person to count money, make deposits, and sign checks.

These types of violations make fraud much easier, more tempting, and perhaps more prevalent. Accounting principles that have as their subject fraud and/or internal controls increasingly include a reminder that evidence of weak controls and fraud are found in the same environment. For example, SAS No. 99 highlights certain discrepancies that if found may indicate fraud. These discrepancies are examples of actions that accompany weak internal controls. Although financial institutions are excluded from both the definition of SNGs and non-SNGs in this paper, it is noteworthy that internal controls are a major focus of 2001 US Patriot ACT. Section 352 of the Act stipulates that financial institutions will have internal controls and independent audits (see the discussion below regarding audits) as components of anti-money laundering programs.

A discussion of fraud and internal controls should note that the manner of the fraudulent act itself is not generally unique in SNGs. Fraudulent acts in SNGs and non-SNGs can be quite similar; the possible violations of internal controls or other fraud controls are similar. Perhaps the perpetrations of fraudulent acts themselves occur in a different pattern in SNGs. This may relate to the fact that for SNGs society has a unique reliance that all involved are known to the community and are selflessly dedicated to the mission of good for others.

An unintended consequence of this reliance may be that of enabling fraud. An acceptance of a lack of both fraud controls and other appropriate accounting controls may result in the act of fraud being more prevalent in SNGs than in non-SNGs. Additionally, our society may assess the occurrence of fraud differently for SNGs than non-SNGs. An acceptance of the type of violations mentioned in the previous paragraph may exist in the SNG setting. SNGs may be permitted fewer controls because of a perceived altruistic focus and in concert with a sense of community. These may influence society to deem that fraud is unlikely or its cost would be negligible.

Last year's report on fraud by the Association of Certified Fraud Examiners (ACFE) finds that smaller organizations continue to suffer disproportionate losses from occupational fraud. The ACFE finds the median loss from fraud to be higher in organizations with fewer than 100 employees. The report notes a major reason for this result: smaller organizations do a poorer job of proactively addressing fraud than larger organizations (ACFE, 2006).

Although this ACFE report regards corporations, this finding is relevant to a discussion of the effects of fraud in SNGs. By definition most SNGs have fewer than 100 employees. As noted earlier, the manner of fraudulent acts is usually not unique. Fraud in SNGs has similarities to that in corporations studied by ACFE. Despite this fact, SNGs have escaped many of the new SOX and SOX type regulations. The factors that cause SNGs to be treated differently include those mentioned: size, resources available, demographics, perceptions of altruistic focus, and a weighing of the potential economic cost of fraud. The existence of other factors needs to be investigated. These factors appear to have influenced society to determine that the cost of accounting principles designed to hinder fraud outweigh the potential benefits. This would be particularly so where society considers the potential dollar amount lost by fraud and deems it negligible or acceptably small. However, society's judgment may be incorrect. As mentioned earlier, the judgment is influenced by a focus on absolute dollars lost and some measure of size and related resources.

Consideration should be given as to whether "cost" should be expanded to include other harms such as that caused by violation of trust. When the extent of fraud at Enron was realized, anxiety was expressed that our stock markets might be negatively affected due to investor psychology. That is related to the belief of some that a culture in which fraud is easy and accepted threatens the economic health of the US society. The importance of trust among all parties in business relationships has long been heralded as a cornerstone and essential element of our American society. When trust is dishonored society attends to potential harm. An example is significant attention given by our national media to an FBI investigation of illegal betting by referees. A dialogue resulted regarding damage to the NBA and its players and fans – the trust placed in referees is deemed critical to the viability of the sport. Trust in one another is interwoven into fabric that serves as a foundation to our culture. This extends to all aspects of relationships of our community and government. However, the regulatory process may not have recognized it as important in computing the cost of fraud in an SNG.

Violation of trust may have significant costs due to the characteristics of SNGs. This is impacted by a confluence with the lack of the same, stringent fraud controls of SOX. Should the regulatory process for SNGs utilize a total harm, or total cost, approach? Using "total cost" might lead to recognition that the factors above are not valid reasons for permitting SNGs to not have the same stringent anti-fraud rules and regulations of non-SNGs. When costs are more comprehensively determined, society may judge the cost of fraud to be as significant as that of non-SNGs. The regulatory process might be changed to acknowledge that as the methods of perpetrating fraud are the same and the costs are as significant, the fraud controls should be the same.

Using a concept of total cost, or total harm, may indicate that the total cost to society of exempting SNGs from all or some fraud controls might be much larger than that previously recognized. The historic practice of using a cost versus benefit model that defines costs as solely economic costs may result, unintentionally, in active discouragement of needed, proactive measures for small organizations with limited resources. If instead total costs are employed in the model, accounting rule makers may decide that cost is significant enough to require SNGs to implement all fraud controls required of non-SNGs.

This tradition of exempting SNGs from implementing appropriate fraud controls has been impacted by a combination of the factors mentioned and has been particularly influenced by the community's trust that all involved in the SNG are altruistic and dedicated to serving others. The nature of accounting as a social

science may interact with these factors in a manner that may be inappropriate. Society's perceptions and judgments may be incorrect due to a reliance on solely economic cost. The interplay between society's judgment and the regulatory process may need careful investigation as regards SNGs. Research may show that society has not recognized the total cost of fraud in an SNG. If fraud controls are instituted to achieve society's aims and society has incorrectly measured harm as it relates to SNGs, then SNGs have inappropriately exempted from fraud regulations.

A significant cause of reliance on direct economic cost may be the difficulty in identifying and measuring other costs. For example, the amount of dollars embezzled can be quickly measured. No so, the cost of harm caused by violation of one or more individual's trust in an SNG. Determining the cost of the latter will be quite problematical and involve subjective as well as quantitative measures. One difficulty relates to assessing the harms that will occur in the future. An example is the distrust of a government SNG that can result when fraud is discovered. This distrust can result in individuals rationalizing the act of cheating on their taxes. These complications in recognition and measurement might suggest that society is not able as a whole to readily assess total cost of harm from fraud. Thus it might be appropriate that society's concerns to be delegated a smaller voice in the regulatory process.

These complications also suggest it may be difficult to conduct research to determine if a measure of total harm would lead to different accounting decisions regarding fraud tools. However, the potential cost of unrecognized harm seems to be of a size that such research is necessary. Questions that might form the initial phases of this research are in Table I.

Table I
Are there types of harm from fraud that are unique to SNGs?
Are there types of harm other than economic, can these be measured?
What factors does society weigh in determining harm from fraud?
Does US society consider only direct economic consequences of fraud?
Have accounting rules and processes been inappropriately impacted by a focus on harm that is solely economic?
Is the cost benefit model ineffective where it includes only economic harm?
Have other costs been excluded from the cost benefit model because of difficulty in measuring?
Do the characteristics of SNGs require a measure of total cost for the model to be effective?
Has our society weighted the potential of fraud damage in SNGs and judged it to be of not of much consequence?
Has society determined that fraud tools to prevent/minimize harm in SNGs are not as necessary as in non-SNGs?
Is there an historic pattern of SNGs not being required to have accounting rules that are as stringent as non SNGs?
Is there an historic pattern of designing fraud tools to respond to only direct economic harm in SNGs that is larger than a determined amount?
Have weak controls resulted and perhaps flourished in SNGs as a result of not considering total harm caused by fraud?
Will the current practice of permitting small organizations to implement new accounting rules years later than large organizations be judged inappropriate if harm is defined from a total cost perspective?
Do external auditors adjust for - and does the public recognize - that weak controls make fraud easier to perpetrate and more likely?
Is the cost of total harm of such significance as to indicate that SNGS should

be required to follow all regulations required for non-SNGs?
Is there a need for the process of decision making for accounting requirements to be changed, particularly regarding the interplay between concerns of society and decision making?

BACKGROUND

As stated earlier this paper is intended as a prelude to determining whether the cost of fraud in SNGs includes a significant unrecognized cost. If this cost is recognized through a total harm/cost concept, might SNGs be required to implement all fraud controls required of non-SNGs? The purpose of the following is to provide support for the existence of significant, unrecognized cost. The following is not intended to represent research. Rather this section discusses recent occurrences. The discussion is intended to serve as background for a total cost concept that recognizes the harm of violation of trust in SNGs.

By their definition SNGs are interwoven in their community. The trust placed in these organizations as discussed above combined with the personal investment of directors, management, other employees, individuals served, supporters, and others within the locality greatly magnifies the potential harm of fraud. The personal relationships and community based familiarity of all involved interacts and magnifies the consequence of violation of trust. The potential exists for many individuals in the community to suffer a significant personal, emotional harm. As discussed, the difficulty in measuring this is a significant cause of the lack of inclusion in cost benefit models of accounting decision making. Yet, violation of trust can threaten the entity's viability. Violation of the community's trust can lead to instances, and acceptance, of unethical or illegal acts. These may be within the entity or by those who interact with it. Discouraged employees may lose their dedication and either leave or quietly obstruct the mission of the entity.

An example relates to the fiscal health of a government. Cheating in payment or collection of taxes and other revenue items may be tempting and tolerated by some as a reaction to personal harm caused by violation of trust. The impact of decline in revenues can be magnified in a small, local government, an SNG. Small size and fewer revenue sources can lead to serious consequences for all constituents. This is because a certain amount of revenue must be raised from local sources. Cheating may cause the burden of supporting the government to fall disproportionately on those who do not cheat.

Another characteristic of a significant, unrecognized cost to fraud relates to the laxness that, unfortunately, can be a component of the accounting in SNGs. This laxness seems to have been accepted, as discussed earlier, due to a weighing of available resources, the potential maximum size of a fraud (in dollar terms), or lack of knowledge. Often this takes the form of weak or non-existent, internal controls. Since internal controls are important fraud controls, the result is greater ease and temptation for an employee to engage in fraud.

Not discussed earlier in this paper is an unrecognized, and difficult to measure, cost involving the individual who perpetrates the fraud – who but for the ease of doing so might never have become involved in dishonesty. For example, a local mother might never have become a thief had she not agreed to be the treasurer of the local soccer league; a job that no one else wanted or would help with. Others working with the soccer league were volunteers who defined their participation as – solely - involvement with the children and the games. As a result the treasurer was given sole custody of all monies collected and sole authority to write checks. This violation of internal control principles made embezzlement tempting and easy. The personal and community relationships existing in this soccer league caused the

harm to encompass not only a family forever damaged by criminality of a mother but also many people within the community suffered a very personal pain related to loss of trust.

Unfortunately, this pain does not seem to lead society to conclude that SNGs require a full complement of fraud controls. Instead, the community's reaction to the personal harm threatens viability of the SNG. This reaction includes reluctance to support the organization and its mission. In the example above, the ability of children to have the positive experiences that accompany a sports league is damaged. This cost is not included in cost/benefit decisions of society and accounting rule makers. Adding this harm to economic harm currently included in the cost benefit model might indicate that fraud controls for SNGs are necessary regardless of whether resources, financial and human, are limited.

Another result of the weight given to the limited resources is audits that are nonexistent or cursory. Unfortunately, this has been prevalent in not-for-profit SNGs managed and operated by volunteers. The lack of appropriate audits is an example of the potential negative impact of the historic cost benefit model applied to decisions regarding fraud controls. Communities and participants judge the cost of a formal, appropriate audit to be too expensive; the cost is deemed to be more than the potential benefit obtained. As a result, SNGs - such as the soccer league discussed above or a local food bank as another example - escape having to undergo an external audit. This is a serious concern especially in light of the lack of fraud controls in these organizations as mentioned above. A dangerous condition exists when internal controls and audits, which particularly under the newer accounting regulations are critical fraud tools, are absent.

The authors' State Board of Accountancy provides an example of requiring not-for-profit SNGs to have the same critical fraud controls required of non-SNGs. This is very recent and is restricted, at present, to audit requirements. The Board's new regulations are designed to correct the problem discussed above. SNG not-for-profits must now undergo a full audit which can no longer be conducted in a cursory manner. The Board's intention is to bring SNG audits into compliance with stringent audit requirements of non-SNGs. For example, new regulations include the prerequisite for the auditor to be in compliance with peer review regulations. As a result of the Board's actions, the factors discussed earlier in this paper may no longer be used to justify nonexistent or superficial audits. Although these new regulations currently only address audits, their existence lends support for the need for fraud controls of SNGs to be similar to those of non-SNGs, irrespective of resources or other considerations. However, these new audit requirements are in the process of being implemented. Cursory audits of small not-for-profits are still prevalent – but they are no longer permitted.

As discussed earlier in this paper management that consists of volunteers may have no idea that fraud controls are lacking or being violated. The Board's new rules may have the unintended effect of encouraging this to occur. Although the new rules have the consequence of requiring all not-for-profit SNGs to have formal audits, the rules are written from the perspective of the individual conducting the audit. By requiring the auditor to comply with the new regulations, the SNGs are in effect regulated. A disadvantage of this approach is that the same individuals who perform cursory audits are those unlikely to stay current on regulations. This is impacted by the fact that volunteer management may also be unlikely to have knowledge of the new regulations. Therefore, it will likely be some time before SNGs in violation realize that audit regulations are being breached. While these new regulations lend support for requiring similar fraud controls of SNGs and non-SNGs, any change in implementing new controls for SNGs must be from the perspective of the entity, not the accountant.

The lack of knowledge just discussed lends support for being cautious when society's perceptions and judgments are included in accounting decision making regarding fraud controls. The regulatory process needs to reflect that management's lack of knowledge is not acceptable. The characteristics of SNGs, including lack of resources in dollars and personnel, cannot be utilized to justify lax controls. Support for

this view can be found in the Attorney General of New York's document for the Charities Bureau. Attorney General Cuomo gives a clear and definitive summary of the responsibilities of directors of not-for-profits. Relevant to SNGs, he states that size does not matter regarding internal (fraud) controls:

Charitable organizations contribute substantially to our society. They educate our children, care for the sick, preserve our literature, art and music for us and future generations, house the homeless, protect the environment and much more. The boards and officers of those charitable organizations are responsible for managing and preserving the charitable assets that benefit all of usWhatever their mission or size, all organizations should have policies and procedures established so that (1) boards and officers understand their fiduciary responsibilities, (2) assets are managed properly and (3) the charitable purposes of the organization are carried out. A failure to meet these obligations is a breach of fiduciary duty and can result in financial and other liability for the board of directors and the officers. Effective internal controls will help to protect an organization's assets and assist in their proper management (Cuomo, 2005).

Another example of society's misjudgment of the harm, or cost, of fraud with resultant lack of appropriate controls exists concerning cursory (superficial) audits. Empirical evidence suggests that for the not-for-profit SNG anxiety regarding cost of implementing a control influences the decision whether to implement it. And the decision not to implement is also impacted by participant's perception of the philanthropic mission and personal relationship of all involved. For example, small churches in the author's state generally have a long-standing custom for audits to be performed by a related party, often with no audit fee. This has been viewed as satisfactory as a result of weighing the resources available, the impression that everyone can trust each other, and the potential for harm of fraud. Here again exists the potential unrecognized cost. These audits are relied upon by the entity's community as providing assurances, including assurance that fraud is not present. Unfortunately entities reassure donors with the information that a yearly audit is performed. Donors assume an adequate audit has been performed. Harm occurs when donors rely on a superficial audit conducted by a related party, obtaining a level of comfort that may not be appropriate.

These quick evening audits by a related individual are equivalent, in the author's opinion, to no audit at all. The State Board's new regulations constitute an essential improvement to the operations of not-for-profit SNGs. Regardless of size or resources, the Board requires the auditor to be independent with up-to-date knowledge and expertise. Thus this Board's new rules constitute a positive answer to the question of this paper, at least regarding audit regulations. It is important to determine whether other accounting regulatory bodies are currently designing similar stringent fraud controls for SNGs either in the form of audit or other fraud tools. Empirical evidence indicates this is not the case. As mentioned earlier, SOX was passed in 2002 and in the past few years SOX like regulations have begun to be designed for governments and not-for-profits. Perhaps there has not been time, or the recognition of a necessity, to get to address similar regulations for SNGs.

If regulatory bodies are found to be considering regulations for SNGs, then these bodies are in the vanguard. Society as represented by communities of SNGs seems not to be expressing that the harm of fraud dictates the need for new regulations regardless of available resources. For example, many stakeholders of SNG not-for-profits have expressed serious concerns regarding the costs of the audits discussed in the previous paragraphs. The new requirements heighten the apprehension that the cost of these audits will be too high, and therefore, unacceptable especially when compared to the anticipated maximum dollar loss of a fraud. For example, directors recognize that peer reviews are expensive and increase audit fees. Implementation of other fraud controls is weighed in the same manner.

The potential exists - due to the nature of a SNG not-for-profit - for directors to be so committed to the mission of the organization that they reject any costs deemed too expensive or “not really” necessary. This is heightened where directors misjudge the true, or total, cost” of fraud. A concern with cost of the required audits compared to the current balance in the checkbook encouraged managers of a local food bank to be tempted to “fly beneath” the radar. This perpetuates the problem of ease of embezzlement due to laxness in the accounting process.

The discipline of auditing provides another example relevant to the discussion of this paper. This exists in the dysfunction between society and accounting regulatory bodies regarding the purpose of an audit. Historically auditors did not believe their job included considering the existence of fraud. It is interesting that the public (society) historically relied on the impression that an audit gave assurance that a search for fraud was conducted and none found. Auditors themselves never had that impression; neither, again, did they consider or search for fraud. After Enron, the field of auditing has evolved to include the requirement to consider fraud. While newer auditing standards address the disconnect between society and auditors, the technical requirements for searching for fraud have yet to be defined by regulatory bodies. Although these regulations are for non-SNGs, this divide between the public’s impression and that of auditors is informative. As mentioned above, accounting rules for SNGs may be negatively impacted by society’s using economic cost, rather than total cost, when considering the harm of fraud in SNGs. Consideration as to whether the regulatory process regarding fraud in SNGs should be changed must include careful consideration of components and effects of societal judgments.

Misunderstandings about audits and inadequate audits can have consequences that are particular to, or heightened, in SNGs. A lack of appropriate audits for SNG not-for-profits was discussed above. Governmental SNGs are prevented from having cursory or non-existent audits by state and federal laws. However, the problem of dysfunction between the auditor and those relying on the audit exists in much the same manner discussed in the previous paragraph. This, however, this is magnified by the characteristics of SNGs, and may be appropriate to not-for-profit SNGs as well. It is unfortunately not unusual for members of the Board of Directors to have very little accounting or finance knowledge. In a government, the director’s election by fellow citizens is influenced by many factors; unfortunately, financial expertise is not often one. Yet, society believes that directors investigate and understand all the functions of the entity. The Attorney General of New York writing for the Charities Bureau gives a clear and definitive summary of the responsibilities of directors of not-for-profits. And, he opines, these duties are mandatory regardless of size. The financial functions are significant to all citizens and to viability. A community trusts that its elected representatives provide assurance that all is well within their government. In addition, the public expects that, like a not-for-profit, the focus and dedication of all involved is to a defined mission. Another assumption is the belief that everyone “knows,” and can therefore trust, everyone else. These assumptions can underlie the same lack of desire to institute proactive fraud measures that exist as discussed earlier in SNG not-for-profits.

Elected officials as directors may - with good faith - believe that the entity is protected from fraud due to a yearly audit; even where an inadequate audit function exists. Where a lack of knowledge is accompanied by lack of appropriate advice from those relied upon, the potential for fraud and harm increases proportionately. Another circumstance making fraud and potential harm more likely is that the nature of an SNG may encourage elected officials who are interested in aspects of the government other than operations. They may rationalize neglecting their duties by trusting that all involved are honest people who only act to further the communities’ interest. If directors’ responsibility to act as a control or assurance is abdicated by delegation of operational responsibilities to an administrator, a fraud control is violated. Too much power resides in one person, making deception more probable.

In an SNG it may be both tempting and easy for an elected official’s efforts to be directed not to the community’s benefit, but to personal interest and gain. As discussed above, our society seems to accept

fewer fraud controls for SNGs. This may have the consequence of creating ease for someone to be trusted who does not deserve that trust. This ease is available to all involved in the entity, not just the directors. There have been several reports in the author's state - within a relatively short time period - of fraudulent acts in local governments. Informed individuals expressed great disbelief and shock that this could happen in "their" government. As discussed earlier, these acts may occur more frequently due to lack of controls within a climate of trust. As in the soccer league fraud discussed above, fraud in a government has the potential for very personal, emotional harm to members of a community. The cost of this harm is currently unrecognized in the decision of when, or if, to implement fraud controls required of non-SNGs.

SUGGESTIONS FOR FUTURE RESEARCH

The questions posed in Table I are important to a determination of whether a significant, unrecognized cost of fraud exists in SNGs and whether this indicates the need for change in the creation of accounting regulations - fraud tools - for SNGs. Additional considerations include:

- What questions need to be asked to assess total harm and its impact on society?
- What measures should be used to determine a concept of total harm/cost?
- What scale should be used to determine when total harm is large enough to dictate that SNGs should implement the same fraud tools as non-SNGs?
- Should the cost benefit model be employed with total cost serving as the "cost" measure?
- What research methods need to be designed to serve as a foundation for accounting regulations for SNGs?
- What methods are necessary to design fraud controls that not only aid in detection but are also proactive?
- What should comprise those methods?
- Should this research be based on case analysis in recognition that fraudulent acts and society's response influence the weight given to regulatory decisions regarding accounting processes and principles?
- Would case analysis effectively address fraud that has occurred, fraud that may occur, related harm to innocent individuals, and societal expectations regarding accounting and its role?
- What other methods might be used?

CONCLUSION

The dedication of individuals to the betterment of others as expressed in small, community not-for-profits and in local governments is an important foundation of our way of life. This foundation is threatened by fraudulent acts. Unfortunately our society and our regulatory organizations may not recognize that the harm caused by fraud in these entities is significant to individuals and society. This may be evident when that harm is measured in a total cost concept. Total cost would include more than direct economic cost. For example, the cost of violation of trust would be measured and included. While this measurement would be difficult, it may be necessary as discussed in this paper. The result is that a concerted effort may be needed to investigate and address accounting and fraud prevention for these small organizations.

Hopefully, this paper assists in fostering recognition this investigation needs to consider whether: 1) fraud in these entities is as serious as in corporations for whom Sarbanes Oxley was created and those to which

it has been extended, 2) the characteristics of these entities result in types of harm that should be measured and included in a total cost perspective, 3) those harmed include individuals, the entity and our society; and 4) the regulatory process regarding accounting rule making may need to be changed with lesser emphasis given to society's judgment of the cost/benefit regarding fraud in SNGs.

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ALERTING PRINCIPLES OF ACCOUNTING STUDENTS ABOUT THE ECONOMIC IMPACT OF TRANSFER PRICING ALTERNATIVES

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ABSTRACT

The economic impact of transfer pricing alternatives can be significant. However, most principles of accounting textbooks contain no coverage of the topic and, those that do, have a very limited coverage that may or may not be part of the material covered during the semester. How then can another topic be squeezed into the already overcrowded array of material in the principles of accounting curriculum? Presented in this paper is a transfer pricing problem which should blend in well with topics currently covered and allow students to quickly become aware of the existence and impact of transfer prices on the business environment.

INTRODUCTION

The economic impact of transfer pricing alternatives can be significant. However, most principles of accounting courses contain no coverage of the topic and, those that do, have a very limited coverage that may or may not be part of the material covered during the semester. How then can another topic be squeezed into the already overcrowded array of material in the principles of accounting curriculum? Presented in this paper is a transfer pricing problem which should blend in well with topics currently covered and allow students to quickly become aware of the existence and impact of transfer prices on the business environment.

OVERVIEW OF TRANSFER PRICING

Transferring goods or services between two divisions of a diversified company is frequently encountered in the workplace. Determining the price at which the transfer should be recorded can prove problematic – with the ideal being the price that fosters goal congruence whereby what is best for each separate division is also what is best for the company as a whole. Consider the following situation:

Transprice, Inc. has two divisions, A and Z. Division A has 500 pounds of Kzon that it can sell to an outside customer for \$1 per pound. Incremental selling costs of \$.15 per pound will be incurred if the Kzon is sold to the outside customer. Alternately, the 500 pounds of Kzon could be transferred to Division Z for a yet unspecified transfer price. If transferred, the incremental selling costs of \$.15 per pound will be avoided and Division Z will add additional costs of \$200 to convert the 500 pounds of Kzon into 550 pounds of XK20 that can be sold for a total price of \$800. If the Kzon is not transferred from A to Z, the XK20 will not be produced.

TRANSFER PRICING QUESTIONS AND ANSWERS

1. Q: At a transfer price of \$650, will Division A favor selling to an outsider or transferring to Division Z?

A: Sell to outsider:

Revenue.....	\$500
- Expenses 500 (\$.15)....	75
Net Income.....	<u>\$425</u>

Sell to Division Z: \$650 = Better Choice

2. Q: At a transfer price of \$650, will Division Z favor having the Kzon transferred in from Division A?

A: Make into XK20:

Revenue.....\$800

- Expenses:

Kzon.....\$650

Additional..... 200 850

Net Loss.....(\$ 50) Due to the Net Loss, Division Z would not want the transfer.

3. Q: At a transfer price of \$650, will Transprice, Inc. favor the transfer? Why or why not?

A: Division A sell to outsider = \$425

Division A sell to Division Z = \$650

Division Z make into XK20 = (\$ 50)

Net Income from transfer = \$600 = Better Choice – Transprice would favor the transfer.

4. Q: At a transfer price of \$550, will Division A favor selling to an outsider or transferring to Division Z?

A: Sell to outsider:

Revenue.....\$500

- Expenses 500 (\$.15).... 75

Net Income.....\$425

Sell to Division Z: \$550 = Better Choice

5. Q: At a transfer price of \$550, will Division Z favor having the Kzon transferred in from Division A?

A: Make into XK20:

Revenue.....\$800

- Expenses:

Kzon.....\$550

Additional..... 200 750

Net Income.....\$ 50 Yes, due to the Net Income, Division Z would want the transfer.

6. Q: At a transfer price of \$550, will Transprice, Inc. favor the transfer? Why or why not?

A: Division A sell to outsider = \$425

Division A sell to Division Z = \$550

Division Z make into XK20 = \$ 50

Net income from transfer = \$600 = Better Choice – Transprice would favor the transfer.

7. Q: What is the acceptable range of transfer prices that will foster goal congruence within the corporation?

A: Division A: Transfer price must be greater than the sell to outsider alternative of \$425.

Division Z: Transfer price must be less than: Revenue of \$800
less additional expenses of 200
Must be less than..... \$600

So, Transfer Price Range = $\geq \$425$ to $< \$600$

Accordingly, the acceptable range of transfer prices that will foster goal congruence includes prices that are above \$425 and below \$600.

ANALYSIS OF THE PROBLEM

Goal congruence is found between \$425 and \$600. At any point on this continuum, Division A, Division Z and Transprice, Inc. all benefit. However, students need to be alerted to several problems. With large diversified companies and autonomous divisions, it is often difficult to isolate numbers like the ones used in the problem above in one upper-level management location in the company and still maintain division autonomy. Additionally, it is not unusual for a transfer from one division to another to present a situation where no market price is readily available. Even where a market price does exist, it is sometimes very difficult to accurately equalize the comparison of internal versus external market prices. For example, it is difficult to correctly weigh factors such as product quality, product delivery reliability, and product price stability. For example, if a transfer pricing situation exists and the company is at a point where it is considering a decision of whether to quit making internally and to start buying externally, it must weigh factors such as the quality of the external product, its delivery reliability and the economic supply-demand impact on the price if it stops making (reduces supply) and starts buying (increases demand) – putting a pressure on future external price increase possibilities.

SUMMARY AND CONCLUSIONS

With just a short problem similar to the one in this paper, which can even be included with other problems where net income is determined, students will be alerted to a very important situation that readily occurs in the workplace – determining transfer prices that will foster goal congruence between divisions in the same company. Alerting students to a variety of real-world workplace problems – even in the freshman and sophomore level courses – will not only make the material more interesting, it should also make it easier to learn since students will hopefully perceive an increase in the relevance of the information when it relates to real-world situations that students may encounter in their professional lives after graduation.

**AN ANALYSIS OF INVENTORY REDUCTION PROGRAMS:
THE ROLE OF TECHNOLOGY, INFRASTRUCTURE AND CULTURE AS CHANGE AGENTS**

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ABSTRACT

Most business writers, both scholarly and practitioner, endorse efforts to reduce inventory or, better yet, eliminate it altogether. Businesses are ambivalent on this topic. They certainly want enough inventory so that shortages do not occur, but not so much as to raise holding costs. Accountants call inventory an asset; practitioners call it a liability. Consumers want variety but then complain because the choices become overwhelming. Marketing clamors for more; accountants demand less; and production managers just want long runs of whatever they make. Resolution of these disparate positions requires a careful blending of technology implementation, infrastructure adjustment and culture change.

INTRODUCTION

This article is about an endangered species – inventory. Most business writers, both scholarly and practitioner, make calls to reduce inventory or, better yet, eliminate it altogether. Businesses are ambivalent on this topic. They certainly want enough inventory so shortages do not occur, but not so much to raise holding costs. Accountants call inventory an asset; practitioners call it a liability. Consumers want variety but then complain because the choices become overwhelming. Marketing clamors for more; accountants demand less; and production managers just want long runs of whatever they make. Everyone has an opinion; yet nobody has a universal solution to the many facets of inventory management.

Efforts to reduce or eliminate physical inventories focus on three areas. The first focus area is the use of conventional programs to reduce the inventories used in making finished products for sale to consumers. The second is the implementation of programs to reduce indirect materials or supplies. The third area, and perhaps most revolutionary, is the conversion of physical goods to electronic formats. We will provide examples for each of the three s, identify their benefits, pose obstacles to their implementation, and offer observations about the change agents needed to achieve inventory reductions.

We are particularly interested in exploring the roles of technology, infrastructure and culture as change agents in these programs.

PHYSICAL INVENTORY REDUCTION

A number of programs focus on reducing the amount of inventory necessary to sustain the flow of goods from the producer to the consumer. These programs do not necessarily change the form of the inventory but they do reduce it. Trade publications promote and scholarly journals analyze in these areas. Some of them reside under the umbrellas of well-known improvement programs such as Lean manufacturing, supply chain management, or Six Sigma. Table 1 contains examples of these types of inventory reduction programs.

Table 1. Direct Reduction to Inventories. Programs that Cause a Reduction in Product Inventories

Transformation	Benefits	Obstacles
MTS to ATO to MTO	Reduced inventories	Increased response times
Physical inventory to cycle count	Accurate inventories	Increased analysis
Accurate perpetual records	Accountability	System maintenance
QRS to ECR to CPFR	Reduced inventory variation	Building relationships
Trace materials flow	Accountability	System cost
Product design – DFM,DFD	Reduced component variety	Design time; coordination
Mass production to mass customization	Increased customer satisfaction	Designing system
One big to many small facilities	Increased customer service	Investment cost
Reverse logistics	Improved product design	Added process complexity
Real to virtual inventory	Reduced inventories	System complexity
Flexible capacity	Smaller lots	Changeover and setup times
Inspection to process control	Reduced defects	Process variability
Shipping containers	Reduced theft	Coordinated system
Standardization	Reduced components	Coordinated system
Quality – TQM or SS	Reduced excess inventory	Program implementation

The main advantage of these types of inventory reduction programs is the reduction in inventory carrying costs. Indirectly, a program designed to reduce defects will lead to improved quality. A program designed to reduce response times and its corresponding in-transit inventory will improve customer service by more closely matching the items available to the items demanded.

The obstacles are in the need to design and implement programs that can achieve the inventory reduction without sacrificing customer service. It takes initial investment costs, initiative and persistence to achieve success with the programs listed in Table 1.

NON-PRODUCT INVENTORY REDUCTION

While product-related inventories represent a large portion of inventory dollars and administrative effort, there is a multitude of non-product inventories. Often, these inventories are included in overhead expense categories such as indirect materials or supplies. As a result, they may not get the attention they deserve.

However, there are expense inventories that are being addressed more closely these days, such as fuels and packing materials. As with product inventories, the form of the inventory does not change; however, the amount of inventory does. Table 2 contains examples of these types of inventory reduction programs.

Table 2. Indirect Reduction – A Reduction in Indirect Materials or Supplies.

Transformation	Benefits	Obstacles
Trace vehicle performance	Reduced fuel consumption	Investment cost
Videoconferencing	Reduced fuel consumption	Gaining acceptance
Virtual reality – travel	Reduced fuel consumption	Gaining acceptance
Environmental control – facilities	Reduced power consumption	Investment cost
Shipping containers	Reduced packing materials	Integrated system
E-commerce, B2B, EDI, IOS	Reduced forms and paper	Initial setup and cost
Outsourcing food service	Reduced food, equipment	Loss of convenience
Outsourcing deliveries	Reduced trucks and fuel	Loss of convenience
Make right turns in driving	Reduced fuel consumption	Retraining drivers
Remote medical diagnosis	Reduced fuel consumption	Initial setup and training
Reverse logistics	Reduced packaging	System design

The advantages of indirect inventory reduction are reduced costs and, to an increasing degree, a reduction in environmental pollution. Reducing fuel consumption is not only good business sense but also beneficial for the environment. For example, reduced packaging requirements limit the need for more, and larger, landfills.

The disadvantages are the need to set up a system for a type of inventory that is not usually the focal point of a company. These expense items receive the attention that product inventories do.

FROM PHYSICAL TO ELECTRONIC

The most extreme form of inventory reduction is to reduce a physical, three-dimensional product to an electronic format. The primary application is in the inventory of information. This format reduces the amount of space required for storage – multiple books can be stored on a DVD or flash drive. It also reduces the risk of damage or theft, assuming the electronic storage is adequately handled. It reduces the cost and time of transporting the information. Table 3 contains examples of this type of inventory reduction. Chris Anderson in his book *The Long Tail* (2006) provides a number of examples of this movement.

Table 3. Direct Substitution – Progression from Large Physical to Small Physical to Electronic

Transformation	Benefits	Obstacles
Cash to checks to EFT	Cost savings	Consumer acceptance
Day-Timer to PDF	Portability	Marginal; setup effort
Books to electronic	Cost + The Long Tail	Requires new way to read
Letters to e-mail	Time	Depersonalization
Patient files to electronic files	Retrieval time	Front-end setup; privacy concerns
Product drawings to CAD files	Preparation and storage costs	Conversion of existing files
Cameras – film to electronic	Per shot cost	Investment cost
Clay models to simulations	Increased versatility	Reduced demonstrability
Actual to simulated testing	Cost; increased testing	Gaining acceptance
Training manuals to LCD display	Availability; quality	Front-end setup
Doctor’s office to patient’s neck	Availability; consistency	Front-end setup
Easels to flash drives	Appearance; convenience	Projector availability
Cart to catalog to store to web	Convenience	Investment; acceptability
Metal license plate to sticker	Per vehicle cost	System design
78s to downloads	Portability; cost	Intellectual property rights
US Postal Service to EDI	Cost; speed	Infrastructure
Long forms to e-tax returns	Convenience; accuracy	Consumer acceptance

The advantages of this type of transition are in reduced costs and added convenience. It is much easier to research a topic by using ProQuest than it was to go to the library and hunt through volumes of reference publications, some of which were not available, in physical format.

The disadvantages rest primarily in the initial design and implementation of the system to make the conversion. In addition, some users are reluctant to make the change. Do any of you still go to a doctor or dentist with a wall full of patient records?

TANGIBLE BENEFITS

We have pointed out that inventory reduction results in lower purchase costs and lower inventory carrying costs. Programs to reduce inventories, such as JIT or Lean manufacturing, carry with it the requirement that the processes must change to improve product quality.

In addition to reducing direct costs, inventory reduction usually carries with it a reduction in equipment and facilities requirements – less space and less capacity requirements.

INTANGIBLE BENEFITS

Programs to reduce inventories also provide intangible benefits. These benefits are not necessarily primary objectives; however, they often result as a by-product of the programs implemented to reduce inventories. We will describe several of these benefits below.

Improved Customer Service

Often, companies view reduced inventories as a trade-off with the level of customer service. They believe that reducing inventories will also reduce customer service levels. Another way to view this issue is to pose this scenario.

If we are going to be able to reduce inventories, we must know which inventories we really need and which are excess. If we learn this, we can reduce the excess inventories and retain those we really need. If we know which inventories we really need, we can make sure we have those inventories and thereby increase the level of customer service.

Taking this approach changes the situation to a win-win game, not a zero-sum game.

Improved Customer Retention

Better customer service usually improves customer retention. Some studies indicate that increased customer retention can provide increased earnings. The premise is that it is more profitable to try to retain customers than to continually seek new customers. This approach sometimes requires a change in attitudes within the organization along with the need for sales and marketing employees to be more analytical than in the past days of seeking out new prospects. While it may be more interesting and challenging to find new customers, cultivating the current customers makes more economic sense.

Increased Knowledge Transfer

Increased knowledge is at the heart of every program listed in Tables 1-3. Without it, none of the programs would actually achieve reduced inventories. With increased knowledge, it is often possible to identify additional improvement opportunities. Customers may respond favorably to suggestions about new books that relate to books they have already purchased, a sales strategy used by Amazon.com. Analyzing product returns often leads to a new kind of product or service that business might otherwise overlook.

Increased Awareness

Closely related to increased knowledge is increased awareness. While increased knowledge may be specific, increased awareness is more general. Being more aware of customer buying habits may not always lead to a new product but it may provide insights into what future generations will purchase. Forecasting the rate of innovation acceptance is still more of an intriguing art than a refined science.

Although businesses may not know exactly when a new growth period will arrive, the concept of increased awareness helps businesses prepare for that growth surge when it does transpire.

CHANGE AGENTS

What are the change agents of a successful inventory reduction program? In a broad sense, they include technology, infrastructure and culture. Each of these terms are vague and need further clarification.

Technology

The APICS Dictionary defines technologies as the terms, concepts, philosophies, hardware, software, and other attributes used in a field, industrial sector, or business function. (Blackstone and Cox, 2005, APICS Dictionary 11E). This definition is so broad that we will have to look further.

Bessant and Francis offer this observation on technology:

“Some technologies are ‘hard’, for example, cellular telephony, and railway signaling or electricity generation. However, ‘soft’ technologies also need to be transferred... There are significant debates about the meaning of the term ‘technology’. Some, who we describe as the ‘hardware school’, define technology as the construction and use of machines, systems or engineering. Others, the ‘socio-technologists’, take a broader view and consider technology to be meaningful only when it becomes a social fact.... we adopt a socio-technological viewpoint and, simply put, we see technology as ‘ways that people get complicated things done’”. (Bessant and Francis 2005: pg. 96)

While technology is ambiguous, it is essential for the success of improvement programs.

Infrastructure

The term infrastructure may be even vaguer than technology. It is often associated with roads, bridges, and other public programs. It is also used in the military to designate support organizations such as parts depots and replenishment supply chains. We will consider infrastructure to be the inanimate guidelines of how things should be done. It includes the mission of a company outlining goals and programs, the organizational structure, policies, procedures and plans. The infrastructure of a business provides the framework within which technology helps employees get things done.

Culture

Culture, or the belief systems inherent in the organization, is another vague, but important, ingredient of successful inventory reduction programs. It includes the human side of the business and the vision of the company that sets out a philosophical approach to running the business as contrasted to the mission that portrays the tangible objectives of the business. The culture also includes the image of the company as perceived by persons within the company and those outside the company, whether customers or other types of stakeholders. Corporate cultures are formed by the history of the company – how it has operated over its lifetime, by the management styles of key executives and, most importantly, by the employees and their collective way of acting.

ATTRIBUTES OF THE CHANGE AGENTS

The change agents of technology, infrastructure and culture can assume a number of different roles during the implementation of an inventory reduction program. Ideally, they will work together in a coordinated

fashion for best results. Their roles, which we introduce as representative, can include any of the following and often more than one during the lifetime of an inventory reduction program.

Barrier. In this role, the change agents act to block any additional progress in the program's implementation. The program may reach the point where improved technology is required before continuing – for example, the need for lower prices on RFID tags. Infrastructure can be a barrier if there is a need for an agreement on profit sharing between two entities. A union contract can also be a barrier if proposed changes in inventory reduction can have an impact on the job security of the existing employees.

Restrictor. In this role, the change agents “drag their feet” in the improvement program. The EDI system works but has intermittent problems. The organization structure retains its vertical orientation and slows the need for horizontal communications. The employees are not able to spend enough time on the new program, either because of other required duties or because of reluctance to “buy in” to the new program.

Participant. All of the change agents are moving along rather well. The reverse logistics process is working with only minor hitches that can be resolved on a day-to-day basis. The policies and procedures align sufficiently to avoid conflict among internal and external entities. The differences between the “way we have always done it” and “this is the new way” have been reconciled so that the employees are able to do their jobs without undue interference.

Enabler. In this role, the change agents participate in a “more than expected” manner. On the technology side, the sales and operations planning system is providing benefits to both the demand and supply sides of the business. The matrix organization structure is enabling employees to work on the program without leaving a major gap in their regular assignments. As an enabler, the employees are compensating for the deficiencies in the IT system or the organization structure.

Driver. In this role, a change agent is the leading force in moving the improvement program along, often in spite of other parties being in a restrictor or barrier role. The automated point-of-sale system offers so many benefits that it creates tremendous pressure on the infrastructure or the culture to “get with it.” When the infrastructure assumes this role, it means that the conditions have been arranged so that the technology (when it is done) and the culture (when they buy in) will move without interference. The culture can act as a driver when there is a consensus among the employees to “do it.”

PHASES IN INVENTORY REDUCTION PROGRAMS

Continuous improvement programs, such as an inventory reduction program, pass through several phases in its journey to success. For a more comprehensive discussion of program life cycles, see Abrahamson (1999) and Crandall and Crandall (2006). For this paper, we will consider those phases to be:

- Discovery
- Design
- Implementation
- Adaptation
- Assimilation
- Consolidation

Discovery. This phase marks the beginning stage of the inventory reduction program. It is the equivalent of the birth stage in the product life cycle. The discovery process can result from either of two situations. The company finds it “must” do something or fall into financial difficulties, or it “can” do something because of a new idea that they have discovered. In the first scenario, the company is aware that

inventory problems impact the bottom line. In the second scenario, an inventory reduction may look attractive because other successful companies are implementing it in their organizations. At any rate, the threat or opportunity ranks high enough in management to get their attention.

Design. Once there is a decision to do something, a task force takes on the job of designing the program. At this stage, they consider the available technology (high level of emphasis), the changes needed in the infrastructure (some consideration), and the possibilities of culture change (often only a brief look and a “we’ll get back to that”). Ironically, often the culture stage can make or break the success of a program. Firm resistance can cause programs to derail, even if there is some apparent good in the program implementation. Consequently, any program introduction should include a subsequent intervention in changing the culture of the organization. Often, it is a matter of reminding employees that change is necessary, even though it may be painful in the short-run.

Implementation. At this stage, the fanfare and expectations of the program may begin to wane as the reality of the hard work ahead settles into the minds of organizational members. Nonetheless, management should gear itself for this loss of enthusiasm, and expect it as a normal part of the change process. Changing the culture of the organization so that employees will be more future oriented is necessary.

Adaptation. In this phase, it may become necessary to make mid-course adaptations of the inventory reduction program to the specific needs of the organization. Such changes may not have been anticipated originally, but now, must be considered if the program is to succeed. Again, affected employees need to be reminded that such mid-course changes are a normal and necessary phase of the implementation process.

Assimilation. Most programs will have a finite life. At some point, the elements of the program that succeeded will be assimilated into the normal way of conducting business. When a program reaches this stage, most of the rough edges have been smoothed and everyone involved appreciates its benefits and limitations.

Consolidation. After the main elements of a program are assimilated into the normal operations of a business, there is a need for a period in which the company operates in a stable and effective way. However, such periods of equilibrium are usually only temporary. In fact, with all of the change that organizations must endure, the normal course of events is to see organizations move in and out of equilibrium. Some note that organizations seeking to operate at a comfortable equilibrium may actually be in danger of failing in the long run (Pascale, 1999; Singh & Singh, 2002). Ready or not, managers and employees must begin to prepare for the next new idea.

ALIGNMENT OF CHANGE AGENTS

Change agents can play several roles. Improvement programs go through several stages. What roles do change agents’ play during these program phases? This is at the heart of our research. At this point, we propose a possible scenario such as shown in Figure 1. We hope to validate, or refute, these propositions during our future research.

Proposition 1. Technology is the driver of most improvement programs. It initiates the idea, enables the program to be implemented, becomes a restrictor as the need for modified or improved technology becomes necessary, and finally becomes a participant at the end of the program’s life.

Proposition 2. Infrastructure is rarely a driver of change. It is somewhat of a restrictor in the early program stages, becomes a participant early and perhaps even an enabler when it gets ahead of the program needs, then settles back into a comfortable role as participant at the end of the program.

Proposition 3. The culture is usually a barrier, or at least a restrictor, in the early stages of an improvement program. People are the heart of a company’s culture and people resist change. Over time, the people can adapt, the culture can change and become a participant in the program. In fact, under good conditions, the culture may play a key role in assimilating the improvement program into the normal practices of the business.

Proposition 4. A continuous improvement program will have only limited success until all of the change agents are aligned as participants in the implementation process.

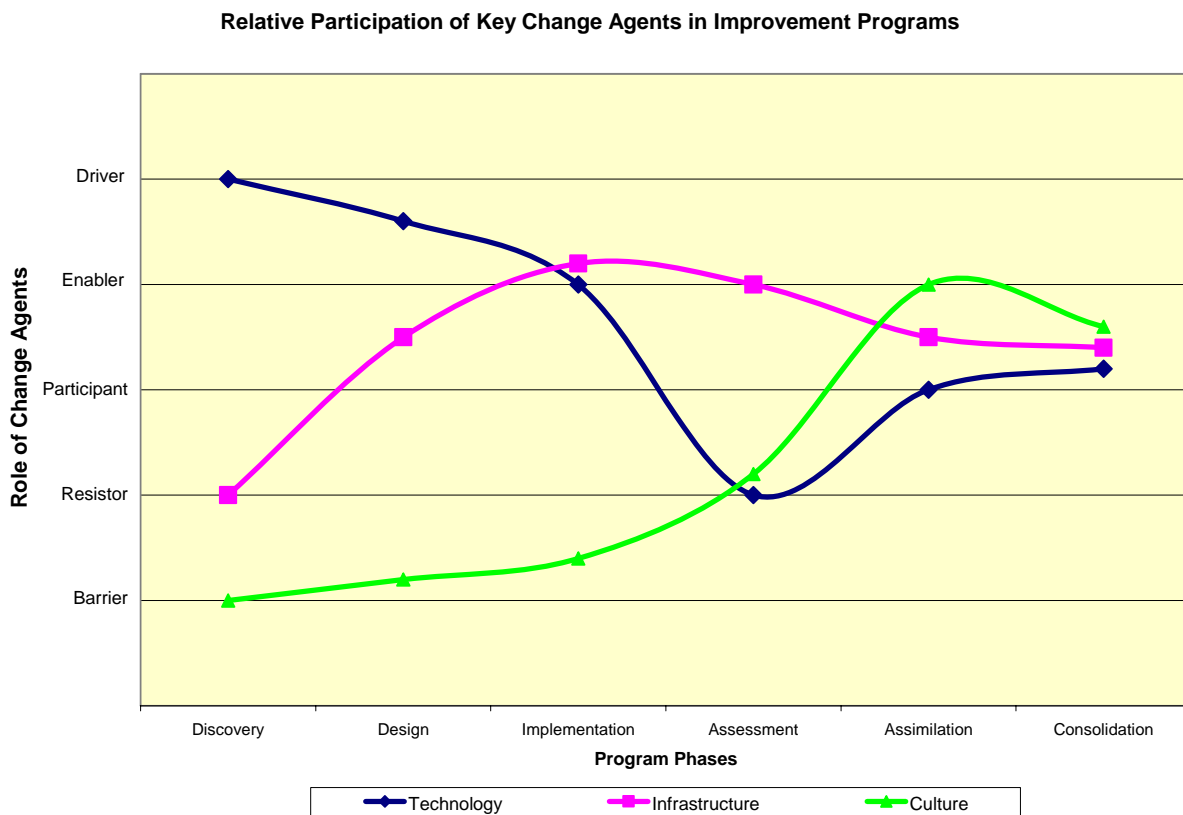


Figure 1. Alignment of Change Agents

CONCLUSION

Most companies find they need to have a successful inventory reduction program, either because they have to or because they are able to. For the program to achieve their objectives, the company must align their principal change agents of technology, infrastructure and culture.

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Motivating your students to take the CPA Exam

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**Proposed for presentation a the 43rd Annual Meeting of Southeastern Chapter of
INFORMS
Myrtle Beach, SC
October 4-5, 2007**

Abstract/Introduction

The point of this study is to give Accounting Professors a tool to motivate students to take the CPA exam. We calculate the present value of the superior earnings of certificate holders vs. non-certificate holders over the average career of an accounting professional. We calculated the superior earnings of certificate holders from two separate salary sources from the IMA and from Robert Half and Associates employment search firm. We calculate the present value of the superior earnings back to the date of certification. The present value of the CPA designation according to our estimates based on the IMA numbers is \$386,641 and according to our estimates based on Robert Half numbers it is \$340,500. Accounting professors should be able to motivate their students with these certification premiums.

Literature Review

Studies by the AICPA on the Demand and Supply of Accounting Majors has consistently found evidence that some of the primary reasons students pick Accounting as a profession is because of job security and high paying salaries. This generation appears to be fairly money motivated at least initially. By showing them the present value of passing the exam and then dividing that number by the standards number of hours most authorities suggest is needed to pass the exam we can show them what it is worth for every hour they are studying what their return on study time.

AICPA Supply and Demand for Accounting Students has surveyed literally thousands of accounting majors over many years. When it came to the question of why they decided to major in accounting two reasons have always topped the list, first job security and second good salaries. So it appears, at least initially, that accounting majors are very much motivated by financial rewards. Also the literature suggests that many students are working part-time jobs to help them support their living and educational expense. So there are great demands on this generation's time.

These pressures make them often have to decide between putting more study time in for delayed gratification versus more work time for immediate gratification. The immediate gratification is a strong influence on their decision making process. We have designed this study to take the delayed gratification from putting in the study hours needed to pass the CPA exam and bring it to an immediate gratification in the form of the present value of each hour they study for the exam.

We could not find any articles that specifically used the CPA salary premium to motivate students to take the CPA exam or more importantly to study to pass the exam. To the best of our knowledge we are the first to tie present value of the salary premium summed over a career to the hours it takes to pass the exam.

Methodology

This study was conducted by first gathering accounting professional salary information from both Strategic Finance's IMA 2005 Annual Survey article [1] and Robert Half International 2005 Annual Salary Guide [2]. The IMA survey collects salary survey information of accounting professionals in private accounting at various ages with and without certification. We used these average salary figures for our structural anchor points on which we built our estimated accounting professional's life time career earnings table both with and without certification. From these two columns of earnings we determined the certification premium and then discounted each year's premium back to the present value and summed this amount. This final sum represents the present value of the CPA certification on the very day that the accounting major passes from pupil to professional or perhaps more appropriately at least the initial stages of being a professional and certainly no longer just an accounting student. Of course to pass the exam they must first complete a rigorous study program of hundreds of hours. By dividing the total life time career CPA salary premium by the 400 hours of study we produce the present value of each hour of studying is worth. We calculated that the total life time CPA salary premium amounted to \$386,641 and dividing this by the 400 hours resulted in each hour that the student studies the CPA exam they are earning \$967 per hour in present value discounted at 5%. It is as if after each hour they study they have someone hand them a check for \$967. This should open there eyes and help keep themselves motivated.

In order to add some verifiability or reliability to our results we decided to also estimate the present value of CPA certification using a completely different source the Robert Half International's 2005 Annual Salary Guide. Robert Half's accounting salary numbers could be considered more reliable in that they reflect the actual starting salaries for the thousands accounting professionals which they place in corporations. Since their finder fee is based on the accounting professional's salary they are in a position to report more reliable numbers than the IMA Survey. In fact the US Bureau of Labor uses Robert Half's numbers for accounting salary numbers between censuses. The IMA survey has hundreds of self reported salaries numbers where Robert Half has thousands of arm's length two party negotiated salary numbers. Of course in addition the IMA survey's much smaller sample size it could also suffer from an upward self reporting bias. It seems reasonable to assume that individuals may tend to report salaries higher than they really are unless they are talking to the IRS.

Robert Half [RH] reports there salary numbers differently then the IMA Salary Survey. RH reports salaries by job title i.e., Entry Level, Senior, Manager, Assistant Controller, Controller, Vice President and CFO/Treasurer. They report each of these positions' salaries separately for small, medium and large firms. They do not report separate salary numbers for CPAs and non CPAs; however they do recommend adding up to a 10% premium for certification or graduate degrees. However, they state that it is assumed that Controller, Vice President and CFO/Treasurer positions all have a certification and/or graduate degree. We used these average salary figures for our structural anchor points on which we built our estimated accounting professional's year-by-year life time career earnings table both with and without certification. We had to estimate the average age at each job title and impute the salary levels between promotions.

Then we calculated the certification premium as 10% of these salary levels up to just before an Assistant Controller becomes a Controller.

Up to the Controllershship level i.e., Entry level, Senior, Manager, and Assistant Controller, the certification premium is just the additional amount of salary companies pay for certification. In other words it is an added bonus a very nice thing to have on the resume. However, from the Controllershship position and beyond i.e., VP of Finance and CFO, the premium becomes a penalty for not having it. Meaning that non certified accountants are in effect are facing a certification ceiling in their careers. They will not be able to advance beyond Assistant Controllershship salary levels. Now for this stage of their career the penalty for not having been certified is calculated by the difference between the top Assistant Controllershship salary and respectively salary levels of Controllershship, Vice President of Finance and CFO/Treasurer across the appropriate life time career years. We calculated that the total life time CPA salary premium average across large firms and medium size firms and that average amounted to \$340,500 and dividing this by the 400 hours resulted in each hour that the student studies the CPA exam they are earning \$851 per hour in present value. It is as if after each hour they study they have someone hand them a check for \$851. This should really open there eyes and help keep themselves motivated.

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Faculty Perspectives: A Comparison of Distance Education and Face-to-Face Courses

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ABSTRACT

With the increasing demand for distance education and the need for faculty to embrace this as a viable teaching tool, faculty perceptions and expectations for distance education as compared with traditional face-to-face courses is an important issue. The current study asked faculty to make comparisons of the two teaching mediums across numerous dimensions.

Introduction

Distance learning is a broad term that encompasses both distance education (a term commonly used in academia) and distance training (a term commonly used in industry). The current paper examines faculty perceptions of distance education as defined by Bordeau and Bates (1997); education that is computer based, remote, or asynchronous and supported by some instructional system.

The pros and cons of distance education are frequently debated at all levels of academia (Celsi and Wolfinbarger, 2001; Bryant, Kahle and Schafer, 2005). As educators we are greatly concerned with the degree to which our current educational practices prepare students to thrive in our ever-changing technological society. While there appears to be little consensus of judgment, most faculty agree that distance education is becoming more important as it provides an opportunity to service more students beyond a geographical location and to make improvements in operational efficiency and student service (Perreault, Waldman, Alexander and Zhao, 2002; Martins and Kellermans, 2004). This influx of students is typically seen as encouraging, because although additional demands are placed on the technological systems of the organization (computing networks, new hardware and software, etc.), there is not a corresponding demand for increased physical space associated with onsite students.

Despite the positives, distance education is not without its skeptics. With the explosion of distance education programs in business schools, issues related to maintaining accreditation standards now permeate curriculum discussions. In fact, current American Association of Collegiate Schools of Business accreditation standards state that "An institution that uses a variety of educational delivery systems at various locations must demonstrate comparable quality of its educational programs for all students. An institution must meet accreditation standards at all the various locations at which the included degree programs are delivered, or in the case of distance learning, standards must be met in all delivery modes" (AACSB, 2005). Faculty has also expressed concerns related to distance education, particularly the technological problems associated with course delivery (Perreault et al., 2002; Crow, Cheek and Hartman, 2003). While challenges still exist, colleges and universities are facing increasing pressure from both internal

and external stakeholders – including accrediting agencies, public agencies, and private organizations, to incorporate more technology into their curriculum (Driver, 2002).

Distance education is not only challenging for many students; it also presents challenges for instructors to create a well-designed virtual learning environment (Kearsley, 2002). Shea, Motiwalla and Lewis (2001) found that most professors sampled from 68 higher education institutions relied primarily on asynchronous tools for their distance education courses; only 63% used live chat, 32% used streaming audio, and 28% used streaming video. The lack of personalized communication has been previously documented as an obstacle in the distance education learning environment (Perreault et al., 2002).

Various recommendations in course design and administration have been offered to overcome potential obstacles, including the perceived lack of personalized communication. Berger (1999) suggests that distance education professors set up online office hours and incorporate live chat sessions into their virtual classes. Similarly, Perreault et al. (2002) recommend that professors strive to create distance education courses that promote interaction and collaboration via providing multiple means for communicating, including e-mail, discussion boards, online office hours and flexible telephone access. Further supporting these findings, Arbaugh and Benbunan-Fich (2006) report that separate from epistemological considerations, collaborative approaches to online course work result in better outcomes and higher levels of medium satisfaction. Riley and Gallo (2000) stressed the importance of incorporating all aspects of course design into a distance education environment. This includes providing the appropriate curriculum and teaching tools, as well as support, interaction, and selection of the best mix of technology tools. Daily (2000) equates the move to teaching a distance education course to the professor moving from an expert lecturer to more of a coach and mentor.

The Current Study

With the increasing demand for distance education and the need for faculty to embrace this as a viable teaching tool, faculty perceptions and expectations for distance education as compared with traditional face-to-face courses is an important issue. The current study reports faculty comparisons of the two teaching mediums across numerous dimensions.

METHODS

Research Setting, Participants, and Procedures

As part of an on-going, multi-phase research endeavor examining distance learning, faculty associated with both a College of Business and a College of Education from a large regional university were asked to complete an anonymous survey regarding their perceptions of distance education. The response rate for the survey was 47%; 109 completed surveys (52% male, 45% female, and 3% undisclosed) were received from the 235 faculty that were invited to participate. The average age of faculty participants was 48 years old, with an average of 12.3 years teaching at the university level and an average of 2.1 years teaching online. Seventy-seven percent of respondents held a PhD/EdD/MD or other terminal degree and 23% had a MA/MS/MBA or other Masters level degree. With regard to academic rank, 22% of respondents were lecturers,

33% were assistant professors, 19% were associate professors, 19% were full professors, and 6% reported some other status or rank. Approximately 71% of participants teach undergraduate courses face-to-face, 28% of participants reported teaching undergraduate courses online, 49% teach graduate courses face-to-face, and 40% teach graduate courses online.

Survey Instrument

The survey instrument used for the current study was comprised of questions used in previous research on technology acceptance (Davis, 1989), distance education (Christensen, Anakwe and Kessler, 2001; Martins & Kellermanns, 2004), and other questions specific to the researchers' interests.

RESULTS & DISCUSSION

Table 1 and Table 2 both depict the responses of faculty with regard to comparisons between traditional face-to-face courses and distance education courses.

An examination of reported faculty perceptions indicates that faculty believes there are numerous differences between distance education and traditional face-to-face courses; although some things are thought to be quite comparable. For example, distance education courses were perceived to provide more flexibility for students, better cost efficiency, and even improved student-centered learning than do face-to-face courses. Likewise, faculty reported that at least comparable resources – training, technological, and clerical, were available for distance education courses as for face to face teaching. Additionally, faculty felt that distance education provided greater opportunity to try new, innovative teaching techniques. However, faculty still felt that online courses provided less structure and likely included less professor-to-student interaction than does the traditional classroom setting. In addition to this, faculty reported that distance education courses are more time consuming in several ways – time spent grading, responding to student email, talking to students on the phone, and in overall course administration. Encouragingly, student motivation, performance, and learning were all perceived as being comparable across the two teaching media.

Christensen et al. (2001) argue that online education is becoming more suitable for traditional learners as professors integrate more technological features into their virtual classrooms. As distance education courses become more sophisticated, they have greater success at “mimicking” the traditional classroom (Christensen et al., p. 276). The current study, while obviously a preliminary examination of faculty perceptions, indicates that distance education courses are also beginning to be seen by faculty as more and more like traditional face-to-face courses on several dimensions. As we continue to increase our understanding of faculty perceptions we will be better equipped to provide the support and resources necessary to allow faculty to best serve their diverse student populations by delivering the best possible courses.

Table 1. Compared with traditional face-to-face courses, how do distance education courses compare with regard to:

	Less than F2F	Comparable to F2F	More than F2F	Uncertain	Total Response
Student to professor interaction	56% (61)	26% (28)	6% (7)	12% (13)	109
Amount of course structure	47% (51)	28% (30)	17% (18)	9% (10)	109
Flexibility for students	5% (5)	37% (40)	49% (53)	10% (11)	109
Cost efficiency for students	5% (5)	19% (21)	68% (74)	8% (9)	109
Student-centered learning	3% (3)	16% (17)	62% (68)	19% (21)	109
Student performance (grades)	13% (14)	42% (46)	25% (27)	20% (22)	109
Student learning (synthesis and integration)	11% (12)	61% (66)	6% (6)	23% (25)	109
Student motivation	28% (30)	49% (53)	4% (4)	20% (22)	109

Table 2. When compared to traditional face-to-face courses, what are your expectations for distance education with regard to:

	Less than F2F	Comparable to F2F	More than F2F	Uncertain	Total Response
Flexibility for professors opportunities to try innovative teaching techniques	18% (20)	18% (20)	59% (64)	5% (5)	109
Time spent developing/prepping the course	14% (15)	45% (49)	30% (33)	11% (12)	109
Time spent administering a course	1% (1)	23% (25)	70% (76)	6% (7)	109
Time spent grading student assignments	6% (6)	20% (22)	68% (74)	6% (7)	109
Time spent interacting with students via email	8% (9)	41% (45)	44% (48)	6% (7)	109
Time spent interacting with students via phone	3% (3)	11% (12)	83% (90)	4% (4)	109
Time spent interacting with students in general	9% (10)	39% (42)	35% (38)	17% (19)	109
Training resources available from the institution	20% (22)	37% (40)	35% (38)	8% (9)	109
Financial resources available from the institution	4% (4)	39% (43)	39% (42)	18% (20)	109
Technology resources available from the institution	2% (2)	30% (33)	43% (47)	25% (27)	109
Hands on support from the institution (graduate assistants, clerical support, etc)	1% (1)	37% (40)	48% (52)	15% (16)	109

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FOSTERING STUDENT INTEREST IN PROJECT MANAGEMENT BY USE OF PERSONAL GOAL SETTING

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ABSTRACT

Project management is an important topic that is taught in various disciplines such as engineering and construction [2], new product development [1], and software development [3]. Students' understanding of the material is often limited to the image of the Gantt chart and some basic concepts that do not transcend to the "real" world upon graduation and is the concern that provides the motivation for this exercise. Specifically, this exercise is intended to illustrate the practice of project management through the use of an issue with broader appeal to the student than the text book focus on construction or information technology project management.

BACKGROUND

Generating interest in any course can be challenging and especially so in a required course that most students perceive as offering little potential of use in their future. What is required is a means of generating student interest in that course or a demonstrated application that is presented in such a manner that the student recognizes usefulness in the topic or a potential solution to a problem they are aware of. This idea has been referred to as a "hook" in past teaching workshops as a way of promoting interest in the topic itself.

Project management (PM) in the business curriculum is often seen as a methodology or tool set of skills more appropriate for the engineering field and more recently that of software design and coding. Not only do management majors express doubt in future application of the concepts presented in the course, but marketing majors have enrolled in the course and dropped the course as having no application to their field. Attempts to explain that new product development and advertising campaigns were marketing applications failed to sway the students. Asking the preverbal "average" student to accept on faith the usefulness of learning has produced poor results since its first attempt. Where the non-traditional or the exceptional student is more inclined to learn for the knowledge gained through that learning, hooking the average student is more elusive. Most college students are aware of the concepts of personal goals. The use of and advantages of applying personal goals are promoted by acclaimed athletes, industry leaders, and the self made millionaires. What is often missing from the lectures, mass media print of such as Tim Robbins, or Peter Drucker is the how of converting that goal into the required steps of going from the now to the desired. Prior studies by the private sector and government have documented that most seniors will retire and rely solely on social security for retirement support. The need for retirement planning is well documented, but also well documented is the fact that the majority of people do not know how to identify the individual tasks required to transition from that vague concept of a goal to the specific individual tasks and how to monitor the progress.

Proposal

Prior efforts to generate interest in project management concepts through the use of familiar endeavors such as building a house, planning a wedding, or landscaping the yard have had limited success. Students often profess lack of content knowledge or that the topic is not related to their major. Students repeatedly score the project management course as one of limited usefulness in their future or not very relevant to their major. If students can not be motivated to acquire the basic skill concepts of project management for their professional lives, would an active learning application in an area of interest to the individual student generate more critical mass? Students appear to have difficulty grasping the concepts of project management in the beginning of the course and lose interest in the subject matter before the practical application portion of the class begins. This proposal is one to address this issue by introducing a practical portion before the theory presentation and to utilize the familiar topic area of goal planning. This follows the practice of using the familiar to introduce the complex or unfamiliar. As most people have trouble in just identifying goals instead of wishes, an exercise in decomposing the goals into actionable task this exercise will introduce students to a practical application of project management and assist them in later efforts of goal setting and attainment. Decomposing the tasks required to achieve their goal is similar to breaking the project down into the work breakdown structure.

Using the project management format offers advantages in goal identification. It offers a tested structured method of identifying all of the required activities, it includes a time component, and all required resources to complete the project. Most people state a goal but do not identify the required steps to transition from their current position to that of the goal. Further more, most people fail to identify any additional skills or attributes of self improvement their deficient in. The PM structured method requires that these issues are addressed.

Achieving some goals may require only one or two actions. Others may require several intermediate mini-goals before the primary goal is realized. As an example, you are a production manager and would like to move up to the manufacturing manager level. A review of those in manufacturing manager positions would reveille what qualifications are common among that group. Which qualifications are you deficient in? What action is required to address that deficiency? Is it a one step action or are several steps required to address that single deficiency? How long will this additive process require? What resources will be required to assist your effort? What obstacles are you likely to encounter and what resources would assist you past these obstacles? Once these actions are identified, most PM software programs will generate a time scale for each step of the process. Updates and revisions can easily be performed. Because of the time scale presentation of the goal's individual activities, monitoring can be easily performed. An added advantage of utilizing PM software is that most people are visually oriented and the visual presentation of the individual activities makes the monitoring and revision sequence much easier to understand.

Anticipated Results

After the students identify and develop their individual goal requirement, it is anticipated that the students will be able to understand the theory and text material presented in the course. Further, it is expected that the students will be equipped to utilize PM concepts in their business careers as well as personal development. This should be reflected by an increase in student evaluation scores for the project management course.

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**ACERS (Accounting Certification Exam Remuneration System):
Using Securitization to Solve a Persistent
Business Education Funding Problem**

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ABSTRACT

While student loans are available to support the accounting student while enrolled in an accounting degree program, there exists no formal system of financial support for the accounting graduate during a post-graduation period of intensive certification exam preparation. Current practice usually entails recent accounting graduates taking employment, and then, usually with the blessing of the employer, studying after-hours for the certification exam. Naturally, this arrangement would be expected to reduce the probability of the candidate passing the exam and extend the time required to pass all components of the exam relative to full-time study

Loan Securitization is the process whereby loans with similar characteristics are pooled and then used to back more easily traded securities. The advantage of this approach is the transformation of relatively illiquid claims into a format which can be traded in the more liquid capital markets. Thus, securitization is essentially a method of facilitating the interaction between providers and users of capital. Loan securitization has been used in many different settings. This paper proposes the use of loan securitization as an approach to channeling funds to graduates in transition who are attempting to pass professional certification exams.

THE PROBLEM: INTENSIVE PREPARATION FOR CERTIFICATION EXAMS

Students training for careers as professional accountants face an awkward period of transition at the time of graduation. While a successful career in accounting may hinge on successful completion of a professional certification such as the CPA or CMA, the typical recent graduate who takes full time employment reduces the probability of quickly passing the associated examinations in doing so. Even when the recent graduate's employer is supportive of the students efforts to prepare for the professional certification exams, the demands and pressures of the workplace significantly impact the individual's ability to effectively prepare.

It is generally held that a recent accounting graduate is most likely to successfully complete the professional certification exams if he or she is able to engage in an intensive review and study period immediately after completing the formal degree program. At that point in time, the graduates knowledge gained in the accounting program is at its peak. In an ideal world, an accounting graduate would begin a the period the period of intensive examination preparation immediately after graduation and would dedicate his or her efforts entirely for the one to three month period which traditionally might have been expected for effective preparation.

The recent transition of the CPA exam to the new computerized format has given greater flexibility to those preparing. Now that a student can take one section of the exam at a time (with up to 18 months to complete after one passed section), it would be expected that it would be easier to find study time during full-time work. However, according to the AICPA, even though the number of accounting graduates has increased in recent years, the number of individuals taking the CPA has declined significantly [Metzer]. Further, it

appears that the number of CPA exam takers declined in year of introduction of the new computerized exam [Edmonds]. The results of a recent study conducted by a joint task force of the American Institute of CPAs, the National Association of State Boards of Accountancy, and Prometrics suggest that the primary reason for candidates not taking the exam is that they do not have enough time to prepare [Edmonds]. Further, the study indicates that although accounting employers believe that they offer support for candidates, the employees themselves feel that they are not given enough time to prepare. The same study suggests that candidates also do not feel a particular sense of urgency with respect to the passing of the exam.

One alternative to the current situation would be to develop a system whereby promising candidates could transition from full time study in the undergraduate program to a period of full-time intensive exam preparation. Unfortunately, traditional student loans require the student to be an active enrolled student for the provision of additional funds. Consequently, even though repayment of existing loans might not be required immediately, there is strong pressure for students to take employment just after graduation to cover expenses. If a special form of short-term funding were available to support appropriately selected candidates, then most likely, more candidates would move more rapidly through the certification exam process.

The problem with this type of loan is that such loans would tend to be for short duration and relatively small amounts relative to other study related financing. Thus, it would be expected that the emergence of such financing would require some type of special inducement (such as government guarantees) or some specific sponsorship as catalyst (such as an industry group initiative). However, if such loans could be pooled and securitized, the result might well be to gain the attention and participation of the larger capital markets.

LOAN SECURITIZATION

Securitization in the most general sense is the transformation of a financial relationship into a financial transaction [Fabozzi & Kothari]. Securitization depends on a claim to a set of future cash flows. If one has rights to a set of future cash flows, one can sell those rights. If the right characteristics are present, the cash flows can be associated with a security which can have significantly different market presence than the relationship which gave rise to the cash flows. While any set of future cash flows might be securitized, market participants are at present most likely familiar with loan securitization.

Loan Securitization is most frequently used when the financing arrangements involve relatively small increments of debt which are created in individual transactions. For securitization to work, the individual debt transactions must be basically similar. At present, securitization is widely used in the repackaging for the larger capital markets of various types of consumer level loans. Securities based on this pooled loan concept currently exist for automobile loans, housing loans, and student loans.

Loan securitization can be seen as freeing financial institutions from the traditional funding role they played in the past. The other roles of financial institutions such as monitoring may persist in the presence of securitization of loans. [Scott].

The key to securitization is that the individual claims be similar enough to serve as rough substitutes for each other. Thus, the pool of claims upon which the security is based is simply a portfolio of similar, though not necessarily identical, financial instruments. For best results, the underlying claims must be well documented with estimable default and pre-payment rates. Aside from these basic requirement, essentially any type of loan could be used in the process.

The specific characteristics necessary for loans to be appropriate for securitization are generally agreed upon. First, there must be a considerable degree of standardization in the loan product [Scott]. Second, the cash flows associated with the loans must be clearly defined or readily estimable. Third, the loans should have

relatively low risk. Frequently, lower risk loans are associated with assets which readily serve as collateral [Scott]. However, low risk need not necessarily be associated with collateral.

SECURITIZATION OF FUTURE INDIVIDUAL EARNINGS STREAMS

In recent years securitization has broadened to include star athletes and musicians. Indeed, plans are currently underway to introduce a formal market for securities based on the future earnings of professional athletes [Lewis]. In the case of the proposed *ASA Sports Exchange*, the securitized cash flows would be 20% of all future sports related earnings. Similar concepts are loose in the European marketplace with at least one hedge fund which runs a portfolio of soccer players. Such approaches have been referred to as the “intellectualization” of pro sports, in which valuations (and salaries) are moving away from the gut estimates of insiders to more formal statistical valuation approaches [Lewis].

Rock star David Bowie famously securitized his future royalties earnings. However, securitization of intellectual property has not advanced as quickly as was originally anticipated [Walsh]. This may be due in large part to the difficulty of estimating the size and pattern of the associated cash flows.

The limitations to growth in the securitization of future individual earnings cash flow streams appears to arise from the difficulty or ease of estimating the future cash flows. Presumably, if the earnings stream of an individual were readily estimable, securitization of that stream would be relatively straightforward.

EARNINGS PATTERNS IN PROFESSIONAL ACCOUNTANTS

Considerable data is available on expected salaries of certified accounting professionals. Data is also available which demonstrates the salary premium derived from successful completion of professional certification in the accounting field.

Using the 2007 Robert Half and Accountemps Salary Guide data, the authors compared the reported lifetime earnings of accounting professionals with and without professional certification in small, medium, and large accounting firms. Assuming a reasonable discount rate for present value calculations, the implied differences are significant. Certification clearly provides a differential future earnings stream. This differential itself could provide the basis for a securitization.

	Small Firms	Medium Firms	Large firms
PV of Earnings Differential	\$165,124	\$296,001	\$550,823
Assumed Exam Study Hours	400	400	400
Implied PV of Compensation per Study Hour	\$413	\$740	\$1,377

OUTLINE FOR THE CREATION OF ACERS

The authors propose the creation of a system whereby select accounting graduates are offered funding for a period of intensive certification exam preparation just following graduation. These funding arrangements would be relatively short-term. Because of the qualification of the borrowers, their future earnings streams can be easily and accurately estimated. Thus a pool of such loans fulfills the requirements for securitization. That is, the three major characteristics necessary for securitization are present.

In this particular instance, one might most reasonable expect successful introduction of standardized short-term professional exam study loans which then in turn could be pooled. Direct securitization of the accountants' earnings streams for this purpose would most likely await main streaming of the private salary securitization concept. In either case, it is likely that some mechanism (either governmental or industry based) would be required to both introduce and oversee the loan program. With appropriate planning, securitization could follow.

CONCLUSIONS

This paper has discussed the potential use of securitization in solving the educational funding issue implied by current practices in recent graduate preparation for professional certification examinations in accounting. In the authors assessment, the characteristics of the individuals involved make future earning streams and certification premiums reasonably estimable. Both direct securitization of future earnings stream premiums and securitization of loans secured by future earnings are discussed. Further development of the conceptualization is left for future research.

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**“ARE THEY REALLY READY TO WORK?”
RECOMMENDATIONS TO EDUCATIONAL INSTITUTIONS
IN RESPONSE TO THIS REPORT ON GRADUATE PREPAREDNESS**

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“Content-driven curriculum and lecture-oriented instruction, at best,
turn out technically competent individuals who nevertheless often lack
vital skills that industry clearly prizes.”

(BATEC Information Technology Workforce Skills Study, p. 37)

There is significant concern with the preparedness of today’s job candidates. To remain globally competitive, U.S. employers are seeking candidates with a skill set more appropriate to meet the demands of the 21st century. While numerous surveys and reports have highlighted the shortcomings of job applicants and the frustrations of employers, this paper will focus primarily on the findings of the report “Are They Really Ready to Work?”

The study was conducted by four organizations: The Conference Board, The Society for Human Resource Management, the Partnership for 21st Century Skills, and Corporate Voices for Working Families. New workplace entrants were categorized as recent high school graduates, graduates from two-year colleges (including technical schools), and graduates of four-year colleges. For the purpose of this paper, the findings of the four-year college graduates are being primarily addressed.

With nearly 60 percent of survey respondents indicating that they expected to hire more four-year college graduates over the next five years, it is certainly time to better prepare those graduates. Changes can be made now to better prepare the nation’s current college students for the workplace.

The overarching theme of the survey is the overwhelming significance of applied skills (as opposed to basic skills). Applied skills include the following:

- “critical thinking/problem solving
- oral communications
- written communications
- teamwork/collaboration
- diversity
- information technology application
- leadership
- creativity/innovation
- lifelong learning/self direction
- professionalism/work ethic
- ethics/social responsibility” (Casner-Lotto, p.9)

As defined by the study, the basic skills include the following:

- “English language (spoken)
- reading comprehension (in English)

writing in English (grammar, spelling, etc.)
mathematics
science
government/economics
humanities/arts
foreign languages
history/geography” (Casner-Lotto, p.9)

According to the 400 employers surveyed, the bottom line is that the workforce is not prepared for work in the 21st century. “The business community, as represented in part by this research consortium, is speaking with one voice, calling for higher standards of workforce excellence consistent with the demands of the 21st century.” (Casner-Lotto p.12)

The top five applied skills reported are as follows: oral communications (95.4%), teamwork (94.4%), professionalism (93.8%), written communications (93.1%) and critical thinking (92.1%). All of these are certainly teachable skills that can be integrated across the curriculum of academic programs. They also reflect skills that are valued across all industries and job vocations.

A Common Theme Across Reports

The Boston Area Advanced Technological Education Connections Information Technology Workforce Skills Study found that when employers were asked about the deficiencies of job applicants, technical skills were missing from the list. The “Millennial” generation (those born after 1982) grew up with cell phones and PCs. They communicate with e-mail and instant messaging rather than through conversation. Fifty-six percent prefer the Internet to the telephone. (Carew) It is understandable then, that employers nationwide reported overwhelmingly the need to see more preparation in the areas of communication, problem solving, teamwork, self motivation/management, and an understanding of the context or the “big picture”. All of these skills (which are directly communication based) have been considered soft skills. Cutting across all industries and all sizes of business, these now have been the focus of the preparation of the future workforce. “...Soft skills have outstripped intellect and technical prowess as the primary competence for successful business leadership.” (Goldberg, p. 7)

Robinson (2000) suggests that “job readiness skills are clustered into three skill sets: basic academic skills, higher order thinking skills, [and] personal qualities.” (p.1) The good news is that employability skills are teachable. The bad news is that they are not being taught to the extent necessary to adequately prepare the nation’s future workforce.

While communication skills continue to be cited as one of the most critical for job applicants, the 2005 National Assessment of Adult Literacy reported on the decreasing literacy levels among college graduates. “Most jobs don’t call for deep academic background. Employers, for the most part, are looking for people who are readily trainable and can work with others. Good language skills are of the greatest importance in that respect, but many graduates entering the workforce are weak there.” (Leef, p.NA)

According to a 2005 American Sociological Association (ASA) survey, only 40 percent of recent sociology college graduates agreed that their program provided them an opportunity to practice the soft skills. “These soft skills included working in groups, getting involved in volunteer activities, participating in service learning programs, and interacting with their fellow majors.” (Erskine, p.NA) Relational skills development was highlighted as a deficiency. This report

concluded that there is a definite disconnect between the skills taught and the skills required in the vocation to meet the realities of the workplace.

In preparation for the workplace, education has an obligation to provide opportunities for students to practice their job readiness skills. To do so will require that educators re-think some of their approaches to teaching. The BATEC study (2006) provides a critical warning to education stating that “You can’t prepare the 21st Century workforce with 20th century content in 19th century classrooms.” (p.7) One recommendation is to use “more holistic methods of teaching – methods that transcend content delivery and that involve students in complex problems developed from industry input.” (BATEC Information Technology Workforce Skills Study, p. 7) It is simply not enough to prepare graduates with the technical skills of their major field of study. The soft skills have been deemed the “hard stuff” repeatedly by business and industry.

Responses at One College

According to the report, “Are They Really Ready to Work?”, college graduates are still deficient in writing. The recommendation is that more colleges integrate writing across the curriculum. Several years ago, in response to the concern with weak communication skills voiced in general national surveys, the English curriculum at Goldey-Beacom College was revised to address two specific areas: writing and speaking. Two semester-long courses were developed for writing and argumentation/debate. In the writing course, an emphasis was placed on the writing of business documents (including a resume and a research paper in the student’s major field of study). An expert reader in the student’s major oversees this process addressing the quality of the research paper’s content. A rubric was also developed whereby consistency was achieved across different departments.

Professors across the curriculum were encouraged to assign more writing assignments. Case studies and research papers are utilized extensively in several of the business courses. Some of the classes have introduced formal debates on controversial topics to further strengthen student verbal communication skills. Generally, class presentations are required for most projects. Group “reporting out” is used extensively in many courses to provide informal public speaking opportunities for students.

Guest speakers from business and industry are invited to the classroom to address the importance of the soft skills and the “real world” issues surrounding employability skills. Workshops outside of class are also conducted. An annual “*How to Wine, Dine, and Act Fine*” program is sponsored by the student chapter of the Society of Human Resource Management (SHRM), the Delaware professional chapter of SHRM, and the Career Services Department of the college.

According to the report, “Are They Really Ready to Work?”, creativity and innovation are expected to increase in importance in the workplace. Unfortunately, the report found that only 21.5 percent of survey respondents identified four-year college graduates as excellent in this skill category. Goldey-Beacom College developed a course entitled “Creative Problem Solving in Business”. This course was delivered in a creative one-week format and team taught. While stressing the importance of developing creative problem solving skills (as opposed to only rational decision making skills), the course used creative delivery (primarily delivered through experiential exercises) and creative assessment (a hands-on project and a journal of self-discovery). The course itself was an application of the concepts being taught.

College graduates are also reported to be deficient in leadership. This is particularly troublesome since this is the number two deficiency cited in college graduates and yet is one of the most

important applied skills recognized for new entrants to the workforce. Leadership as an applied skill is defined as the ability to “leverage the strengths of others to achieve common goals; use interpersonal skills to coach and develop others”. (Casner-Lotto, p.16) Goldey-Beacom College has developed courses in group/team dynamics and leadership. The general management and organizational behavior class (required of all business students) has emphasized team skills and “getting things done through others”. Experiential exercises and self assessments are utilized extensively in the delivery of this course.

Outside of the classroom, leadership workshops are offered for student organization officers. While officer positions provide a wonderful opportunity for development and growth, a formal workshop helps students better take advantage of that opportunity to leverage the most they can.

Benchmarking Practices: Innovative Responses by Other Colleges and Universities

As organizations have become more selective in their hiring choices, the pressure is on academia to better prepare students for the workforce. Education has realized the importance of partnering with business to prepare graduates. Universities already developing these partnerships include MIT, the University of Texas, UCLA, Temple University, and Ohio State University.

Recommendations for education from the report, “College Learning for the New Global Century”, include more widespread use of learning communities whereby students are provided the opportunity to research broad problems by linking different disciplines, writing intensive courses across the curriculum, collaborative learning environment, additional global learning opportunities (such as study abroad programs), “real world” community-based learning, internships and capstone courses with the culmination of an integrating project or paper.

“In today’s knowledge-fueled world, ensuring the most empowering forms of learning for all students should be our top educational priority.” (“College Learning for the New Global Century”, p. viii) Some of the changes to education require new approaches in teaching. Ohio State University has responded with a broader approach by “teaching undergraduate computer science majors about utilizing a software engineering methodology rather than teaching them about a particular programming language like Java or C++”. (Hoffman, p.41) Students at MIT’s Sloan School work in teams on real-world projects submitted by their corporate sponsors. IT executives are invited to present their own IT problems and then lead a discussion of how they were solved.

The need for more problem-based learning was addressed in the nursing program at Samford University in Alabama where course concepts are presented in modules. Teams of students then present solutions for the problems. Providing students with opportunities to “connect the dots” by integrating information from various disciplines is critical. Wagner College has developed learning communities where seniors attack big, real-world problems integrating the knowledge gained in two different disciplines. Portland State University provides opportunities for a similar senior learning experience based on their local community. This community service has had positive consequences for students beyond the mere curriculum as they have learned how to contribute to their communities. Tulane University actually requires public service in a “service learning” class for graduation.

Advisory boards are playing a bigger role today. Babson College solicited the input of an ad-hoc advisory board of IT experts to redesign their IT program’s electives – and then they responded immediately by making the suggested changes within just two weeks. The report “Are They Really Ready to Work?” and similar reports have prompted considerably more discussion about

including a liberal education in bachelor's degrees. The push for the liberal arts education is to provide opportunities to students to acquire soft skills. The federal Commission on the Future of Higher Education has put colleges and universities across America on notice. More is expected – and sooner rather than later.

“In a deliberate break with the academic categories developed in the last century, liberal education is defined...not as a discrete set of disciplines...but rather as a comprehensive set of aims and outcomes that are essential both for a globally engaged democracy and for a dynamic, innovation-fueled economy.” (“College Learning for the New Global Century”, p. 11) A re-mapping of the educational process may be needed to help institutions move away from the traditionally ingrained academic silos. Recognizing the importance of writing skills, Carleton College requires writing portfolios with mandatory inclusions of a minimum of two different disciplines.

Bentley College in Waltham, Massachusetts, is encouraging students to develop the softer skills by creating a way for undergraduates majoring in business to easily complete a secondary degree in Liberal Studies. Students take eight classes they would have taken anyway grouped together under a concentration heading and connected to business classes through papers, projects, etc. LSM concentrations include Global Perspectives, Media Arts & Society, American Perspectives, and Ethics & Social Responsibility. (“Bentley’s Liberal Arts Bent”) This is an attempt “to really connect the dots and make connections across disparate disciplines and bodies of knowledge”. (“Bentley’s Liberal Arts Bent”, p. NA) Students choose LSM because business students hope to develop a competitive edge as they enter the workforce.

Davy suggests, “Great art isn’t made in a vacuum, and great business isn’t made in a vacuum,” (“Bentley’s Liberal Arts Bent”. p. NA). More stakeholders have taken active roles in designing college curriculum. Recommendations by the National Association of State Boards of Accountancy (NASBA) prompted changes in the teaching of ethics in accounting programs. In Ohio University “real-life” situations, financial statements, and documents are used in the classroom. The University of Oklahoma partnered with the business community to develop curriculum to provide the specific skill set needed in the engineering program. “Worker skills and education will be decisive factors in America’s ability to compete in the global manufacturing environment. If colleges and universities don’t step up to the plate, they will be the losers, along with the manufacturing base, the economy, and the citizens of the United States.” (Fenster, p.100) The Partnership for Regional Innovation in Manufacturing (PRIME) is a partnership of colleges in Pennsylvania that has specifically responded to local manufacturers’ input in developing their workforce.

Recognizing the importance of teamwork in today’s workplace, many colleges and universities have integrated teamwork into the curriculum. The ability to work effectively with other students is a big factor in completing courses successfully at the University of Phoenix. The belief is that this cannot be learned from a book, but must be experienced. “A maximum of 30 percent of a student’s grade is derived from team grading...meaning poor teamwork can affect a student’s final grade.” (Cline, p.NA)

All stakeholders are taking a more active role in defining the competencies required of the workforce. The State Council of Higher Education for Virginia (SCHEV) has developed a list of competencies important for college graduates. Public institutions in Virginia are then required to report on their specific results in meeting these outcomes. Commitment to essential learning outcomes across programs has been embraced by Indiana University-Purdue University

Indianapolis (IUPUI). Faculty created six Principles of Undergraduate Learning that are applied and assessed across the entire curriculum.

Conclusions and Further Recommendations

The question posed by the report, “Are They Really Ready to Work?” has a disappointing answer. Today’s graduates are simply not prepared for work. This report and others with similar findings are creating a buzz – in business, industry, government, and education. The key, however, is that all the stakeholders must partner to develop creative actions to respond. The longer that this situation persists, the farther behind the US workforce will fall.

Employers have further suggested, that employees are “unpromotable” if they lack the soft skills. A lack of professionalism is even reflected in today’s recent graduates. “Punctuality, courtesy, and manners are among the qualities many employers see as having fallen through the cracks between the Baby Boomers generation and succeeding ones.” (McLester, p. 24)

There are far reaching implications of these findings that highlight the ill-prepared workforce. Linda Barrington of the Conference Board warned that the global competitiveness of America is at risk with a workforce that does not deliver the skills required. The U.S. Chamber of Commerce has estimated that approximately 90 percent of new American jobs will require education beyond a high school diploma. It is essential that business is actively partnering with education to identify the skills needed in the workforce.

The Massachusetts Business Alliance for Education (MBAE) issued a report that echoed the findings of national surveys and provided some basic recommendations for education. These included providing more opportunities for students to practice public speaking and teamwork. Even the physical layout of college classrooms nonverbally suggests that communication flows in one primary direction – from the professor to the students. This needs to change. Physically reconfiguring seating (perhaps in circles) encourages more interaction among students themselves and between students and the professor. Team projects should be used in every class and graded as a team effort. When grades reflect a student’s ability to work well with others and coordinate these efforts, the skills seem more important.

According to Leef (2006), “If we want to improve the usefulness of college, the place to start is with English skills”. (p.NA) More writing assignments across the curriculum and more opportunities for oral presentations are needed. The best ideas in business are irrelevant if employees cannot communicate them. Education can provide more opportunities to ensure that students are writing and speaking more in every class – and being graded on it.

Henderson and Wieler (2005) have suggested that community colleges have an opportunity to positively impact regional economies by focusing on occupational skills needed by local employers. They point out that “Community colleges are uniquely positioned to link needs of local business with skilled local workers, benefiting firms, workers, and the region as a whole.” (p. NA)

Business and industry can play a bigger role in the educational process today by offering more internships and job shadowing opportunities. Professional organizations can partner with colleges and universities to bring students to the workplace to shadow professionals to get a feel for the vocations and the “real world” in general. Summer jobs and work-study programs can provide valuable learning opportunities for students as well. The opportunities, however, must be provided by business and industry in partnership with educational institutions.

The issue of workforce preparedness is so critical that it even was taken to Capital Hill in a March briefing. KPMG, the H.E. Butt Grocery Co. and CVS were highlighted for their efforts to provide opportunities for young people to acquire job readiness skills. KPMG provides employees four hours away from work each month to do volunteer teaching (for organizations like Junior Achievement). The H.E. Butt Grocery Co. offers job shadowing to enable students to learn about their company and CVS developed a program, “Pathways to Pharmacy”, to generate an interest in math and science. These programs once again emphasize the need for a coordinated effort by all stakeholders.

According to the BATEC Report (2006), “...current instructional methods produce students who are good test-takers, but not necessarily good problem solvers.” (p. 38) The call is for a focus on the performance of students – versus “seat time” in the classroom. The recommendation to simultaneously teach content and skills is firmly grounded in the Socratic approach to education. Institutions today can use more “problem based case based instructional methods” (BATEC Information Technology Workforce Skills Study). It may, however, be necessary to provide professional development funds for faculty to adapt to these new approaches.

It will also be necessary for higher education to re-think the development of program outcomes. The recommendation for writing high-level outcomes is constructing “by-or-through statements”. (BATEC Information Technology Workforce Skills Study, p.73) These will provide a clearer assessment of whether the student was able to perform the task. The following examples were provided as guidelines by the BATEC report (2006):

“Poorly written outcome:

The student will write a program in C language that prints to the computer.

Better high level outcome:

Using include, get, md, compare, and print(f) functions the student will compile and demonstrate user interfaces **by** demonstrating a C language program that gets user input (whole number) from a keyboard, compares it to a program generated random integer, and outputs the mathematical whole number difference to a system connected printer.” (p.73)

To better ensure partnerships with all the stakeholders, education can take the lead by attending both industry and professional association meetings, solicit involvement of employers in curriculum development, follow relevant legislative issues, and ensure faculty develop relationships with local employers.

The hope of these many workforce readiness reports and this paper is to “inspire action” – on the part of all the stakeholders - to better prepare the nation’s workforce in meeting the competitive challenges of the 21st century.

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KNOWLEDGE AND SKILL REQUIREMENTS FOR IT/IS GRADUATES

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ABSTRACT

In order to assess whether curricula for IT-related programs prepares graduates for entry-level IT positions, the authors collected data from nearly 400 IT managers using a survey instrument. The results of the survey are reported in this paper. The data collected will be used to help the ongoing design and evolution of IT-related curricula and courses. In addition, the results of the survey are compared to the ACM IT Curriculum to determine if there are any areas not currently covered by the curriculum.

INTRODUCTION

Following the “dot com” bust, some questioned whether the impact of information technology (IT) on the economy was anything more than “smoke and mirrors”. In his popular article, “IT Doesn’t Matter”, Nicholas Carr claimed that the strategic importance of IT had diminished (Carr, 2003). However, there are many that disagree with Carr. Recently, Atkinson & McKay (2007) claimed that the digital revolution is “... more than fulfilling its original promise, with digital adoption rates actually exceeding the most optimistic forecasts of the late 1990s” (Atkinson & McKay, 2007, p. 3). Atkinson and McKay also claim that information and communications technologies are a major driver of economic growth and will continue to drive growth in the foreseeable future.

Studies have shown that capital investment in IT impacts worker productivity by three to five times that of non-IT capital expenditures. According to Atkinson & McKay (2007), IT was responsible for most of the growth in labor productivity in the U.S. between 1995 and 2002. The IT industry improves the economy by creating high paying jobs, allowing more people to work, and making it easier for more people to join the workforce. On average, IT jobs pay 84% more than other jobs. IT also improves the quality, level of customization, and processes involved in creating and delivering products and services. (Atkinson & McKay, 2007)

As IT continues to positively impact the economy, ensuring that graduates of IT-related programs are properly prepared to enter the IT workforce becomes increasingly important. A well-prepared, efficient, professional IT workforce will only add to the positive impact on the economy.

To determine the preparation level of our students, we examined the skills typically required of entry-level IT workers and compared them to what is currently taught in IT-related curricula. Despite the existence of several model curricula (such as AIS IS 2002 Model Curriculum, ACM IT Curriculum), several studies suggest that there is a gap between the skills achieved by IS/IT graduates and the skills required by employers (Trauth et al., 1993; Lee et al., 2002; Kim et al., 2006; Cappel, 2001/2002). A number of studies have examined this gap as it is perceived by IT professionals, academics, students, and users (Tang et al., 2001/2002; Randall & Price, 2006). Several have made recommendations for how to improve the IS curriculum (Trauth et al., 1993; Leitheiser, 1992; Young, 1996; Abraham et al., 2006; Lee et al., 1995). However, many of these previous studies are now outdated, calling into question the continuing validity of their findings and recommendations. Additionally, there are few, if any studies, that compare the entry-level skills required by employers to the skills included in the IT model curriculum. (http://www.acm.org/education/curric_vols/IT_October_2005.pdf).

To address these gaps in the literature, the authors collected data from a nationwide cross-section of 364 IT managers to (1) examine the views of IT managers on the skills required of entry-level IT workers and (2) to compare these skills to the IT model curriculum.

METHODOLOGY

The primary purpose of this study is to determine the importance of various skills for entry-level IT workers as perceived by IT managers. Survey instruments are typically used to examine the skills gap and as a basis for comparing the skills required by employers to the skills set forth within model curricula. To this end, a survey was designed and administered to IT managers nationwide.

The skill items in the survey were created by examining the ACM IT Curriculum (http://www.acm.org/education/curric_vols/IT_October_2005.pdf), IS 2002 Curriculum from the Association of Information Systems (www.aisnet.org/Curriculum/), and current empirical studies (Fang et al., 2005 and Abraham et al., 2006). In addition, several demographic questions were added to the survey to gather information about the respondents and the IT operations of their respective organizations.

A pilot study was conducted to test the questionnaire. The survey was administered to faculty, students and IT staff at the authors' university. Approximately 30 people participated in the pilot study. Feedback was gathered, leading to an improved version of the survey that was used in the data collection.

The final survey consisted of 32 skills/traits that were ranked in terms of importance on a scale of 1 (not important) to 5 (very important). The survey was web-based and administered via email by a reputable online survey company. The survey was administered to IT managers only. There were 390 respondents with 364 surveys that were complete enough to use for data analysis.

DATA ANALYSIS

Demographics of Respondents

Responses were received from IT managers in all but five states in the U.S. Twenty-eight percent (28%) of respondents were in organizations with annual gross revenue of over \$1 billion and 30% were in organizations with over 10,000 employees. Sixteen percent (16%) of organizations had annual gross revenue under \$50 million and 12% had fewer than 100 employees. Ninety-four percent (94%) of respondents stated that their organizations employed a full-time IT staff and 44% said that the number of IT employees exceeded 100.

The respondents represented a cross-section of industries. Table 1 provides an overview of the characteristics of the respondents and their organizations with regards to (a) the industry to which they belong, (b) the areas of demand for IT workers within their organization, and (c) the sources they use to acquire new IT staff. Nineteen percent (19%) of respondents were in an organization in the IT industry.

Respondents could select more than one response for areas of demand for IT workers and sources for finding IT workers. The most common areas of demand cited by respondents for full-time entry-level IT employees were IT help desk (70%), networking (56%) and programming (55%). The most common sources cited for finding entry-level IT workers were the web and internships. Respondents were fairly optimistic about the job market next year – 28% of respondents said that the job market would be better next year while 49% said it would stay the same.

TABLE 1: CHARACTERISTICS OF RESPONDENTS AND THEIR ORGANIZATIONS

(a)		(b)	
Industry	% of Respondents	Area	% of Respondents
IT	19	Clerical/Data Entry	29
Education	11	Database Area	44
Health care related	10	IT Help Desk	70
Government/Military	8	Networking	56
Manufacturing	8	Programming	55
Financial	6	Systems Analysis & Design	48
Other	6	Web Design & Development	46
Computer technology vendor	5	Other	9
Consulting (not in IT)	4		
Insurance	4	(c)	
Retail	4	Source	% of Respondents
Telecommunications	3	Co-op	13%
Transportation	3	Instructors' recommendations	6%
Non-Profit	2	Internships	39%
Utilities	2	IT department office	34%
Other	10	Newspapers	37%
		Relatives/friends	24%
		School's career planning office	24%
		Web	48%
		Other	15%

Results

For ease of interpretation and consistency with the methodology used in similar studies (Fang et al., 2005; Tang et al., 2000), most of the skills/traits can be classified into one of four categories: technical skills,

organizational knowledge, personal skills/traits and interpersonal skills/traits. Lee et al. (1995) used a slightly different classification of technical, organizational, IT management, and interpersonal/management knowledge/skills. We use a combination of the two approaches to arrive at four categories: technical, organizational, managerial and personal/interpersonal skills/traits. Table 2 provides a rank ordering of the 32 skills/traits surveyed based on the average score for each item.

TABLE 2: RANK OF SKILLS/TRAITS

Rank	Skill/Trait	Average Score
1	Honesty/integrity	4.62
2	Communication skills (oral and written)	4.54
3	Analytical skills (e.g., ability to analyze and evaluate)	4.51
4	Ability to work in teams	4.49
5	Motivation	4.37
6	Interpersonal skills	4.37
7	Flexibility/adaptability	4.33
8	Creative thinking (e.g., ability to generate new ideas)	4.18
9	Organizational skills	4.13
10	Relevant work experience	4.06
11	Awareness of IT technology trends	4.04
12	Operating systems	3.99
13	Hardware concepts (PCs/Server/Router/Network)	3.92
14	Database	3.92
15	Security	3.91
16	Telecommunications/Networking	3.90
17	Web development programming languages (XHTML, XML, Javascript, JSP, ASP, etc.)	3.85
18	Any work experience	3.83
19	Packaged software (word processing, spreadsheets, etc.)	3.82
20	Systems development life cycle methodologies	3.75
21	Programming languages (Java, COBOL, etc.)	3.72
22	Knowledge of primary business functions (e.g., finance, marketing)	3.65
23	Project management skills	3.65
24	Leadership skills	3.63
25	Knowledge of your company (e.g., your goals and objectives)	3.59
26	High IT GPA	3.50
27	Knowledge of specific industry (e.g., retail, health care, transportation)	3.50
28	Internship experience	3.40
29	High overall college GPA	3.34
30	Entrepreneurial/risk taker	3.21
31	Co-op experience	3.20
32	Extra-curricular activities (other than work)	3.04

Of the eleven skills/traits that had a ranking above 4.0, the top nine are in the category of personal/interpersonal skills. The top five skills/traits are honesty/integrity, communication skills, analytical skills, ability to work in teams, and motivation. Entrepreneurial/risk taker (3.21) and leadership (3.63) were ranked as the lowest skills in this category.

The only technical skill that was ranked above 4.0 was awareness of IT technology trends (4.04). The remaining technical skills were ranked in between 3.5 and 4.0 with operating systems receiving the highest average score (3.99) and programming receiving the lowest (3.65).

The highest ranking skill/trait in the organizational knowledge category was knowledge of primary business functions (3.65) with a ranking of 22. The initial indication is that personal and interpersonal skills are the most important, technical skills are next and organizational knowledge third.

There are a few other items worth noting. Project management, the only IT management skill on the survey, was ranked as the 23rd most important item. Relevant work experience was ranked as the 10th most important item. Yet, internship experience was only ranked as 28th. If the internship was specified as an IT internship, the results may have been different. The respondents may have assumed that the internship was general in nature as opposed to specific to IT.

DISCUSSION AND CONCLUSION

The results of the survey have several implications worth noting. In addition, some of the results of this study are in concurrence with the ACM Computing Curricula - IT Volume and some are in contradiction.

1. **Personal and interpersonal skills are the top-rated skills.** This is consistent with the findings in other studies and is also consistent with the current draft of the ACM Computing Curricula - IT Volume, as there are several program outcomes related to personal/interpersonal skills:
 - o “Design effective and usable IT-based solutions and integrate them into the user environment”
 - o “Demonstrate independent critical thinking and problem solving skills”
 - o “Collaborate in teams to accomplish a common goal by integrating personal initiative and group cooperation”
 - o “Communicate effectively and efficiently with clients, users and peers both verbally and in writing, using appropriate terminology”
 - o “Recognize the need for continued learning throughout their career”(http://www.acm.org/education/curric_vols/IT_October_2005.pdf, p. 6).
2. **Project management is the least important IT technical or management skill cited in the study for entry-level employees cited in the study.** According to the current draft of the ACM Computing Curricula - IT Volume project management is important as there is a program outcome related to project management: “Assist in the creation of an effective project plan” (http://www.acm.org/education/curric_vols/IT_October_2005.pdf, p. 6).
3. **The highest ranked IT skill is awareness of IT technology trends.** This is consistent with the current draft of the ACM Computing Curricula - IT Volume as there is a program outcome related to this skill: “Identify and evaluate current and emerging technologies and assess their applicability to address the users’ needs” (http://www.acm.org/education/curric_vols/IT_October_2005.pdf, p. 6).
4. **Internship experience is relatively low in importance for entry-level IT workers.** However, relevant work experience is much higher in the ranking (10th versus 28th) based on average importance scores. This seems contradictory. In addition, internships were cited as one of the most often used sources for hiring IT employees, second only to the web. This may partially be explained by not specifying that the internship was an IT internship.

As educators, we need to think about how to develop several of the aforementioned skills, specifically the personal/interpersonal skills that are so important to the employers that hire our graduates. Some of these

skills - such as analytical and communication skills - are already being taught. But how do we teach honesty and integrity? This is a personal value typically set prior to a student arriving at a college campus. As educators, we can talk about the importance of the privacy, ethical, security and legal issues surrounding IT, but we can not teach honesty/integrity.

Similarly, we may have students work in teams for projects and other activities in the classroom, but are we teaching how to work in teams? Just because students do work in teams does not necessarily mean they know how to do so effectively.

Based on our findings, project management is not as important as other skills. The findings in Abraham et al. (2006) might provide an explanation. Based on structured interviews with 100+ senior IT managers, they found that project management skills were not cited as the most important for entry-level workers. However, these skills were cited as important for mid-level employees and as skills likely to remain in-house as opposed to being outsourced. Our results are in contradiction to the findings of Kim et al. (2006) where project management was cited as the most important skill in the field as perceived by IS employees over the next three years. However, this study was conducted at a single manufacturing firm and did not target entry-level employees. The question that comes to mind for IT educators is whether or not project management is important in the curriculum. The current draft of the ACM Computing Curricula - IT Volume only states that a student needs to assist in the creation of a project plan, not manage an entire project. This is what an IT graduate should be able to do and this may shed light on the seemingly contradictory findings on project management.

SUMMARY

In this study, we collected data from nearly 400 IT managers to assess whether IT-related curricula properly prepare graduates of IT-related programs for entry-level IT positions. One desired outcome of the study was to help the ongoing design and evolution of IT-related curricula and courses. The data we have collected will be used for this purpose. Results of our efforts in this area will be reported in future studies. Another desired outcome was to compare our results to the ACM IT Curriculum to determine if there are any areas not currently covered by the curriculum.

In keeping with previous studies, our findings suggest that personal and interpersonal skills are the top rated skills with technical skills taking second place. Our findings also suggest that although the ACM IT Curriculum appears to adequately address the technical and project management skills expected of entry-level IT workers, it does not provide adequate preparation for several of the most important “soft” skills (such as honesty, integrity, motivation, etc.). Whether these soft skills can (or should) be taught, and if so, how they can (or should) be taught, will be an ongoing challenge and subject of debate among IT educators for years to come.

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Get Volume and No.

THE USE OF CLASSROOM SIMULATIONS IN THE STUDY OF FOREIGN EXCHANGE

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This workshop will demonstrate a classroom foreign exchange simulation using modifications to a popular board game. Used for the past 4 years in several international business and international finance courses, the simulation employs four currencies with several exchange rate regimes. Its use not only develops increased student proficiency in handling foreign exchange calculations, but also allows deeper and broader comprehension of strategies firms employ to hedge against transaction risk.

In addition to explaining the modifications to the board game and the mechanics of running the simulation, this workshop will explain the use of a stylized form for data collection by students. These data provide a basis for preparation and presentation of the strategies employed, as well as a standardized performance reporting mechanism. More importantly, however, is the use of the student-generated data in the creation of operating cash flow statements that feed into the analytic models used in the study and practice of international finance.

The use of the simulation generates a high level of student engagement, not only through playing the game, but also in taking ownership of the data. Additionally, students engage quickly in a simulation familiar to them, allowing them to focus on transactions, record keeping, and analysis. They also build document preparation and presentation skills.

Attendees will be allowed sufficient time for questions and will walk away with sample output and ideas for expanding the use of simulations to other classes, such as accounting, policy/strategy, and capstone courses.

INTERNET MEDIATED DISTANCE EDUCATION AS A DISRUPTIVE TECHNOLOGY: THE POTENTIAL IMPACT ON THE FOUR-YEAR DEGREE MARKET

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ABSTRACT

Demand or competition will result in an increased number of four-year colleges and universities offering distance education courses for the purpose of certification or degree programs (Lamb, 2000). The change from the traditional face-to-face (FF) to internet mediated distance education (IMDE) have generated concerns that include such diverse topics as students' (e.g., Leonard & Guha, 2001) or faculties' (e.g., Ross & Klug, 1999) opinions of IMDE courses; student interactions (Arbauch, 2000); and the evaluation of IMDE courses/degrees in the recruitment and hiring of new college graduates (e.g., Caudron, 2001). With a few exceptions (e.g. Armstrong, 2000) little attention has been devoted to understanding the potential market changes that may occur as universities add IMDE courses. Based on Christensen's (1997) discussion of the effects of innovative technology, the present paper will provide information that may be beneficial in understanding this process.

INTRODUCTION

A growing number of four-year colleges and universities (universities) are adding IMDE classes or programs to their curriculum at, what appears to be, a torrid pace (Arbaugh and Benbunan-Fich, 2006). At the same time, however, some universities continue to concentrate their efforts on traditional face-to-face (F/F) class. Regardless of a university's approach, it appears that its decision regarding inclusion of IMDE classes must include some consideration of the market for the two instructional delivery systems.

Of considerable importance in the university's evaluation of its market position are its assumptions regarding the potential changes resulting from the introduction of IMDE classes. In essence, will increased growth and acceptance of IMDE classes create a bifurcated four-year education market composed of two separate and independent markets? One market defined by FF offerings and the other market defined by IMDE offering. Or, will the four-year education market become more integrated? Resulting in curricula that relies on both FF and IMDE courses?

FF and IMDE as Independent

IMDE. Based on their actions, some universities appear to consider FF and IMDE delivery as two independent markets. Both for-profit (e.g., Jones International and Capella Universities) and not-for-profit (e.g., Western Governors University, United States Open University) universities have entered the education market as virtual universities. That is, these universities solely focus on the development and delivery of IMDE programs. In fact, it is reasonable to conclude that such universities owe their existence to the introduction, development, and increased acceptance of the internet as an educational medium (Caudron, 2001).

FF. Based on data available from the U.S. Department of Education, (Department of Education, 2002) universities that continue to focus primarily on FF delivery are private institutions. The data show that while 8% of public universities continue to offer only FF courses, 44% of private universities do so.

A number of explanations (e.g., cost, demand, size, etc.) might be offered for this large difference; however, private universities may exhibit different missions than those exhibited by public universities. In addition, some universities may believe that FF classes best serve their educational reputation (Howd, 2000).

FF and IMDE as Integrated

A number of reasons might be offered for the integration of FF and IMDE courses by for-profit universities. Two of the more obvious reasons for this integrative approach are the university's history (originally a "brick" university) and federal regulations (50% rule for federal financial aid). Without attempting to identify a reason(s), one example

might be Phoenix University, which continues to provide F/F classes, but has gained considerable recognition because of its aggressive offerings of IMDE programs.

Somewhat surprisingly a large number of state-supported universities, most often recognized for their F/F classes, have begun offering IMDE classes and programs. In fact, Morgan (2001) reports that from 1995 to 1998 there was an increase of 17% in the number of state-supported four-year universities that offered IMDE classes or program.

A 17% growth rate is significant; however, even more impressive is the suggestion that in the near future complete academic programs will be offered by nearly 90% of all four-year state-supported universities (Lamb, 2000). This number may be conservative because it has been reported that 92% of four-year state-supported universities offer or intend to offer some form of distance education courses/programs (Department of Education, 2002).

The Four-Year Education Market

Historically, universities have been viewed as residence universities, that is, students were “in residence” at the university attending FF classes. With improvements in mail service, some universities began offering a basic form of distance education, generally referred to as correspondence courses. Improvements in various forms of technology (e.g., film, recording media) added to the value of these correspondence courses. More recently other technologies (e.g., telephone, up/down link satellites, internet) have dramatically changed the distance education landscape. Cost considerations may, however, influence the extent to which these newer technologies will replace older technology (Inglis, 1999).

The Department of Education recognizes 11 identifiable forms of distance education. As one might suspect, however, asynchronous and synchronous IMDE appear to represent the technology with the greatest potential for significant growth (Waits and Lewis, 2003). Consequently, IMDE appears to have the potential to not only change, but to possibly, define the four-year education market.

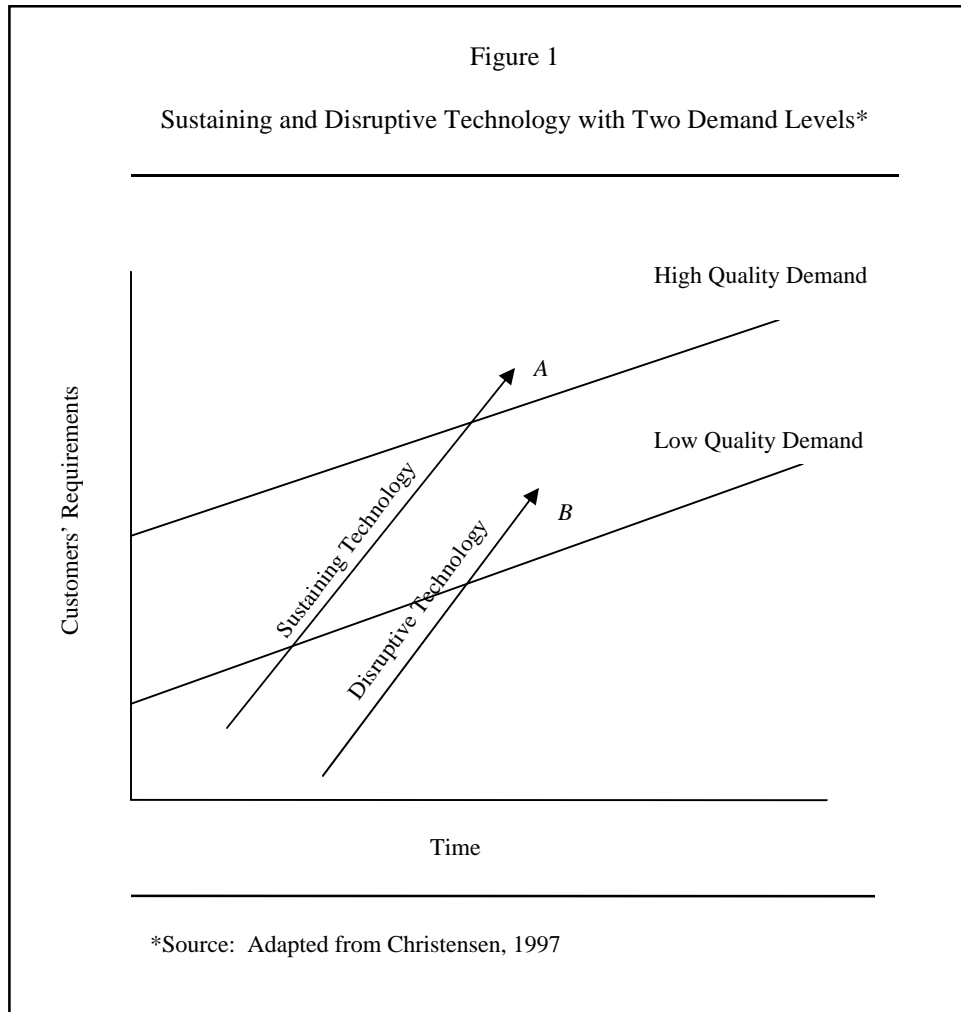
TECHNOLOGY AND THE MARKET

If IMDE has the potential to exert such a serious impact on four-year education, it would be wise to develop a model for understanding the process. A number of models (e.g., economic, structure, strategic planning, etc.) might be proposed as helpful in understanding the process and potential impact. However, an insightful method of viewing the impact of differing technologies on the competitive marketplace (Christensen, 1997) may be appropriate. This is especially true if the relation between FF and IMDE in the four-year education market is seen as the same “product” delivered by competing technologies.

Christensen (1977) characterizes technology as either sustaining or disruptive. The term “sustaining” should not be interpreted as a reference to an unchanging technology, but is best considered as descriptive of a technology’s impact on the product or service in the marketplace. It might be best to consider a sustaining technology as one with the ability to sustain valued attributes (e.g., quality, price, etc.) of the product or service provided. It is suggested that the market for the product or service may be segmented based on customers’ demands for these attributes.

A disruptive technology, similar to a sustaining technology, can exhibit a change that range from incremental to discontinuous and competes in same marketplace as a sustaining technology. The difference is that a disruptive technology taps into a different set of customer values. These values, according to Christensen (1997), generally include a lower quality requirement for the same product or service as provided by the sustaining technology.

A representation of Christensen’s (1997) view of sustaining and disruptive technologies is shown in Figure 1. In a general view, the lower quality provided by the disruptive technology does not have the ability to attract those customers who demand high quality. At the same time, a sustaining technology cannot attract those customers whose quality demands are less stringent.

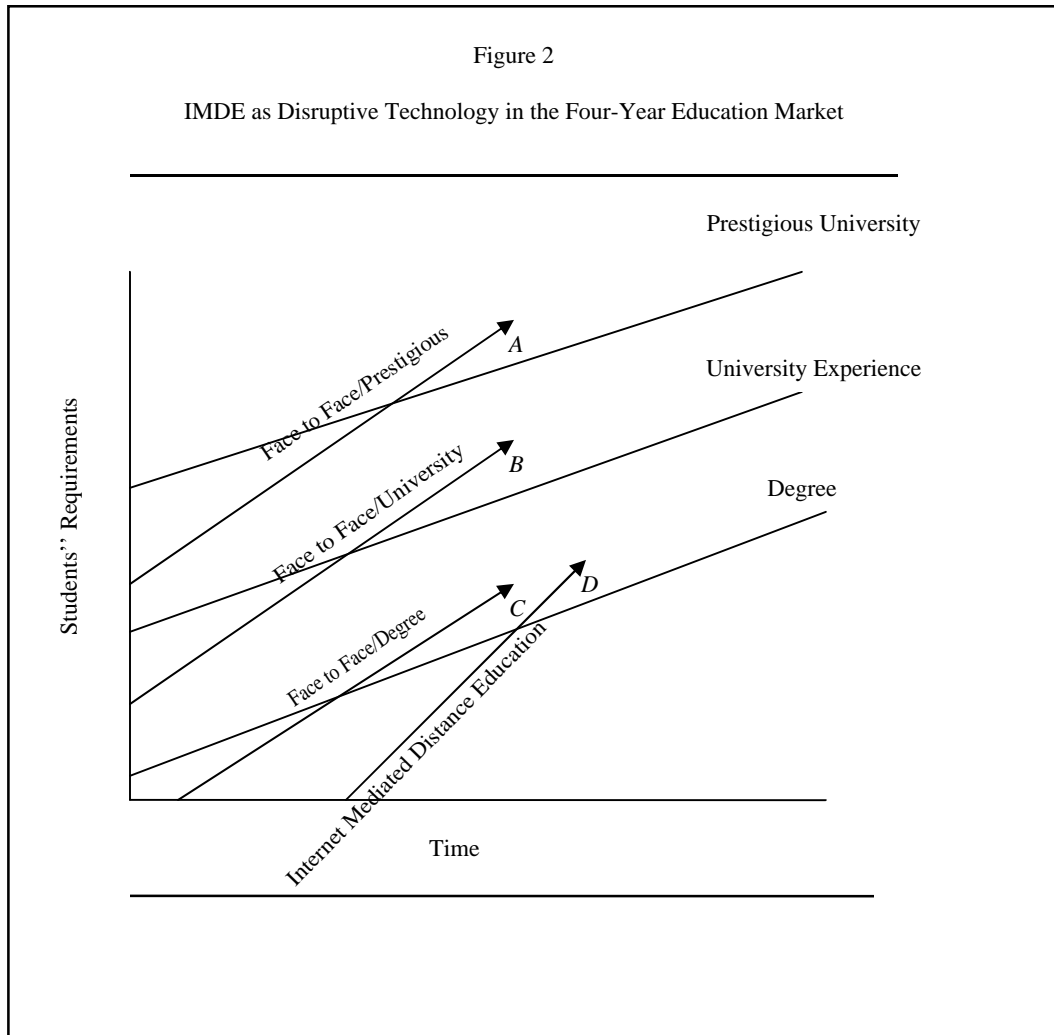


The areas designated as *A* and *B* in Figure 1 represent possible shifts in demand or a potential loss of customers in the marketplace. Each area represents the potential that the technology may provide attributes that surpass customers' demands. For instance, area *A* shows that the sustaining technology provides attributes that exceed the requirements of the high demand customer. These increased attributes are expected to be associated with a proportional increase in price, which may cause the high demand customer to shift to the disruptive technology. In other words, a sustaining technology that provides a product or service that exhibits attributes that are not wanted or exceed the demands of the high demand customer may result in the loss of customers.

The same loss of customers might be observed for area *B* associated with the disruptive technology. However, without the availability of another competing product, these customers would be "forced" to continue purchasing this product or leave the marketplace. Another significant consideration is that area *B* also represents an improved quality of the product or service, which has the potential to attract customers from the higher quality product.

IMDE AS DISRUPTIVE TECHNOLOGY

Consistent with the model proposed by Christensen (1997), Figure 2 represents the educational market for a four-year degree. Figure 2 is based on information presented above and represents the higher education market as composed of three segments.



The three segments are identified by the providers in each market segment: Prestigious University, University Experience, and Degree. The three segments are described here as:

The Prestigious University Market (PM) is composed of mostly private, highly selective, and extremely costly universities.

The University Experience Market (UM) is populated by residential universities that satisfy the socialization dimension of higher education. These universities may be private or public and range from “near prestigious” to simply “acceptable.”

The Degree Market (DM) includes all other universities that offer a four-year degree. These universities range from virtual to residential, vary as to quality, and may focus on student convenience. The size of this market is unknown, but may grow to be extremely large as more “non-traditional” students are attracted to the market.

Obviously, these markets exhibit significant overlap. Students, based on student/parent/employer decisions, can move “freely” among the three market components.

Figure 2 also includes four possible technologies. The technologies are identified and described as:

Face to Face Prestigious (FF/P) represents the classic delivery technology, noted because of its delivery by highly qualified faculty who possess terminal degrees. Faculty assistants may provide significant “personal” attention.

Face to Face University (FF/U) includes a mix of terminally qualified faculty and those with lesser qualifications. Personal attention tends to be limited.

Face to Face Degree (FF/D) includes terminally qualified and lesser qualified faculty. A significant number of the faculty will be employed on a part-time basis.

Internet Mediated Distance Education (IMDE) is the “newest” technology and varies significantly based on the mission of the university. The greatest variation may be in the faculty qualifications, which may range from terminally qualified to “techies” presenting “canned” material. Because IMDE builds on FF experience, the slope of this curve suggests its ability to more quickly surpass the attributes of FF classes.

Consistent with the earlier discussion of FF (FF as Independent) it is expected that the PM will primarily focus on the delivery of course material by FF. While area *A* may indicate that the education quality exceeds students’ requirements, the limited number of universities that populate the PM and the increasing population of student age applicants suggest that there will be no loss of students. In fact, it can be suggested that the slope of the PM curve will increase, accepting the increased quality provided by the FF/P technology. Because of the mission of these universities, it is not expected that IMDE will have a disruptive effect.

Again, because of the increasing number of student age applicants, the UM curve may reflect a similar, but a more modest increase in its slope. The UM curve will also be changed as some students shift from the UM to the PM. However, the significant overlap between the UM and the DM suggests the potential for major migration to DM from UM. Area *B* suggest that the FF/U technology used by these universities significantly exceeds Student Requirements, thus, some loss of students to the DM can be expected. Consistent with the earlier discussion (FF/IMDE Integrated), it is expected that universities with high enrollment goals will begin to offer some IMDE courses. However, the focus of the IMDE efforts will not be off-campus students, but initially will be used for on-campus enrollment.

The DM has the greatest exposure to IMDE as a disruptive technology. As shown in Figure 2, IMDE technology matches the attributes of FF classes suggesting that students may be indifferent to the two technologies. Since students in this market are simply seeking a four-year degree, it can be suggested that convenience and, possibly, cost are the driving force in this market. As a result, students might easily be seen to prefer the time-convenience of IMDE over more time-regimented FF offerings and consistent with the earlier discussion (FF/IMDE Integrated), these universities will attempt to offer a fully integrated FF/IMDE curricula.

The potential size of the DM, see above, and the ability of IMDE technology to satisfy the convenience factory suggest that some universities will focus solely on IMDE. Such a concentration is consistent with the earlier discussion (IMDE/Independent) and suggests that universities that populate the DM and UM may experience significant competition for students. It is reasonable to expect these universities to aggressively respond by offering an increasing number of courses and programs by IMDE.

SUMMARY AND CONCLUSIONS

The increasing number of courses and programs offered by IMDE (Department of Education, 2002) might be explained by a number of factors (e.g., student demand, changes in strategy, etc.); however, Christensen’s (1997) concept of sustaining and disruptive technology appears to provide an alternative explanation. Applying this model to the four-year degree market (Figure 2), three market segments (Prestigious, University, and Degree) can be identified. Sustaining technology, noted here as FF technology, was defined for each of the three markets based on the mix of faculty qualifications (FF/P, FF/U, FF/D). The disruptive technology was identified as IMDE.

It was noted that the PM was somewhat immune from the effects of the IMDE technology and it is expected that only a small number of the universities that populate this market will adopt this disruptive technology. Universities

that populated the UM are somewhat protected from the effects of IMDE; however, they may adopt this disruptive technology for their on-campus students. These universities, because of their need to increase enrollment, may attempt, in the future, to extend IMDE to off-campus students. The success of these efforts may be impaired by increased levels of direct competition with other similar universities, cost, and a lack of fit with the mission of the university.

IMDE as a disruptive technology has its greatest potential impact on universities in the DM. To some extent, IMDE provides attributes that compare favorably to those provided by the FF technology. Students who consider convenience as a significant attribute will be naturally attracted to IMDE. Universities that do not adopt IMDE will eventually lose enrollment to those that do adopt IMDE.

The convenience factor associated with IMDE may serve as the central reason for some universities to concentrate solely on this disruptive technology. It is expected that these universities will be significant competitors for the universities that populate the UM and DM, but especially those in the DM.

A last point must be drawn from Christensen's (1997) model. That is, over time, disruptive technologies tend to improve so that they are direct competitors with any sustaining technologies. As such, unless otherwise protected, an organization that stays too long with a sustaining technology places itself in jeopardy.

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TIME TO CHANGE THE TRADITIONAL SYSTEM FOR EVALUATION OF FACULTY PERFORMANCE

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ABSTRACT

Under the new AACSB accreditation standards, business schools have to determine what kinds of knowledge and skills they want their students to learn, and then demonstrate that the students meet these specified learning goals. The new standard is called “Assurance of Learning.” Given the AACSB’s new standards with focus on actual learning outcomes, the traditional system for the evaluation of faculty which primarily focuses on the student evaluation of instructor scores (students satisfaction) may no longer be an effective means for motivating faculty to comply with the assurance of learning standard. The authors suggest the use of additional measures beside the student evaluation of the instructor scores for the evaluation and motivation of faculty. The proposed measures are based on the AACSB’s new standards

INTRODUCTION

The AACSB standards for accreditation have evolved over the years. The focus of standards has shifted from examination of the quality and quantity of academic *inputs* to the examination of the quality of academic *outputs*. Initially the AACSB employed a resource evaluation approach to the accreditation of college programs under which the standards focused on measuring specific sets of *inputs* such as number of faculty with terminal degrees, student/faculty ratios, percentage of faculty with current research output, faculty load, proportion of faculty with professional certification, etc.

Later on, in 1991, the AACSB radically changed its standards for the accreditation. The new standards shifted the emphasis from the adequacy of *inputs* to the existence of adequate and effective *processes* for the accomplishment of the mission of the school and continuous improvement efforts. The main focus was on *processes* for curriculum planning, evaluation and revision, including an analysis of educational outcomes.

In 2003, once again the AACSB revised its standards for accreditation. This time the focus was shifted to *outputs*. The new AACSB accreditation standards require business schools to produce evidence of learning in their courses and programs [1]. Under the new AACSB accreditation standards, business schools have to determine what kinds of knowledge and skills they want their students to learn, and then demonstrate that the students meet these specified learning goals. The underlying rationale for the new standard is that when student *learning* is the focus of assessment, the institution can achieve academic excellence.

The new accreditation standards let each institution decide what those learning goals should be and how they should be measured. The new standard is called “Assurance of Learning.” The AACSB has suggested two measurement categories for the assessment and monitoring of students’ learning: **Direct Methods** (includes selection tests, course-embedded measurement, and stand-alone testing), and **Indirect Methods** (includes various surveys of alumni, employers, and

students). The AACSB has clearly stated that the indirect methods cannot replace the direct methods for assessment of student performance. By themselves, surveys produce weak evidence of learning.

OBJECTIVE OF PAPER

It is generally understood that the faculty performance evaluation process should be designed in a manner that motivates the individual faculty members to undertake activities that help to accomplish the mission of the school and in particular maintain its AACSB accreditation. And student evaluation of the instructor scores has been a major component of the traditional methods for the evaluation of faculty performance.

Given the AACSB's new standards with focus on *actual learning outcomes*, the traditional system for the evaluation of faculty which primarily focuses on the student evaluation of instructor scores may no longer be an effective means for motivating faculty to accomplish and comply with the assurance of learning standard. Students' evaluation and satisfaction scores are not necessarily a measure of the actual amount of learning taken place in class.

Several studies provide evidence that students evaluation of the instructor is affected by many other factors such as grades granted in the course; vigorousness of the course; gender of the instructor; timing of the course; etc. For example Bharadwaj, Futrell and Kantak [3] utilized a longitudinal research design, and found that student evaluations change over time and that the final grade has an impact on attitudes toward the class. Paswan and Young [4] conducted a nomological investigation of student evaluation of instructors using structural equation modeling, and found that input factors of course organization and student-instructor interaction influence the endogenous factors of instructor involvement and student interest in a positive way, and also that factor-course demands affect these endogenous factors in a *negative* manner and are negatively associated with the other two input factors. Accordingly, the authors expressed concern that administrative users of student evaluations often ignore these relationships, and suggest that they should be considered when using student evaluation results. Boex L. F. J. [2] found that the student's self-reported expected course grade had a statistically significant impact on the instructor's effectiveness rating in all four study regressions. As expected a course grade below the student's GPA resulted in a reduced likelihood of receiving an excellent effectiveness instructor rating from all four groups of students in the empirical study; and an expected course grade above the GPA improved the ratings for undergraduate but not graduate instructors.

The objective of the current paper is to propose additional measures for the evaluation of the faculty performance that encourages the faculty to focus more on course learning outcomes and the enhancement of the learning outcomes and scholarship. The proposed measures encourage faculty to undertake activities that ultimately enhance course learning outcomes. Specifically, the suggestions proposed by the AACSB's new standards are incorporated in the evaluation process.

PROPOSED MEASURES

Teaching Evaluation

The measures that we propose to be adopted beside the student evaluation of the instructor scores for the annual evaluation of faculty performance in the area of teaching are as follows:

a. **Vigorousness of the Courses:** The AACSB's new standard promotes course expectations that result in investment of time by students and faculty in learning activities (Time-on-task concept). Accordingly, we believe that the extent of engagement of students in learning activities, in particular through graded activities, should be one of the adopted measures for the annual evaluation of faculty in teaching area.

b. **Course Currency and relevance:** As noted by the AACSB standards, currency is critical for a quality education. Utilization of current and relevant instructional materials should be encouraged. Enhanced learning environment through guest lectures, speakers, field trips should be encouraged. Accordingly, the extent of activities undertaken by faculty to maintain course currency and relevance should be one of the measures adopted for the annual evaluation of faculty teaching.

c. **Feedback to Students:** The new standard also emphasizes the importance of timely feedback on student performance, and the frequency of the feedback provided to the students. The new standard, understandably, considers performance feedback as an effective means for enhancement of the student learning. Accordingly, we believe that the frequency of the feedback provided to the students should be one of the adopted measures for the annual evaluation of faculty in teaching area.

d. **Active Learning Strategies:** As it is stated in the AACSB Standard, "passive learning is ineffective and of short of duration." Faculty members should develop techniques and styles that engage students and make students responsible for meeting learning goals such active learning techniques. Accordingly, we believe that the extent of application of active learning strategies in teaching should be one of the adopted measures for the annual evaluation of faculty in teaching area.

e. **Conducting Assessment:** Faculty should be encouraged to monitor learning outcomes in the course through assessment. Pre and Post assessments should be helpful. Accordingly, we believe that the extent of assessment and the extent of usage of the assessment results to improve course learning outcomes should be one of the adopted measures for the annual evaluation of faculty in teaching area.

f. **Incorporation of Skill Building and Interdisciplinary Subjects:** The AACSB standard has outlined certain critical skills and knowledge for the success of students in this ever changing business world. Faculty should be encouraged to take the opportunities for incorporation of some of those skills and knowledge in their courses to the extent possible. Accordingly, we believe that the extent of incorporation of skill building and interdisciplinary subjects in the course should be one of the adopted measures for the annual evaluation of faculty in teaching area.

Professional Development and Intellectual Contributions

The AACSB's standard has also put high importance on the maintenance of disciplinary currency by faculty. Faculty members are expected to demonstrate activities that maintain currency and relevance of their instruction such as attendance in disciplinary workshops, professional development, professional experience, and collaboration with the business community. The standard promotes applied research studies. Faculty should make a conscious effort to include their students as beneficiaries in the involvement in these activities. It is believed that when faculty is current with the applicability and relevance of ideas and concepts in his or her field,

instruction, practice and inquiry benefit. Accordingly, we believe that a combination of the above activities should be used for the measurement of faculty's professional development and intellectual activities rather than just publications.

CONCLUSION

The AACSB's new standards have created an environment that requires a shift from traditional methods for the evaluation of faculty. Now that the "student learning" as well as "quality education" is the focus of the standards, the traditional approaches utilized for annual faculty evaluations should change. Annual faculty evaluation is an effective means to drive desirable behavior by faculty. Instead of evaluating primarily based on the student evaluations, schools should focus more on encouraging behaviors that enhance student learning, assessment of learning, learning enhancement activities, quality education which is critical to the school mission and student success and maintenance of the AACSB accreditation.

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Administrator Use of the Portfolio in the Hiring Process

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ABSTRACT

This study was a nation-wide survey of building-level school administrators who were asked to rate the value of portfolios and their contents in respect to employability of job applicants. The results indicated that only a very few typical portfolio artifacts were deemed essential or useful by administrators, that administrators seldom actually review the portfolio's total contents, and that electronic portfolios were not looked upon favorably by prospective employers. The authors note that portfolios may be on the decline as assessment instruments for teacher education graduates or for accreditation purposes.

INTRODUCTION

The use of portfolios as "authentic assessment instruments" has been a mainstay of higher education for the past several years. The National Council for Accreditation of Teacher Education (NCATE) has vigorously advocated for the use of the portfolio as one of the several data points for national recognition of teacher education programs in colleges and universities. State departments of instruction have also used portfolios as a measure of teacher competence and required their use as a certification requirement. However, there is growing sentiment for the removal of the portfolio as a legitimate method to gauge the effectiveness of teacher education programs or the competency of the graduates of those programs to teach children in the nation's classrooms. The problems associated with portfolios have long been recognized. While commenting on the versatility and extraordinary usefulness of portfolios, Wolf (1991) stated that unless educators are very cautious, portfolios will be inherently messy, difficult to construct, cumbersome to store, and vulnerable to misrepresentation by students. The problems identified by Wolf have come to be realized by many teacher educators, and teacher education programs, over the years. The original idea was that the portfolio would allow the pre-service teacher to become a more reflective practitioner and thus improve classroom performance (Dietz, 1995; Wade & Yarbrough, 1996).

The format of the teacher education portfolio has evolved from a sometimes-vast collection of hard copy documents filling a 4 or 5-inch binder to various types of electronic formats. Some "forward thinking" individuals articulated in the literature that the electronic portfolio will most assuredly overcome the bulkiness and the storage problem associated with hard copy portfolios, and assumed they would be more appealing to prospective employers who are more technology-oriented and, thus, amenable to pre-service teachers' dossiers in an alternative format. Reilly (2003) refuted this assumption and demonstrated clearly that local school districts' human resources personnel were simply not prepared to view electronic portfolios and had little interest in them.

Teacher educators should be interested in not only the process of the development of portfolios, but also in how these rather cumbersome projects are utilized by prospective employers. Schools of education are telling their students to take their portfolio to the job interview to demonstrate their potential for a teaching position (Wolf & Dietz, 1997). Anthony and Roe (1997) found that 5

percent of school districts require portfolios of prospective professional employees in the application process, but only about half of the school districts will ask for them or refer to them in the actual interview.

The purpose of the present study was straightforward: we wanted to know the extent to which school administrators, in particular, building principals, use portfolios in their hiring practices of prospective teachers. We were keenly interested in the extent to which these administrators rated the usefulness of a number of portfolio items that are more or less required by either the teacher preparation programs or state departments of education for certification. Our intention was to gather pertinent information so that those of us who are in the teacher education profession will be better informed as to the usefulness and applicability of the portfolio documents.

Method

A nationwide electronic survey was conducted of building-level school administrators at the elementary, middle, and high school level. The research questions of this study were:

1. What artifacts should be in a student's portfolio?
2. Do administrators use the portfolio as an employment device?
3. Should a portfolio be in hard copy format or an electronic format?

Subjects

Subjects for the study were 1500 principals of public schools in the United States. The subjects were selected from either school web sites or the State Public School Directory of each state. A random sampling procedure was not employed because of the format of state directories; several states' directories do not identify school administrators e-mail addresses. The researchers then had to go to school web pages to locate principals' e-mail addresses. The researchers made sure that the total sample was proportionally representative in terms of level (elementary, middle, junior high, senior high) of schools surveyed. A total of 250 surveys were returned. This was a rather small return rate (17%). No follow-up reminders were sent to the non-responders.

Results

This was a nationwide study to determine the ways in which school administrators' use portfolios during the hiring process and their opinions of portfolios in general. There were three major research questions: first, what items do administrators wish to see in a student's portfolio; second, do administrators use the portfolio in the hiring process; three, should the portfolio be in hard copy format or an electronic format? Only percentages are presented here, as the authors were not looking for statistical differences between respondent groups or survey items.

To determine the answer to our first query, (what artifacts/items should be included in a prospective teacher's portfolio), thirteen items were listed for the respondents selection. These items included: Philosophy of Teaching, Resume, Unit Plans, Academic Transcripts, Photographs of Work, Case Studies, Computer Work, Student Teaching Evaluations, Behavior Management Plan, Strength/Weakness Paper, Awards/Honors/Accomplishments, IEPs/Diagnostic Summary, and Videos of Teaching. Table 1 presents the findings for this survey item. The administrators' top two items that were considered to be "Very Important" for inclusion in a prospective teacher's portfolio were Transcripts (54 %) and Evaluations of Student Teaching Performance (52%). Artifacts the administrators considered to be "Unimportant" were Video Tapes (50%) and a tie between Videos of Teaching and Strength/Weakness Paper (44%).

Table 1
Administrator’s Rating of Portfolio Artifacts Given in Percentages

	Unimportant	Very Important	Important	Unimportant	Very
Philosophy of Teaching	29	24	36	11	
Academic Transcript	54	33	12	1	
Comprehensive Resume	34	40	20	6	
A sample Unit Plan	18	49	29	4	
Photographs of Work	7	33	50	10	
Samples of Computer work	15	26	41	18	
A Behavior Management Plan	32	47	20	1	
A Strength/Weakness Paper	11	35	44	10	
Student Teaching Evaluations	52	39	6	3	
Evidence of Awards/Honors	23	49	26	2	
IEPs/Diagnostic summaries	39	41	18	2	
Case Studies	15	43	31	11	
Videos of Teaching	11	31	44	14	

In Table 2 we find that 50 percent of the administrators consider the portfolio to be “Unimportant” as a tool during the hiring process. Sixty-four percent of the administrators considered the actual viewing of videotapes to be “Unimportant”.

Table 2
The Portfolio as an Employment Tool Percentages

	Very Important	Important	Unimportant	Very Unimportant
Portfolio as an Employment Tool	11	35	50	4
Viewing video Tapes	5	25	64	6

In Table 3 we find that the use of portfolios during the hiring process was at best “Some of the Time” 43 percent and only 14 percent use the portfolio “All the Time” during the interview. It would seem that the portfolio is not in big demand for an interview tool.

Table 3
Use of a Student’s Portfolio During the Interviewing Process

	All The time	Some of the Time	Seldom	Never
Use a Portfolio during the interview	16	43	37	4

In Table 4 we notice that 44 percent of the administrators determined the value and usefulness of portfolios was “About Right”.

Table 4
Overall Usefulness of the Portfolio

	Not Enough	Accurate	About right	Excessive
Usefulness of Portfolio	17	26	44	13

In Table 5 we find that if a student should happen to bring a portfolio to an interview, 83 percent of the administrators would greatly prefer a “Hard Copy” as opposed to an “Electronic Format”.

Table 5
Administrator’s Opinion of the Format of a Portfolio for an Interview

	Hard Copy Format	Electronic Format
Format of a Portfolio	83	17

Discussion

Portfolios have been on the educational scene for years to fulfill various purposes including showing student growth over time, nurturing students’ ability to become a reflective practitioner, providing data points for accreditation and program approval, demonstrating individual accomplishments, and as a piece of hard evidence for prospective teachers to take to the job interview. However, a number of negative issues also emerge in the portfolio development process. What do portfolios cost students and faculty in terms of time and effort required in relation to the ultimate use of the collection of documents? The students do not like creating portfolios because of the enormous amount of time it takes to create and maintain the portfolio. In many instances, the majority of portfolio artifacts are completed during the student teaching phase of a student’s career. Cooperating teachers who supervise student teachers and seek to establish a mentoring relationship with the novice frequently complain of the inordinate amounts of time student teachers spend on the portfolio which could be better spent in honing one's craft and establishing a pedagogical knowledge base. This creates problems because cooperating teachers complain that instead of focusing on student teaching, the student is focusing on completing the portfolios.

Schools of education have told the student teacher in the past that one of the major purposes for developing the portfolio is to take the portfolio to the job interview because the interviewer is expecting to review the portfolio and make employment decisions based on the quality of the collection of documents found in it. This survey indicates that this is not always the case. These results indicate that relatively few administrators will actually use the portfolio prior to or during the job interview.

The use of portfolios, which were once touted as being the acme of authentic assessment in teacher education programs, appears to be waning. Some state departments of education are also eliminating them as data points for accreditation purposes. The use of portfolios in the hiring process also appears to have stagnated and may even be on the decline. Even as schools of education move toward the use of electronic portfolios, portfolios in any format are not being readily accepted by administrators as indicators of employability of prospective teachers. The results of the present study indicate that perhaps portfolios may have outlived their usefulness in teacher education, and that other assessment devices and procedures may better capture the skills and talents of future education professionals. Additional study is recommended.

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EFFECTIVE STRATEGIES FOR THE COMPLIANCE WITH THE TIME-ON-TASK CONCEPT OF AACSB

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ABSTRACT

The AACSB's new "Assurance of Learning" standard has generated substantial interest in the enhancement of students learning in the courses and programs. Under its new accreditation standards for the business programs, the AACSB has introduced the concept of "Time-on-Task". The "Time-on-Task" concept is concerned with the extent of time invested by students and the faculty for learning activities in a course. The concept promotes the course requirements that result in sufficient investment of time by students in learning activities. This paper discusses several strategies for the enhancement of effective learning activities in business courses for the purpose of compliance with the "Time-on-Task" concept.

INTRODUCTION

In 2003, the AACSB revised its standards for accreditation shifting the focus of higher education to *outputs*. Specifically, the new AACSB accreditation standards require business schools to produce evidence of learning in their courses and programs. Under the new AACSB accreditation standards, business schools have to determine what kinds of knowledge and skills they want their students to learn, and then demonstrate that the students meet these specified learning goals. The underlying rationale for the new standard is that when student *learning* is the focus of assessment, the institution can achieve academic excellence.

The new accreditation standards let each institution decide what those learning goals should be and how they should be measured. The new standard is called "Assurance of Learning." The AACSB has suggested two measurement categories for the assessment and monitoring of students' learning: direct methods (includes selection tests, course-embedded measurement, and stand-alone testing), and indirect methods (includes various surveys of alumni, employers, and students). The AACSB has clearly stated that the indirect methods cannot replace the direct methods for assessment of student performance. By themselves, surveys produce weak evidence of learning.

OBJECTIVE OF THE PAPER

Under its new accreditation standards for the business programs, the AACSB has introduced the concept of "Time-on-Task". This concept refers to the amount of time invested by students and faculty members

for learning activities. The students and the faculty at the AACSB accredited schools are expected to invest ample time for learning activities.

For accreditation purposes, “Time-on-Task” for students is to be measured by review of course syllabus, lecture notes, learning activities, and samples of student work in order to assess the demands of course projects and learning expectations. Time-on-task for faculty members is to be measured by review of course syllabus, lecture notes, and examples of student work in order to assess participation of faculty members in direct faculty-student interaction and currency of course materials. Measurement and consideration of the “Time-on-Task” certainly will help to the enforcement of and the compliance with the assurance of learning standard.

The purpose of this paper is to describe several strategies adopted by the authors for increasing the amount of time invested by students and faculty for effective learning.

APPLICATION OF WEBCT BASED ASSIGNMENTS

The introductory accounting course is an important course for business students. The course familiarizes students with the process by which accounting information is prepared and used in making business decisions. Homework is critical to the reinforcement of the accounting concepts learned in the introductory accounting class. Based on experience, students do the homework when it is graded and factored in the course grade. Thus, homework assignments are most effective as a reinforcement tool when they are graded. However, grading numerous homework assignments in an introductory accounting course with a large number of students enrolled is a substantial burden on the instructor. This obstacle is removed by requiring students to submit their answers to the homework via WebCT.

WebCT is one of the widely used web-based course management systems that help faculty make better use of the Web in their courses. Through WebCT faculty can create and manage course websites without having to know HTML. One of the important capabilities of WebCT is the automated grading. Using the automated grading feature of the WebCT, faculty can grade the answers submitted by students to a wide range of questions such as true/false, multiple choice, calculated, multiple answer, ordering, fill-in-the-blank, matching, and short answer/essay questions. Faculty can control the date and the time when students must submit their answers to a homework or test. In addition, faculty can create grading rules and weight differentially the questions in a homework or test. Furthermore, WebCT provides analysis data for homework or test item results which can be exported to excel for additional analysis.

In the introductory accounting course offered by one of the authors, WebCT grades the homework automatically, making it possible to assign and grade homework on a weekly basis. In addition, after the deadline for the submission of the homework is pasted, the detailed solution to the homework is posted on WebCT and is discussed during the class following the homework deadline.

In general, WebCT allows for the use of at least six different formats of questions for assessing the student learning in accounting courses. They are as follows:

Type 1 Question – Multiple Choices

- Q1.** A company uses the lower of cost or market to value inventories. The corresponding concept is
- Consistency
 - Materiality
 - Full disclosure
 - Conservatism

Type 2 Question – Computing a number

Q2. The Baylor Company gathered the following condensed data for the year ended December 31, 2005. Baylor is subject to 25% income tax rate.

Cost of goods sold	\$ 800,000
Sales	1,800,000
Administrative expenses	250,000
Interest expense	60,000
Interest revenue	30,000
Loss from employee strike	200,000
Selling expenses	90,000

Compute Baylor's net income/loss for 2005? In submitting your answer to the WebCT don't use dollar sign (\$), space, or comma. Example: 5000

Show net loss, if any, with negative number. Example:-5000.

Type 3 Question - Computing several numbers

Q3. The following is the account balances for Mitchell Company as of December 31st in random order:

Depreciation Expense	4,800	Salaries Payable	5,000
Interest Payable	4,000	Cash	24,000
Accounts Payable	11,000	Common Stock	27,000
Equipment	54,000	Cost of Goods Sold	12,500
Interest Expense	3,500	Dividends	4,500
Marketable Securities-short-term	11,000	Salaries Expense	15,200
Retained Earnings	23,000	Unearned Revenues	2,000
Accounts Receivable	12,000	Sales Revenue	47,000
Accumulated Depreciation	12,000	Supplies	5,000
Bonds Payable	25,000	Land-investment	9,500

Compute total current assets and current liabilities, respectively, as of December 31st. In submitting your answer to the WebCT don't use dollar sign (\$), space, or comma. Separate your answers with a comma “,”. Example: 125000,89000

Type 4 Question – Words

Q4. The _____ principle states that expenses must be recorded in the period in which they were incurred and helped to generate revenues. What is the missing word?

Type 5 Question – Computing a number along with indicating the balance type

Q5. On April 1, the cash account had a balance of \$4000. During April, company had the following transactions:

- Provided \$6000 services to customers, collected \$5000 in cash, the rest was on account
- Purchased \$8000 equipment, paid \$3000 in cash, the rest was on account
- Collected \$2000 cash from customers for services to be provided in the future

Compute the balance of *cash* account after journalizing and posting all of the above transactions. Also, indicate whether the balance is debit or credit. Use capital D for debit and capital C for credit. In

submitting your answer to the WebCT don't use dollar sign (\$), space, or comma. Example: 5000D or 2500C

Type 6 Question – Journal entry

Q6. The following is list of accounts for Brown Law firm each represented by a letter.

- | | |
|---------------------------------------|-------------------------------|
| A. Cash | N. Retained Earnings |
| B. Supplies | O. Dividends |
| C. Accounts Receivable | P. Legal Service Revenues |
| D. Interest Receivable | Q. Interest Revenue |
| E. Prepaid Rent | R. Property Taxes Expense |
| F. Prepaid Insurance | S. Interest Expense |
| G. Equipment | T. Supplies Expense |
| H. Accumulated Depreciation—Equipment | U. Rent and Utilities Expense |
| I. Interest Payable | V. Salaries Expense |
| J. Salaries Payable | X. Insurance Expense |
| K. Accounts Payable | Y. Depreciation Expense |
| L. Unearned Legal Services Revenues | Z. Income Summary |
| M. Common Stock | N. Retained Earnings |

Provide journal entries for the following transaction: Purchased \$4000 equipment, paid \$1000 in cash and the rest was on credit.

In submitting your answers to the WebCT follow instructions:

Example: \$400 of supplies on hand was used.

Supplies Expense	400
Supplies	400

The answer for the above entry for WebCT is: T400D,B400C where T denotes supplies expenses account, 400 is the amount, D stands for debit, B denotes supplies account, 400 is the amount, and C stands for credit. The letters are in capital. Comma is used to separate the debit section from credit. Don't use dollar sign, decimal point, or space in any place. If in an entry requires more than one debit or credit accounts, first enter debit accounts, then the credit accounts. The order in which debit or credit accounts are entered does not matter. Example: Provided \$5000 services to clients, collected \$3000 in cash the rest was on account. The answer for Black Board is: A3000D,C2000D,P5000C

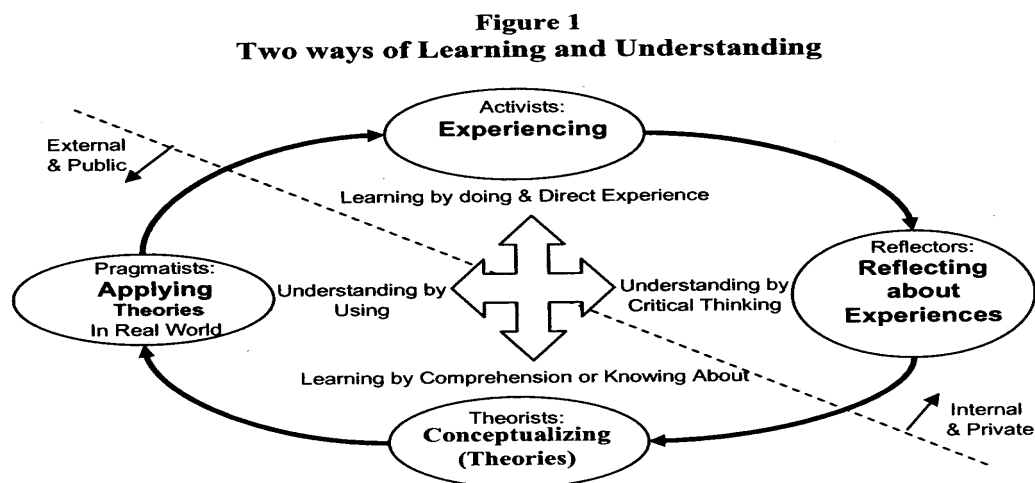
One of the critical elements of assurance of learning is to provide continuous feedback to students regarding their performance. WebCT offers students continuous feedback by allowing the students to see

their scores for each homework along with the correct answers to the questions that are missed, after the deadline. In addition, overall class performance on each homework question is tabulated and posted on the WebCT. By tabulation of the performance of students in homework, the instructor is able to monitor and assess student learning throughout the course. Questions that are missed by the majority of students are discussed in class and often placed again in subsequent homework assignments.

APPLICATION OF EXPERIENTIAL BASED LEARNING ASSIGNMENTS

It is a well-established fact that learning is facilitated when students participate completely in the learning process, and when they are confronted with practical and real-life problems. In recent years, the discipline of business administration has received a lot of criticism. Much of the criticism has focused on dissatisfaction within the business community of business education delivered to undergraduate students. The lack of necessary skills to apply the theoretical concepts and abstract knowledge in practical situations; and too much weight placed on theory and not on practical skills are two examples of such criticisms.

Experiential learning is an approach to education that has grown in popularity over the past twenty years. This type of learning occurs when students participate in some activity, reflect upon the activity, and use their analytical skills to derive some useful insight from the experience. What experiential learning does best is to capture the interest and involvement of the students, but most importantly, it contributes significantly to the transfer of learning. David Kolb [5] has developed the most established model of experiential learning. In his model the process begins with “Experiencing”, followed by “Reflecting”, which concentrates on what the experience means to the person who is experiencing. The reflection then leads to “Conceptualizing”, which corresponds to "knowledge about" which is theoretical and is represented by abstract concepts, and finally, if applicable, “Applying the New Knowledge” in real situations. Because “Experiential Learning” engages students, its benefits include: increased learning, increased motivation, and increased connection to reality. Kolb [5] has summarized the most important characteristics of experiential learning in the following diagram:



The following describes several ways by which one of the authors of this paper has applied experiential learning in marketing course:

Example # 1: “Packing the Powerful P!”

Most students in an introduction to marketing course can easily visualize the role packaging plays in protecting and facilitating the storage of products, it is not as clear to them the powerful role packing can play in determining how a consumer views and classifies a product (the promotion aspect). This taste test experiment is designed to graphically demonstrate how packaging makes us see three very similar products as completely different items. Three products are used in this taste test: KitKat candy bars, Sweet Escapes, and Keebler Fudge Sticks. The items should be cut up into bite size pieces. Each product is placed in separate bags labeled A, B, and C. Students are divided into groups of 3 to 5 depending on class size. The groups are given taste test sheets to fill out as a team. These sheets include the following items: which product did you prefer and why did you prefer it; what is the target market for the product; what the name of each product is; what price does each sell for (or list most the expensive to least). Once these are completed, they are collected and reviewed with the class and the identity of the products is revealed. Next the groups are given the ingredient lists for the three products labeled 1, 2, and 3 and are asked to match the product with its ingredients. These sheets are collected and reviewed. Finally students are given the nutritional breakdown for each product—standardized—so that each product’s nutritional breakdown is for the identical serving portion and asked to identify which product goes to which nutritional breakdown. These are collected, reviewed and how each team fared on the three tasks is reviewed. After the taste test is completed, the results are discussed as a class.

What the students discover is that the three products are all basically chocolate covered wafers are viewed very differently and sell for very different prices based on packaging. KitKat is packaged individually as a candy bar, while fudge sticks are packaged in a group as cookies, and Sweet Escape, a cross between a cookie and a candy bar, are packaged as a group but individually---. Students tend to be surprised at the fact that they cannot identify the candy bar, which they perceive as a chocolate bar, by its ingredients.

The taste test allows students to immediately begin to understand the relevance of packaging in determining how one perceives a product. It also demonstrates how packaging interacts with the price, promotion, and positioning of a product. Additionally, it allows them to apply their own experience to the material presented in class lectures. This exercise has a side benefit as it exposes students to taste tests as a form of marketing research. Most importantly it forces students from a passive state of learning to participatory learning. A good follow-up is to ask them to try and find their own examples.

Example #2: Pepsi/Coke Blind Taste Test

How did the Pepsi/Coke taste test evolve? In the late 1970s, Pepsi was looking for a creative promotion for its big problem area: the southwestern United States. Pepsi's national market share was 17 percent at the time but only 8 percent in the Southwest. Pepsi decided to stage a blind taste test using a sample of loyal Coke drinkers in the southwest. Pepsi had the volunteers to taste test two colas - one labeled M (Pepsi) and one labeled Q (Coke) and state their preference. In this test, more than half the Coke drinkers chose the product labeled M, Pepsi. Pepsi advertised the results in a promotion in the Dallas-Fort Worth area, and sales of Pepsi doubled. The promotion was so successful that Pepsi introduced it into seven other market areas. At this point, Coca-Cola announced that Pepsi's taste test was biased and unfair. Coca-Cola pointed out that variables other than taste were affecting volunteers' choices. One extraneous variable is that people have a natural preference for the letter M over the letter Q. As a result, the preference for product M could be based on taste or could be a subconscious preference for the letter.

In extensive testing, when people were asked to pick either Q or M, 78 percent chose M and 22 percent preferred Q. When people were asked to chose a number from 1 to 4, 70 percent chose 2 or 3, and only 30 percent chose 1 or 4. How do your class results compare?

Before Coke introduced its reformulated "New Coke" in 1985, it conducted almost 200,000 blind taste tests with consumers. The results: New Coke (55 percent) chosen over original Coke (45 percent); New Coke (52 percent) chosen over Pepsi (48 percent). However, after New Coke was introduced, it failed miserably in the market. The original formula was reintroduced a few months later as "Coca-Cola Classic."

We can replicate the taste test comparing New Coke, Coca-Cola Classic, and Pepsi as follows:

1. First, ask each student to select either the letter M or Q. Next, ask them to select a number from 1 to 4. Tally the results.
2. Get forty small paper cups and label ten with the letter R, ten with S, ten with T, and ten with the letter W.
3. Outside the room have a student volunteer randomly assign New Coke, Coca-Cola Classic, and Pepsi to the letters R, S, and T. Write down which soft drink goes with which letter.
4. At the start of class, select ten students as taste testers. The subjects should be regular consumers of non-diet cola (at least six 12-ounce bottles in the last month). Place the students at the front of the classroom.
5. Outside the room, the student volunteer should be filling each cup with the appropriate soda. Fill the W cups with water.
6. Put an R, S, T, and W cup in front of each student, and hand each student a copy of the Cola Taste Test Form provided.
7. To eliminate order bias, have three of the students begin the taste test with cup R, three with cup S, and four with cup T. Have them take a sip of water between colas and continue to sample and test in any order they wish. They can resample as needed to fill out the questionnaire.
8. Have a student tabulate the answers during class and share the results at the end of class. The form could even lend itself to cross-tabulations (between preferences and answers to questions 5 or 6) if the sample were larger.

Example 3: A Peek at Packaging: Students' Observations of Their Own Use of Packaging

The purpose of this assignment is to cultivate students' awareness of product packaging and related strategic issues. Each student records all packages handled over the course of four days, reports observations about the packaging used, and reflects on several strategic issues. An in-class activity conducted on the project's due date reinforces potential competitive advantages offered by strategic packaging and provides salient evidence of the challenges that marketers continue to face.

The project is comprised of three components:

1. **Record.** Students observe and record (i.e., list) all packaging they handle over the course of four days. For example, a peanut butter jar, jelly jar, and bread wrapper are all handled when a sandwich is made. An asterisk (*) is placed on the list next to any package which is disposed of. Students are instructed to watch for miscellaneous or non-traditional types of packaging that they use, e.g., groceries are packaged in either "paper or plastic". Part of the learning experience is determining whether something should be considered "packaging", based on the definition and functions discussed in class. Students are asked to divide the days into four time periods. Students are *strongly* encouraged to record their package use throughout the day. Of the four days, two must be "weekdays" (Monday - Thursday) and two must be "weekend days" (Friday - Sunday). The days do not have to be consecutive.

2. **Report.** Students discuss their observations in a two-page paper about the packaging handled. Discussion guidelines are provided:
 - Discuss observations about the amount (sheer quantity) of packaging handled on the weekdays vs. the weekend days.
 - Discuss the *types* of packaging handled on the weekdays vs. the weekend days. Were different types of products used? Discuss any patterns observed (portion sizes, disposed of more packaging on certain days, etc.).
 - Discuss observations relating to environmental issues. Based on these observations, discuss whether or not most packaging is environmentally friendly. Identify the package that was the worst environmental offender. Identify the package that offered the most positive example of environmental responsibility.
 - Discuss one other issue/observation about the packaging used over the course of these four days. (*NOTE: Although suggestions for potential issues can be provided, requiring students to identify a salient issue based on their own observations contributes to the learning experience.*)
3. **Reflect.** Based on the packaging handled over the course of the four days, identify the very best package and the very worst package. Specify why these particular packages were selected. Bring these two packages to class on the due date.

In-Class Activity

On the due date, form five-member groups. Each group member shows his/her best and worst package and explains why it was selected. Each group chooses their best and worst package. Then, each group's best package is presented to the class by the student who brought it, who again emphasizes the package's attributes. This is followed by a vote for the Grand Champion Package. This process is repeated for the worst package which culminates in the selection of the Very Worst Package. The students who brought these packages are each awarded a small prize.

The in-class activity reinforces the functions, attributes, and competitive advantages achievable via excellent strategic packaging. The poor packages provide salient examples of the criticisms and challenges facing the marketers of packaged-goods. A number of students are appalled at the quantity of packaging they personally use. Some rue obvious excess packaging while others point out that the level of product quality demanded by customers (e.g., unbroken cookies) requires product protection. A discussion of these issues can be used to [re]emphasize the challenges marketers face regarding customer expectations, social responsibility, and/or the marketing environment. When the projects have been graded and are returned to the students, a list of packages documented by especially observant students is read to the class, e.g., envelopes, banana labels, rubber bands around newspapers. This provides an opportunity to recap the qualifications, functions, and benefits of packaging.

APPLICATION OF APLIA BASED ASSIGNMENTS

Aplia is an online delivery of college-level educational materials supplemented by interactive applications. It is designed to improve learning by increasing student effort and engagement, registered its 500,000th user during the spring 2007 semester. Aplia provides instructors with the ability to deliver interactive, auto-graded assignments, ensuring that students put forth quality effort on a regular basis. Aplia has four different types of content, including problem sets with detailed feedback, timely news analyses, real-time experiments, and tutorials that help students overcome deficiencies in prerequisite material. These assignments have been developed for a range of textbooks, are easily customized for

individual teaching schedules, and include several cost-effective purchasing options. Aplia first developed materials for economics courses in 2002, and has since expanded its offerings into accounting, finance and business statistics.

Project Description:

A New Vision for Learning as a Nation Goes to College calls for a new focus on excellence to better prepare students for the twenty-first century. The report recommends the creation of a New Academy characterized by high expectations, a focus on learning, and a commitment to demonstrated achievement, intentional practices, and an engaged, practical liberal education for all students.

Aplia is an online delivery of college-level educational materials supplemented by interactive applications. It is designed to improve learning by increasing student effort and engagement. We hope that students will find participating in this interactive applications fun and increase their enthusiasm for studying economics.

Goals:

Educators have emphasized the benefits of providing students with *active learning* experiences in the classroom, both to stimulate student interest and improve retention of the material taught. “Active learning may be defined as instructional activities involving students in doing things and thinking about what they are doing.” [1, P.1]. In the field of economics, classroom experiments have become a popular means of helping students understand the roles of producers, consumers, and the process by which markets achieve equilibrium.

The same instructor has had the opportunity to teach four sections of the same course of Principles of Microeconomics (ECON 2106) during fall semester 2005 through spring semester 2007. Aplia has been conducted over two semesters—fall 2006 and spring 2007-- in the course. Principles of Microeconomics is a required course for business majors at Clayton State University, and is usually taken by sophomores. The primary objective of the course is to introduce students to the economic concepts and issues involved in making business and personal decisions. During both fall 2006 and spring 2007 semesters, the instructor assigned ten (10) graded assignments on Aplia to assess the students understanding of issues ranging from the process of making choices to the opportunity costs of a teachers’ strike to the impact of trade restrictions after they have completed the readings and in-class discussions.

The above project was designed to include the following five (5) Principles of Universal Design:

Principle 1: *Equitable use*--Students in the course will have access to the faculty web-based courseware product for assigned activities in the course.

Principle 4: *Perceptible information*—Students will have access to all required materials in the course in both hard copy and digital (on-line) formats.

Principle 6: *Low physical effort*—Students will use computer software to complete all activities in the project.

Principle 8: *A community of learners*—Students will be required to use e-mail and/or class discussions in order to accomplish the goals of activities in the project.

We compared the performance and satisfaction of the students in the course during the semesters when Aplia was not used (fall 05 and spring 06) with the semesters when Aplia was required (fall 06 and spring 07). We noted the following:

1. Students drop rate from the course was more when Aplia was not used.
2. Students' performance was lower in the course when Aplia was not used.

With respect to the evaluation of instructor and content of the course, students are indifferent or better evaluate during the semesters when Aplia was used compare to the semesters when the Aplia was not required. Also, using information from on-line graded assignments in principles of microeconomics course, we find that non-procrastinators (both early-starters and front-loaders) obtain higher scores than their dillydallying counterparts. We also find that while busier students tend to start their assignments earlier, they nevertheless back-load the bulk of their effort.

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TRAINING, LEARNING AND PERFORMANCE

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ABSTRACT

In this work we set out to provide the theoretical and conceptual basis for an approach to adult learning and performance. The idea is to demonstrate a confluence of theory and constructs that support instructional activities for adult learners in a work setting. Proposed is a model and method that involves employees in: (1) the development of training for performance improvement, and (2) the creation of templates for performance [scripts for enacting critical performance events (CPE)]. This creative activity is followed by practice in the operating environment that ultimately leads to employee reflection on their efforts and reporting of what was learned so as to improve the templates for performance.

INTRODUCTION

In many, if not most organizations the unpredictability of events and conditions is great and change is taking place at an unrelenting pace. The pace and amount of change experienced means that both learning and performance is subject to modification on-the-fly. Many managers have to make changes, take action, and decide on future directions before they have a chance to learn all they need to learn in anticipation of changes. When it comes to performance, particularly employee task performance, "getting it right" the first time in terms of quality, quantity, level of skill applied, and so on, is probably illusory. In many cases, performance and its improvement represent moving targets and it is reasonable to think about performance as something that must be enhanced and improved over time per incremental adjustments.

With regard to training and education for performance in regular business operations there are many models of instruction, training, personal and/or organizational development available to academics, researchers, and practitioners. Under the rubric of practitioners we could include varieties of instructors, facilitators, consultants, trainers, and managers. Most of the instructional models are grounded on a single theory or concept and there has been little effort to create instructional approaches that integrate several theories or concepts into a powerful or robust model that may serve several interrelated purposes (Dehler, 2001; Kayes, 2002). Such purposes may include learning: new information or skills (including learning how to learn individually or in groups), to solve problems, ways to structure an approach to learning, problem solving, and continuous improvement at once; and learning how to create personalized models for continued learning and improvement of performance. This learning may relate to the individual in a personal context or to a job or position in an organizational context.

People are inquisitive beings that continually search for better, more efficient and effective ways to do things. Models of instruction and development should reflect both efficiency and effectiveness of effort and, at the same time; reflect process elements that are mutually reinforcing (Lyons, 2005). We know a great deal about human learning and motivation and we need to express instructional approaches for adults that draw from what we know -- from what research tells us (Pearce, 2006). It is also important to combine activities that take us from the attainment and assimilation of information to application and use

of that information in ways that adults find motivating, effective, satisfying and that clearly contribute to improved performance. Finally, we need to combine learning activities that have consequences that are transferable to different settings and contexts and that may be used for improvements in what we do, think, and achieve. This paper makes an effort to address these matters.

Purposes of This Work

In this work we set out to provide the theoretical and conceptual basis for an approach to adult learning and performance. The idea is to demonstrate a confluence of theory and constructs that support instructional activities for adult learners in a work setting. Much of what is offered is taken from the author's research over the past decade. That body of research has relied upon social learning theory, experiential learning theory, creation and use of scripts, constructivist approaches to learning, and other concepts to demonstrate effective approaches to training and learning in organizations.

Theory and method combine to create learning activities that help to illuminate as well as change fundamental assumptions, enable learners to develop self-efficacious responses to complex problems (individually and in groups), and provide contexts for learning that are stimulating and tap into personal motivation (see, for example, Bourner & Flowers, 1997).

We believe that the approach or method guiding instruction and learning should take on a life of its own, that is, the method itself should offer and then become, for the learners, a learning platform or scaffold; a structure that may support learning for different purposes presently and in the future. Learning method and learning content are thus separate yet intertwined and mutually reinforcing. And this is only part of the landscape because method offers a way of being and thinking while content that relates to knowledge, skills, and dispositions offers improved means of performing supported by a deliberate effort to reinforce and improve both learning and performance.

Ultimately, we want to establish a theory-grounded, robust approach for instruction and guidance that has very practical consequences for participants. The approach must reflect what we currently know about adult motivation and learning in general. The consequences resulting from participating in the approach must reflect learning and change as well as improved performance in an organizational context.

BACKGROUND

There are several important needs that drive the interest and subject matter of this paper and they are summarized here. We need instruction and training models that:

- ❑ represent robust, rich instruction-learning approaches that serve multiple, related purposes, not the least of which is performance improvement;
- ❑ may be personalized for learning and performing in a variety of contexts,
- ❑ may be managed for both effectiveness and efficiency, and
- ❑ have transfer of learning potential and at the same time serve as a scaffold for advanced learning and continual performance improvement.

It is a reasonably large order to create an instruction and training approach that will effectively address all of these needs. This paper offers the basis for the model only. Testing of the approach is to be conducted in the future. In addition to addressing the needs listed above, the model proposed should also make a concerted effort to address several important topics that are central to instruction, training, and performance. These topics include:

- ❑ enhancing adult learning in social contexts [this may include dynamics of groups in a performance context such as social facilitation, identity, information processing (Lord & Kernan, 1987; Bandura, 1997; and Lyons, 2006);
- ❑ helping employees to apply learning to make improvements in task achievement, contextual skills, and overall competence (Gilbert, 1996);
- ❑ using what we know about adult motivation to enhance learning (Latham & Pinder, 2005),
- ❑ helping employees in the creation of new knowledge (Mezirow, 1990), and
- ❑ helping our employees (at any level) to learn and use reflective skills such that they learn to review, re-visit, and examine their own methods and processes of attaining and using information (Kayes & Kayes, 2005).

In addition, it is most desirable to augment or expand the valid, practical models of performance improvement that have been established over the past several years, such as the ProMes model, which has a 25-year history of success in performance improvement (Pritchard, 1990), and the Multiple-Linkage Model of Richard Chang (1995) that has a demonstrated track record of success in performance improvement. The Performance Template approach expressed in this paper offers improvements in these existing, successful models, although empirical testing of the templates' use is not part of this work.

In the following segment of this paper we present the general features of the model under consideration. Then, the theory base for the instruction component is presented in detail followed by an example of the model in practice.

GENERAL FEATURES OF THE MODEL

Up-front we assume the managers, leaders, and key operatives know well their business and its operations. In the approach that follows performance and learning are regarded as combined in a series of contemplative steps. Descriptions of the learning and performance dynamics are explained below.

In the model cycle, managers must first identify key processes needed for high quality performance of important tasks and functions. So we start with this – clear explanations of the key processes.

1. Once processes are carefully defined (most businesses already have done this), then per each process managers must identify the critical performance events (CPE). These events relate to the training, guidance, coaching and learning required because the information and skills involved in each CPE are of vital importance.

2. There must be some discussion among the designers and crafters of the actual training and the managers who oversee key processes in order to flesh-out the essential features of the CPE for which information, knowledge, and skills are to be created, developed and/or enhanced. We need consensus among designers and management in this phase. The consensus can be based largely on coarse or granular features -- that is, the detail work, the "grinding and polishing" may occur over time in subsequent learning encounters.

3. The training, itself, can be shaped in many ways. What must result from the training per a given CPE is the Performance Template [PT, hereafter – Template].

Training and education in the construction of the template makes use of a variety of methods, tools, and concepts. The training must be appealing to the typical adult learner. Assumed here is that the training is

conducted in groups, preferably small groups in order to encourage maximum, individual participation in the template-building process.

4. Once one or more templates have been developed (all of them are in a tentative state – nothing is “final” in the usual sense), then employees must use them (practice) in regular work situations in critical performance events [CPE]. The templates can be made available in print, CD, and on a web-site.

5. Each time a template is used in a CPE, the employee is expected to reflect upon use, note what was learned (reactions of customer, missing information, guidance as per application, etc.) and feed that information back to the design staff (person). This part of the capture process can be facilitated with forms, instructions, as well as electronic, web-based reporting formats. Research (Kleingeld, et al., 2004) has demonstrated that involvement of employees in work of this type, as informed participants, results in improved performance.

6. Adjusting the template. Some basis must be used for timing, frequency, etc., of up-dating and revising the templates. Actual frequency of use of a template may dictate the basis for adjustment. Regardless, templates need to be adjusted based on learning. Adjustment may relate to information (product, service, etc.), customer needs and wants, and/or the skill features of the template (e.g. use of follow-up questions in sales contacts) among other things.

This last step relates to the transference dynamics of learning. This is the crucial step in this template process because the learning is amplified for several levels. For example, suppose the group of interest is sales agents for a global publisher of college texts and related print and web-based materials. There may be dozens of sales agents in our group. In number 6, above, the information learned from implementation of a particular template by our sales agents from activities such as individual customer visits, bookstore exhibitions, exhibitions at academic conferences, and so forth is fed back into the template development process. The information has implications for learning transfer for at least three groups of individuals (training staff, managers, employees), and perhaps other individuals.

Assuming that the initial viewer of the fed-back learned information is the individual responsible for training, template development and promulgation. This person learns from the exchange. The information fed to management provides not only information aimed at template development and revision but also aimed at critical performance elements of a larger process. Contemplation of these elements offers opportunity for management development and transference of basic information to important performance components. Managers also have the opportunity to learn whether the information learned and passed on by the sales agent has implications for other matters. Perhaps some observation passed on by a sales agent is a bellwether of some trend, etc., in the making. At the extreme, such learning could be substantial enough to assist business strategy development. Obviously, the sales agent has learned something otherwise he/she had nothing to pass on in the first place. Learning, as expressed here is clearly anticipated by management, and is part of the psychological contract.

These last (above) considerations set the stage for management development in terms of apprehension of and actions towards modifications in business practices, recognition of new opportunities, mentoring/coaching of staff (see for example, Pollitt, 2006) and the championing of change. These considerations and features represent the main characteristics of the model. On the pages that follow we describe details of the training processes that lead to the construction and use of the performance templates.

THEORY BASES FOR INSTRUCTION AND DEVELOPMENT OF PERFORMANCE

TEMPLATES

Experiential Learning Theory

For our purposes, learning is generally defined as a change in performance. Adult learners make use of several forms of educational or training processes and in this paper we rely on the use and influence of experiential learning theory [ELT] as used in the creation of performance templates, particularly in the training portion of the work. Experiential approaches usually seek to involve learners in new experiences, tend to be somewhat holistic in nature, and often integrate other approaches into a single framework as action, cognition, reflection, and experience (Kayes, 2002). In general, experiential approaches include action-driven learning approaches that seek to improve task behaviors that contribute to effectiveness in achieving goal-directed outcomes. Also included are cognitive approaches that are concerned with thinking processes (e.g., memories, perceptions, representations) that emphasize intra- and interpersonal transformations that take place within and between employees, and employees and managers. Finally, reflective approaches as part of experiential learning tend to focus on processes of self-discovery and questioning whereby employees learn to reflect critically on their assumptions and beliefs, and then, ultimately, free themselves from assumptions that limit their perspectives.

ELT, as an interdisciplinary field, is grounded in philosophy, anthropology, sociology, psychology, and cognitive science (Carver, 1996). In the past 100 years there has been much study and empirical research regarding experiential education and experiential learning and the traditions of experiential learning extend from the writings of Dewey (1933) to the current day (Mezirow, 1998; Kolb & Kolb, 2005). Perhaps the most established and discussed model of experiential learning is that of David Kolb (1984). The performance template creation and use examined in this paper parallel, in sequence, the behaviors explained in Kolb's model of experiential learning. Kolb's model (1984) is grounded in the humanistic concept that people have a natural capacity to learn. Experience acts as the catalyst for engaging in the process of a dialectic inquiry - process that is based on and confined to the data of human experience. The process operates whereby knowledge is created through the transformation of experience (Kolb, 1984, p. 41) and the learning activity rests on six assumptions: Learning

- (a) is a process, not an outcome,
- (b) derives from experience,
- (c) requires an individual to resolve dialectically opposed demands,
- (d) is holistic and integrative, it goes beyond cognition to include thinking, feeling, perceiving and behaving;
- (e) requires interplay between a person and environment, that is, we assimilate new experiences into existing concepts and accommodate existing concepts to new experiences; and
- (f) results in knowledge creation.

Moreover, learning involves the interplay between two interdependent dimensions of knowledge: acquisition and transformation (how to get information and what to do with it). Each dimension requires an individual to resolve a dialectic or a set of competing learning tensions. In *acquisition*, the learner resolves the tension between apprehension (concrete experience) and - comprehension (abstract conceptualization). Apprehension is the taking in of information, while comprehension is when the learner breaks down this information into meaningful events and places them within a symbolic system of culture and society (how the information fits with what we know/believe).

This knowledge (acquisition) interacts with the second learning dimension:

knowledge transformation. Here, one resolves the tension between knowledge intention (reflective observation) and knowledge extension (active experimentation). The learner moves inwardly to reflect on previously acquired knowledge. Then, he/she moves beyond the self to interact with an external environment.

Taken in concert, these four processes constitute the learning cycle. As learners and managers resolve these dialectical tensions, they orchestrate their way around the cyclical process of learning. Learning, then, is a continuous process of responding to diverse personal and environmental demands that arise from the interaction between experience, conceptualization, reflection, and action in a cyclical, but not necessarily orderly, fashion. The four processes mesh very well, indeed, with the performance template activities identified in this paper.

In applying the performance template approach to learning we find that to learn requires facing and embracing differences; whether they be differences between skilled, expert performance and one's novice status, differences between deeply held beliefs and new ideas, or differences in the life experience and values of others that can lead to understanding them (Kolb & Kolb, 2005).

Background for Creating Performance Templates

We know that business or organizational competitiveness is tied to improving managerial skills as well as improving the training and development of the workforce, that is, the enhancement of human capital (Worrall & Cooper, 2001). The quality of performance of human resources is usually grounded in the application of skill and knowledge competencies. Skill is the application of some behavior that has some discriminations of mastery, for example, quality and/or quantity.

Like competence, skill has relativistic referents and virtually every task or job may be performed more or less skillfully depending on results achieved, time used and resources applied. Both competence and skill are qualitative terms. If we can improve an individual's skills we are also improving their competence and their capacity to more carefully discriminate among alternative approaches to skill application.

We base creation and maintenance of performance templates [PT] on what is often referred to as a constructivist approach to employee learning and change. In such an approach the employee is constructing or creating new knowledge over a foundation of prior or previous learning. If what we discover in taking on new learning activities is at variance with what we already "know", we have choices to make about behaving and performing differently. In the context of templates as presented here individuals, working together to improve performance, make meaning socially as they construct their experience together so they can cooperate and communicate and achieve consensus about what is happening. There are multiple representations of reality and managers and employees, together, construct reality and the construction is ongoing and changing as accepted meanings and understandings among or between individuals are negotiated in a social context (Raelin, 2000).

Use and Functions of Performance Templates

We suggest that template creation as a process may be used in organizations, on a small or large scale, to identify domains of knowledge, skills, and abilities that represent the individuals of a particular group or unit who need to carefully execute critical performance events (CPE). Individuals using direction and guidelines map the activities and competencies needed for quality execution (Lyons, 2003). The template is the result of a process of listing critical skill and knowledge elements of a task, job, role, or unit so as to demonstrate or discover, or re-discover, what is needed for successful performance. Identities and listings are followed by activities that seek to create refinements of skilled behavior, integrate (or create) standards for measuring skilled performance, and related activities. All of these elements are needed for a

template.

Commencing with templates relies on the analysis of performance in some general-to-specific areas. The analysis of performance relies on current practice, recent data and historical information. For illustrative purposes, we need some target performance domain. Our earlier example supposed a sales function and we have several agents primarily involved in direct selling to customers in-person, at exhibitions, or by some other means. This sales group we refer to as a team and this team will be subject to education and training in template creation.

Our performance domain within sales is "assisting the customer to define his/her needs." This is a CPE that is a segment of a larger process. Please keep in mind that we have assumed that the organization and its managers already possess considerable information and knowledge of its important processes. Further, suppose that a variety of performance indicators such as data from customer satisfaction surveys, random telephone surveys of customers' buying experience, unsolicited communications from customers, observations of associates' performance with customers, and other means have yielded information that indicates that knowledge and skill of associates in dealing with needs of customers is an area that likely requires improvement in quality. Explicit benchmarks may or may not have been established and details regarding benchmarks are beyond the scope of the present paper. Analysis should ordinarily result in the identity of performance gaps or problems. Such discovery is central to the overall process of creating and maintaining a performance template.

Once performance gaps have been identified, clarification and meaning, it is important to establish objectives for improving the process. Ultimately, we want to be able to specify what performance is desired and how much improvement is needed. We need to address the focus of improvement efforts. For example, is the improvement only at the individual performer level, or, is it at the level of a unit, or a team? Might the improvement be focused on a combination of levels? In the example provided above (assisting the customer define his/her needs) the primary focus of improvement level is the individual performer. Also, given the nature of improvements, what implications do they have for management intervention, training and so on.

Objectives should be general enough to allow the template builders enough freedom to find good solutions and specific enough to convey what the change effort ought to accomplish. Changes need to be driven by ends and not means. While the quality of the thinking and effort that goes into the construction is important, it is merely a means to an end, that is, identities of improved performance activities. One way to quickly make progress with the creative work is to construct a skills chart (Lyons, 2003). The chart starts out as a graphical representation of activities and behavior that *might* be part of a task process where the employee needs to behave in a more skilled manner to be effective. As performance gaps are known, the group commences to chart, on poster sheets, whiteboard, Powerpoint, etc., the bits of information, data, intuition, guesses, expert opinion, and so forth, that may influence improved performance. Then we commence with a type of brainstorming activity to identify improvement ideas and strategies.

The creation of the chart is just the beginning. The construction of the chart serves as a as a graphic organizer of ideas. Individuals or small groups can brainstorm a number of ideas, behaviors, or performances that may help to define skilled performance in some area. Again, our sample skill area is: assisting the customer to define his/her needs and we are assuming that our individual or small group used this skill area as its stimulus or trigger.

The team lists the major activities, and actions that would need to occur as part of a skillful repertoire of behavior to address the performance gap. This is how the physical map commences. Several significant component areas could be identified, such as these examples:

- Initial encounter with customer (in-person, other)
- Creating questions and using questions with the customer
- Active listening to/with the customer
- Reflecting and summarizing customer statements
- Focusing on how product/service choice meets customer needs

The next segment of this work addresses a detailed example of the creation and implementation of a Performance Template.

Performance Template - A Detailed Example

Scripts - In General

The process of activities that includes the construction and maintenance of a template incorporates, in large measure, the creation of a script and makes use of experiential learning theory and use of skill charts. In general, a script is a hypothesized cognitive structure that upon actuation provides a guide to appropriate behavior sequences in a given context or situation. We tend to think of a script as a product, output, or result of some intellectual work. It is an entity, a thing that has been produced. Unlike a play or movie, script as used in this work is not an explicit, word-for-word expression of what to say or do in some circumstance or sequence of events. Rather, the script is a guide to action. While the script-as-guide is a product, the activities that create the script are the main focus of this paper and the activities stimulate learning in different ways. The details of the activities are described later in this work.

According to Lord and Kernan (1987) scripts may serve a dual purpose: they help one to interpret the behavior of others, and aid in generalizing behavior. Hence, they may guide the planning and execution of familiar and/or repetitive tasks. In supervisory or managerial work, for example, it is likely that relatively common scripts exist for a variety of activities such as conducting informational meetings, coaching an employee, conducting performance appraisal sessions, and the like.

In script creation processes, individual and small group task assessments may be presumed to be causally related to both task motivation and satisfaction (Thomas & Velthouse, 1990). The growth and change in one's knowledge and understanding as a result of the processes should lead to increased self-efficacy and quality of performance. The work of Griffith (1999) in the use of a reflecting team in case work supports these assertions. The motivational aspects of the learning in script creation include a variety of self-referent processes involving self-monitoring, personal goal-setting, outcome expectations, and self-efficacy (Bandura, 1997, 228). These activities promote interest in intellectual work through the investment of the self-system in them. Hence, working through the script processes to achieve useful products demonstrates successful performance which translates to enhanced motivation and self-efficacy beliefs.

The general dynamics of the learning that occurs in the activities defined in the preceding paragraphs reflects upon the social context of a learning team as the learners, by design, work through a sequence of steps that guide them in their adaptive responses. Consistent with the work of Wise (2002) the steps, additively, should positively influence self-regulation, outcome expectancy, and self-efficacy.

In the sense that scripts are used here, scripts are flexible, adaptable, constructed tools to enhance performance and learning. Typically, they are not end-states or final -- they are steps on the road to skill development and continuous improvement. Again, the word *script* carries certain meanings and there may be a better word to use in its place. We don't yet know what that word is. The words, routine, or program, do not seem to be improvements over the word, script. For our purposes, the script is but a part

of the Performance Template. What follows is an example of a complete template creation and learning sequence of activities.

Performance Template - Sequence of Activities

As mentioned above, it is assumed that nearly all of the participants in the activities outlined here are knowledgeable about the business and have substantial experience in the business and industry. What follows also assumes that learning and performance are combined in a series of steps or phases and that it is sometimes difficult to discern where instruction, learning, and performance intersect as they influence one another. The process explained here is a general process, one that may be adapted to a variety of training and educational purposes.

1. Target performance. First, we commence with knowledge regarding a specific activity or process that is a well-understood performance domain. For our purposes here we use sales of college textbooks by agents of publishers. The sales agents have several venues in which to operate such as: sales calls to college faculty, program directors, and the like; exhibits at professional and/or academic conferences, and bookstore exhibitions. We may isolate a single process in the work or task environment, such as a conducting a sales call. Further, we isolate one area of that process, "assisting the customer to define her/his needs." This is the target area for the construction or creation of a Performance Template. In well-managed companies it is reasonable to assume that much work has already been completed with regard to training and education for agent success in this critical performance event. That is, it has already been determined that *assisting the customer to define her/his needs* is an area for which training and practice has been examined and implemented.

2. Training Design. Second, with or without the history mentioned above in step #1, above, we are now embarking on the process of creating a template. This means that training for *assisting the customer, etc.* will be re-considered, re-formulated and so on to embrace not only the behavior needed to be successful in practice, but to include the iterative actions used in updating the practice guide to increase learning and to leverage learning. Training designers and managers need to agree on how to best carry out the new training for it to result in a practical, meaningful template for performance. This may include some adjustment to the definition of the critical performance event.

3. Implement Training. Once general agreement is reached regarding the basic ideas and assumptions, the training needs to commence. Actually, the training is akin to guided discussion as the sales agents are to do most of the work in the creation of the performance template. We commence with the existing need, *assisting the customer, etc.* and any existing, detailed guidance (models, scripts, etc.) for successful implementation of the behavior. The process is facilitated by one who has attained familiarity with the script creation approach. Participant(s) review the information for completeness, understanding, and common meanings. Clarifications are sought. For our example (see above) the participants need some dialog with the facilitator to clarify basic terms, purposes of customer needs identify, responsibilities of and accountability of the agent and related matters.

Discussion takes place in open forum. We seek to clarify what we know, what we do not know and/or have questions about. This discussion has as one of its objectives the commencement of recognition of information and performance gaps. At the least, we need to attain consensus about the critical issues, assumptions and problems that the information reveals to us in a practice (in-the-field) sense. To assist in this work we use Brady's (1996, 2004) conceptual framework to shape and crystallize our mental models of reality. That is, we want to address or help give shape to situational issues using these five elements or screening tools:

Time aspects- currency, immediacy etc.,

The Setting - milieu, customers' features, background, etc.

Actors - history of the sales target, past relationships with our company, satisfaction with our products, etc.

Social Patterns - (if any) past relationship with this customer, common interests, experiences with product of other professionals, etc., and

Assumptions - what do we take for granted; what is clearly "true."

Superimposing these five categories of information on our sales example, we begin to quickly fill-in some of the gaps in our knowledge and understanding. That is, the categories help us to focus on critical elements of the context and the interrelationships among characteristics of the context. Questions regarding when, what, why, and so on help participants to visualize a clearer view of what may be going on and what may need to take place.

Brady's framework helps to provide criteria for content selection and emphasis. It also helps us to envision possible relationships among various aspects of reality. A fundamental assumption is that participants already possess considerable knowledge and need to reorganize it to make it more useful. Participants need to supplement knowledge with insights and skills that will help explain more fully what they already know (Brady, 2004, p. 280). This particular step in the process is representative of constructivism in action. The scaffolding of information known and understood regarding the sales encounter takes place in a give-and-take discussion. Some consensus building takes place among participants. Prior learning and assumptions may inhibit or accelerate learning in the group.

4. Performance Adjustment. As part of the training activity, brainstorming potential interventions for treating the issues, questions, and concerns takes place. Once possible template content is identified, tasks are parsed to the individual(s) or groups as follows:

List - What is the specific behavior required to skillfully execute the application of the template [again, assisting the customer to define her/his needs]

Access/Summarize - What research, authoritative information, etc., must be reviewed and considered to successfully implement the template?

Reconcile - In order to put forth a tentative action plan for template content, it is necessary to reconcile our behaviors list with the research information in order to identify and recommend a more precise set of behaviors.

In this aspect of the work we need to be very clear about the differences between performance as behavior and performance as outcomes. Another way to state this is that activities and tasks are important and need to be well defined and understood; and the results or outcomes of the various activities must be defined, made clear and understood (Cardy, 2004). It is in this work we find both constructivism and experiential learning emerging. Information is known and revised; the concrete experience of sales work shapes ideas; reflection occurs in order to augment understanding and to launch personal theories of actions to take, or at the least, consider. The foundation of the template takes shape.

5. Template Identity. At this point there is identification of the behavioral elements necessary to address the issues or problems heretofore examined. Consensual processes have taken place to achieve this result. The result is temporary as validation processes still need to occur. Per our example (above) we now have some reasonably clear notions of what specific behaviors need to occur in order to help assess customer needs. If we were starting the process completely from "scratch," a key segment of the entire process is near completion. Learners have achieved some objectives and this encourages feelings of self-efficacy as mastery and control of the creative process is evidenced.

The template information is recorded using, as needed, descriptions, graphs, charts, and so on. The information needs to be in a form for reproduction and dissemination.

6. Model the template. The modeling is a rehearsal and such rehearsal requires the leadership of the facilitator. Participants actually act-out (perform) for each other the behaviors heretofore identified. In terms of experiential learning, this phase represents active experimentation.

7. Field work. The template is now ready for trial in actual work situations. At this point in the overall process, when a template is used as a part of a critical performance event, such as our sales call example with its constituent parts, the sales agent is expected to reflect upon use, note what was learned (reactions of customer, missing information, etc.) and feed that reflective information back to the training design staff (contact person). This part of the capture process can be facilitated with forms, instructions, as well as electronic, web-based reporting tools. This capture process matter is very important and could be the subject of a separate study.

Expectations: Management and the design staff will know, on average, how many sales calls are made in a week, so some percentage of the calls, as a minimum, should be selected by the sales agent for reflection or reporting. Not every critical performance event needs to be recorded – sampling is appropriate. Management and design staff need to create some clear expectations regarding this activity.

8. Adjusting the Template. On some schedule to be determined by training staff and management, templates-in-use are updated with input from users and evaluation by staff and managers. The schedule could be on a bi-weekly or monthly basis. The new template information is then made available to all relevant parties. The updated templates reflect what has been learned and how that learning may contribute to timely, improved performance.

9. Feedback and Iterations. Assuming we have codified the templates currently being used, the revised template for a segment of a critical performance event should be sent to all participants. This may be done per an electronic data base of all templates to be downloaded by participants. The overall process repeats, the sales staff is responsible as part of their normal responsibilities to participate in the on-going template adjustment process. Recent research (Pritchard, et al., 2007) has demonstrated that when individuals have access to information such as that in the templates, that is, both simple and complex information, they use the complex information in the intended ways. This concludes the detailed example of the entire process.

Evidence of the Effectiveness of Similar Template Creation Activities

Several training and educational approaches demonstrate the effectiveness of processes which are similar to yet not exactly the same as performance template work. Most of this work is focused on script creation. Frankly, we do not know of many unsuccessful attempts in the use of the methods as such efforts do not find their way into the literature. We report here, briefly, upon the research to which we have access. Keleman and others (1993) used script creation and management to demonstrate how group support systems can be made more effective. The primary focus of their research was the implementation and use of group support systems in various arrangements for problem-solving, decision making and so on. They developed an approach that permits a facilitator of a group to enable script creation and script adjustments on-the-fly in real time situations with problem solving groups. The approach enables better use of time and more effective use of information by the group.

Lyons (2003, 2004a) used script creation processes extensively in skill development and performance improvement training and education. Script creation was housed within a training design that applied skill charting activities. Skill charting is a tool that uses the general script creation model explained earlier in this work to help a group of employees or students to focus very intensely on skilled, behavioral

performances that attend a particular key result area, such as customer satisfaction. Performance definition and focus are critical elements in the process and once skill attributes and behaviors are identified, in this example - customer satisfaction pursuant to some types of transactions with employees, the learners go on to create performance standards for each one. The process is somewhat reflexive and self-reinforcing. In one study (Lyons, 2003) team leaders' performance of specific supervisory and leadership skills with team members was improved from using script creation processes in their training. In another study (Lyons, 2004a) a senior management team making use of script creation processes was able to positively influence a serious employee turnover problem through the skillful creation of behavioral profiles of ideal work associates.

Finally, in a recent study (Lyons, 2004b) a training model was developed that made use of hypothetical problem situations (cases, incidents) with script creation activities superimposed on the case analysis work. The resulting approach was named Case-Based Modeling and was used to improve the performance of team members in certain performance areas such as skillfully managing meetings. The approach has broad applicability for training in general supervision, management, and for higher education in business and management. With adaptation, the approach could be used in many different situations and with many different occupational groups.

SUMMARY AND CONCLUSIONS

The main elements in this paper offer a proposal for training and performance improvement. While the grounding of the proposal includes several clearly identified theories and concepts, particularly those related to the training component and the template construction component, there is very little evidence to demonstrate that the learning capture and use is effective when it comes to improvements in performance templates and the subsequent implementation of improvements.

There is much presented in the paper that supports the idea that the entire approach could be successful in terms of performance effectiveness. However, the proposal, in its entirety, needs to be tested in the field to determine if all of the components of the approach can be skillfully conducted, effectively implemented, and successfully evaluated. This is the domain of future research. It is important to the author to receive information from SE-INFORMS participants that could be helpful in the creation of empirical analysis of the proposal.

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APPLICATION OF LITTLE’S LAW TO ENROLLMENT MANAGEMENT PRACTICES IN HIGHER EDUCATION

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ABSTRACT

Little’s Law is applied to university enrollment management in degree programs with capacity constraints. Using empirical data on graduation rates, number of credits taken per semester, and number of active students by program, calculated flow times from admission to graduation are compared to flow times predicted by Little’s Law. Despite significant variability between students in part-time degree programs, due to students entering with varying transfer credits and taking varying credits per semester, the Little’s Law model reasonably approximates the relationship between the inventory of current students, flow rates through each degree program, and flow times to graduation. This analysis utilizes institutional enrollment data and simple decision support tools.

INTRODUCTION

“Enrollment Management” often refers to recruiting and marketing to attract plenty of the appropriate students to fill academic programs. However, the “too much or too little” problem does not stop here. Universities with capacity constraints or excess capacity in specific schools or individual degree programs have enrollment management challenges extending beyond recruitment and admissions. The problem at the dean level is to match the student demand for specific schools and majors with the supply of available faculty and seats in courses.

In traditional, full-time undergraduate and graduate programs, enrollments are predictable, so the challenge is to match capacity (number of faculty, number of course sections offered, and number of seats available) to the projected demand. In university schools of continuing and professional studies, however, students progress part-time through undergraduate and graduate degree programs at variable rates.

A school’s capacity (the supply of course sections and number of seats per section) can be adjusted to match demand in a flexible manner, subject to the budget for faculty salary expenses. In some schools, demand proportionally influences tuition revenues in the school budget. So matching supply and demand in academic operations is a key to managing enrollments, and success or failure can be measured in standard budget reports.

The operations research classic Little’s Law (Little, 1961) describes the relationship between work-in-process inventory in a system to the flow rate of finished product exiting the system and the flow time from entry to exit.

$$\text{Average Inventory} = \text{Average Flow Rate} * \text{Average Flow Time}$$

This relationship has been used to describe diverse operations including assembly lines and supply chains, batch processes, queuing and job shop processes in Cachon and Terwiesch (2006) and numerous other sources. In this paper, this relationship is applied to describe the enrollment process from the time students enter a variety of university degree programs to the time of graduation.

This analysis has enabled more precise management decision-making under challenging scenarios such as the elimination of redundant or struggling academic programs, and the planning of new academic programs. This analysis also has supported the development of admission policies for specific degree programs, and has facilitated the preparation of class schedules by department, matching supply to demand in a cost-effective manner.

LITERATURE REVIEW

The seminal article that proved the relationship between the average arrival rate to a system, the average time spent in the system, and average number in the system appeared in *Operations Research*, over 45 years ago, Little (1961). This result does not depend on the underlying probability distributions of the arrivals or the order in which items are serviced. Since that time, there have been many, many applications in a variety of settings including queuing systems, Bertsimas and Nakazato (1995) and stochastic networks, Kook and Serfozo (1993). Tu, Chao, Chang, and You (2005) used Little's Law in an electronic wafer foundry to determine backup capacity to overcome bottlenecks in the production process. In the residential construction industry larger homebuilders sometimes view their production system as an assembly line process. It is in this context that Bashford, Walsh, and Sawhney (2005) examine the relationship specified by Little's Law to account for characteristics of construction projects that affect project performance and the resulting financial performance of the company. An important extension of Little's Law for situations where the long term, steady state relationships between average flow time and inventory do not hold but, instead the investigation of observed results over finite time periods (such as the sequences of semesters examined in this paper) are of interest, can be found in Kanet (2004).

Much of the enrollment management research has been based on marketing techniques. Bassin and Sellner (1997) present a step by step method to forecast the enrollments of college students who are well prepared as defined by a certain criteria. Bruning (2002) looked at enrollment management in the context of retention of existing students. His work showed that the attitudes held by the students regarding the public relationships of the university were important determinants in whether a not a student returned for the next year. Imenda and Kongolo (2002) examined the factors that explained a South African university's ability to sustain and raise its student enrollment levels against declining national enrollment in its category. We found no record of the application of Little's Law to enrollment management such as we present below.

METHODOLOGY

For an undergraduate operations management class project, Little's Law was applied to analyze demand measures over a five-year period in the University of Richmond School of Continuing Studies. A decision support system extracting enrollment data from the university database into Excel was used by administrators and the students to analyze flow rates, inventory of active majors, and flow times through degree programs, by degree program in each department.

Flow Rate - The flow rate of “product exiting the process” was the number of graduates per year, by degree program in each department, for the period Spring 2003 – Spring 2006.

Inventory - The number of active students in each degree program was determined for the period Fall 2002 – Spring 2007.

Flow Time - For each individual student, the flow time was calculated as the number of years between the term of admission and the term of graduation. The variability in students’ flow times was calculated with a histogram and cumulative distribution table showing what percentage of these part-time students graduate within two, three, four or more years of entering a degree program. Student flow times vary widely, depending on transfer credits and number of credits taken per semester.

Excel Analysis – For graduation flow rates and flow times, a database administrator retrieved the relevant fields of source data, from the university database into Excel, including degree program, major department, admit term and graduation term for each graduating student in this time period. For inventory of active students, source data about students who took courses each semester were retrieved, such as degree program, major department, term code, and courses taken. The undergraduate operations management students then encoded and converted the data into a form usable for the analysis. (This was an opportunity to analyze a large amount of realistic data, and to experience Excel functions like filters, lookup tables, sorts, subtotals, IF statements, and histograms).

The calculation of flow time to graduation was determined to be more error-prone due to the way admit terms have historically been manually entered in the university database. Thus flow time was chosen to be the variable predicted by the other two variables, inventory and flow rate.

RESULTS

The bachelors and graduate degree programs in the University of Richmond School of Continuing Studies are part-time programs for working adults. Students take an average of two undergraduate courses per semester, or one graduate course per semester. Fewer students are active in the summer semester.

The Department of Information Systems has had non-stationary enrollments in the past five years, due to a national downward/flat trend in computer science and information systems in most universities during this period. Graduates exiting the system reflect enrollments starting about five years previously. Sample results for the bachelors degree program in the Information Systems department are summarized below.

TABLE 1

Flow Rate - Number of Graduates per Year
Bachelors Degree – Information Systems Major

2002	11
2003	13
2004	16
2005	15
2006	18

Average Flow Rate = 14.6 ISYS Graduates per Year

TABLE 2

Inventory of Active Students by Term
Bachelors Degree – Information Systems Major

Fall 2002	88
Spring 2003	80
Summer 2003	34
Fall 2003	72
Spring 2004	81
Summer 2004	38
Fall 2004	71
Spring 2005	76
Summer 2005	32
Fall 2005	62
Spring 2006	57
Summer 2006	20
Fall 2006	53
Spring 2007	57

Average Inventory = 69.7 Active ISYS Majors
(Over the fall and spring terms only)

FIGURE 1: # ACTIVE STUDENTS BY TERM
BACHELORS DEGREE - INFORMATION SYSTEMS

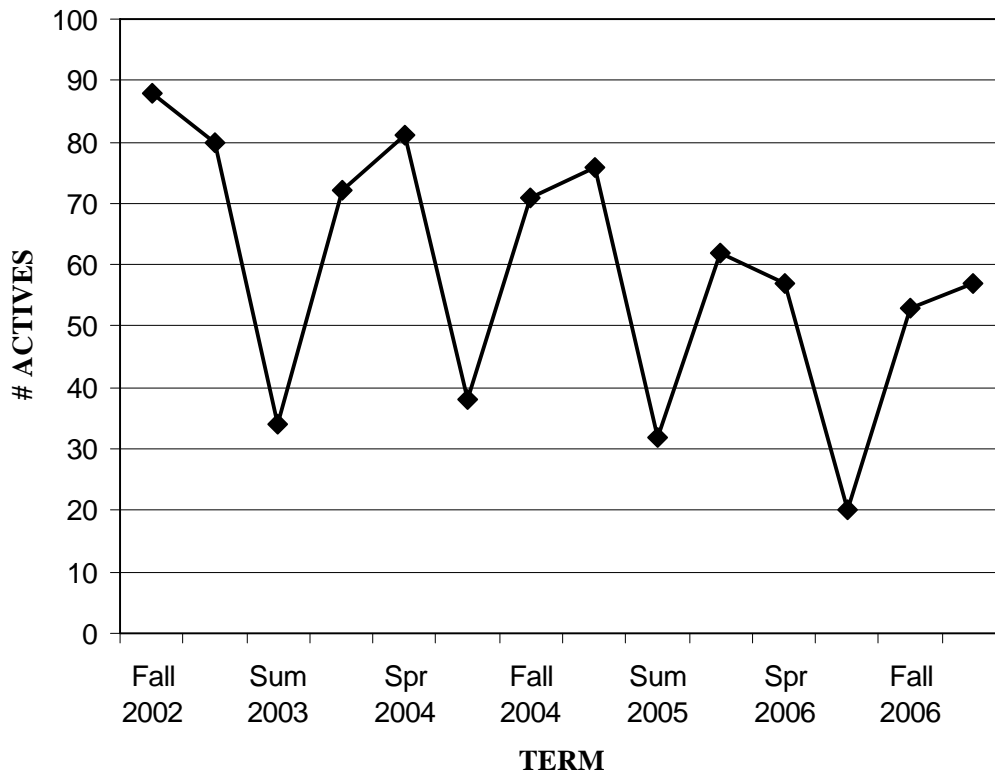


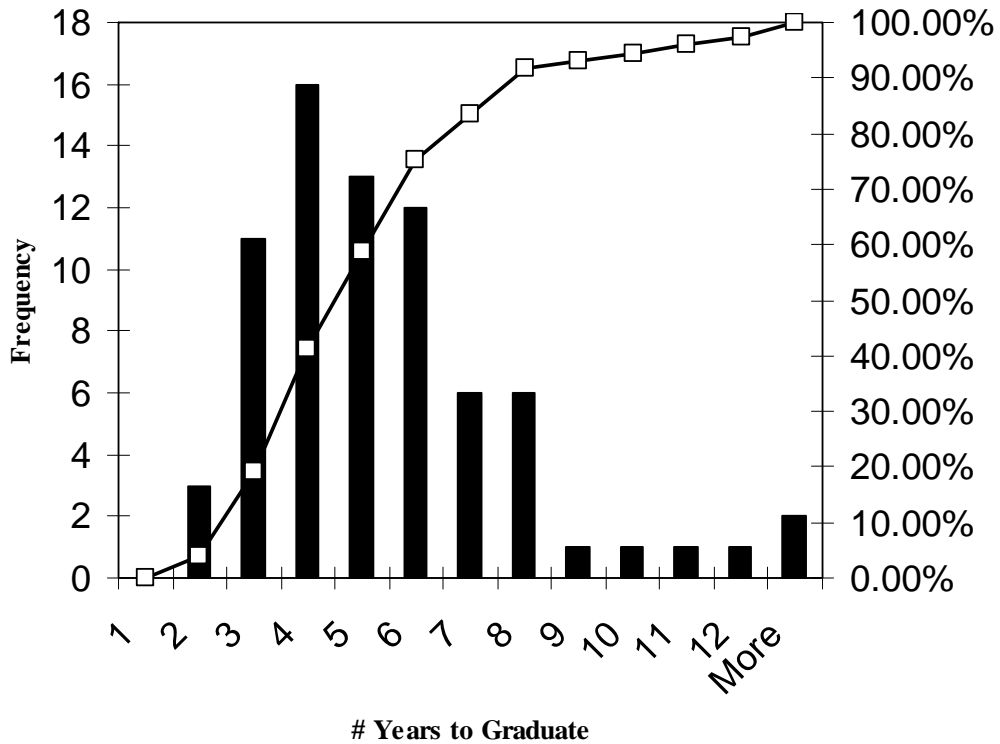
TABLE 3

Student Flow Times to Graduation

Bachelors Degree - Information Systems Major

<u># Years to Graduate</u>	<u>Frequency</u>	<u>Cumulative %</u>
1	0	0.0%
2	3	4.1%
3	11	19.2%
4	16	41.1%
5	13	58.9%
6	12	75.3%
7	6	83.6%
8	6	91.8%
9	1	93.2%
10	1	94.5%
11	1	95.9%
12	1	97.3%
13	0	97.3%
14	0	97.3%
15	2	100.0%

FIGURE 2: Student Flow Times to Graduation
Bachelors Degree - Information Systems



Applying Little’s Law to predict the average flow time to graduation, we find the predicted value to be somewhat lower than the actual, but closer to the median flow time to graduation for this degree program:

TABLE 4
ACTUAL VERSUS PREDICTED
AVERAGE INVENTORY, FLOW RATE, AND FLOW TIME
BACHELORS DEGREE - INFORMATION SYSTEMS MAJOR

	<u>ACTUAL</u>	<u>PREDICTED</u> <u>(LITTLE'S LAW)</u>
AVG INVENTORY OF ACTIVE STUDENTS *	69.7	
AVG FLOW RATE GRADS PER YEAR	14.6	
AVG FLOW TIME TO GRADUATION, YEARS	5.2	4.8

* Used fall and spring numbers to calculate this average; in the summer term, students are still active but not all of them take courses.

DISCUSSION

This analysis can be replicated by administrators utilizing institutional enrollment data and simple decision support tools. When deans and department chairs become knowledgeable about the number of active students, number of graduates per year, and the flow time to graduation, improved decisions can be made.

Whether or not a higher education institution is up for reaccreditation, the metrics in this paper are vital for continuous program assessment:

- (1) To maintain enrollment levels, the number of annual admits must replace the number of annual graduates—understanding this flow rate metric allows concrete recruiting and admission goals to be set if increased (or decreased) enrollment is desired.
- (2) In some degree programs, when there is a capacity constraint on enrollment, the number of active students in the program as well as the number of graduates per year must be tracked.
- (3) Graduation rates and flow times to graduation are needed for routine institutional reporting.
- (4) In part-time degree programs, these flow rates are directly tied to tuition revenues, and these metrics can support effective budget management.

Additional, reinforcing measures of flow rate in this application are illustrated in Figure 3 and Table 5:

Total Number of Credits Taken per Semester: When viewed by degree program in each department, this indicates the relative contribution and scope of each degree program in a school. Larger degree programs, or growing degree programs, can be monitored as critical success factors; struggling degree programs can be re-evaluated, and resources can be re-allocated to more effective uses.

Average Number of Credits Taken per Student per Semester: This measures student productivity and aggregate progress of these majors toward degree completion. This metric can have implications for student advising and communications.

**FIGURE 3: NUMBER OF CREDITS TAKEN BY TERM
BACHELORS DEGREE - INFORMATION SYSTEMS**

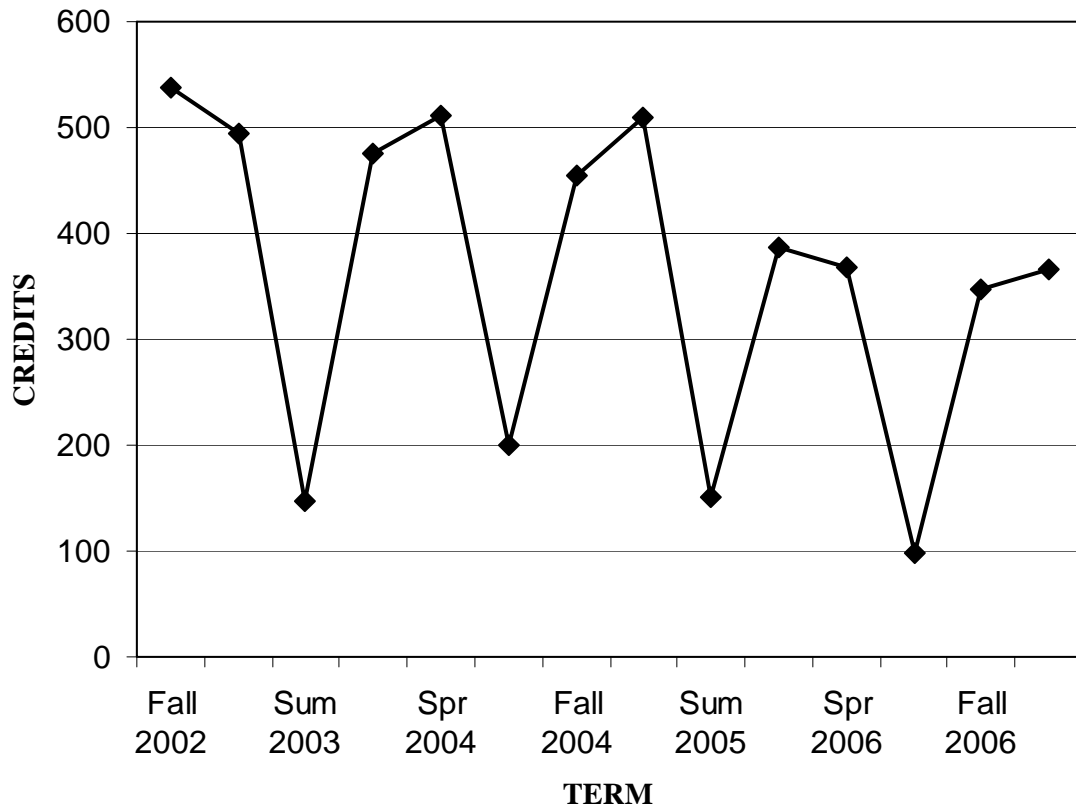


TABLE 5

**Average Number of Credits Taken Per Student by Term
Bachelors Degree – Information Systems**

Fall 2002	6.1
Spring 2003	6.2
Summer 2003	4.3
Fall 2003	6.6
Spring 2004	6.3
Summer 2004	5.3
Fall 2004	6.4
Spring 2005	6.7
Summer 2005	4.7
Fall 2005	6.2
Spring 2006	6.5
Summer 2006	4.9
Fall 2006	6.5
Spring 2007	6.4

This analytical approach has been used for managerial decision-making in the following ways in the Department of Information Systems. The metrics in this paper, used to understand aggregate demand from part-time students, have helped to make the scheduling of course sections more effective, to match supply of seats with the demand. Capacity utilization of available seats has improved. Furthermore, to offset a potential decrease in graduation rates in the next few years (reflecting the moving 4-5 year lag between the number of active majors and the number of graduates), the flow rate may be increased by intentional administrative measures, e.g., (1) promoting summer enrollments, and (2) by improving students' ability to take more credits per semester or per year. Improved course scheduling and student course planning, as well as some curriculum revision to remove some unwitting road blocks to degree completion, have been implemented to improve flow rates and flow times to graduation. Furthermore, in this particular example, enrollments are starting to increase again as of Fall 2007, due to external industry conditions. This analysis will track the effect of these factors on student productivity in degree programs, and signal when changes to capacity and other managerial actions may be needed.

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**RESPONDING TO THE EMPLOYER-APPLICANT SKILLS GAP:
ONE COLLEGE'S RESPONSE TO CLEANING UP
DIGITAL DIRT AND ACTING FINE**

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“Failure to equip young people with the job readiness skills critical to job success is equivalent to placing employability barriers in their path. Allowing students to graduate with these deficiencies has far reaching implications.” (Robinson, pNA)

New skill sets are required for the current workplace. The resounding consensus today is the growing emphasis on soft skills. These soft skills include good communication (Dolash, Cline, Woods, and Johnson), leadership (Woods), “people management” (Woods, Johnson, and Cline), networking (Johnson), adaptability (Dolash), emotional intelligence (Goldberg), teamwork (Cline), and creativity in problem solving (Robinson). The President of Add Staff, Cari Shaffer, has pointed out that “a resume is just an advertisement piece. It is to create an interest and in the interview is where you discuss soft skills.” (Johnson, pNA)

“Cleaning up digital dirt” and “acting fine,” are included under the umbrella of “professionalism”, which encompasses an ever-widening array of skills in demand in the workplace today. Professionalism continues to be a hot topic in the business world – and one that employers expect colleges and universities to address. With all of the important knowledge that needs to be conveyed to students within the academic arena, this aspect of employability often does not get the amount of attention in the classroom that is needed to adequately prepare students and graduates. It needs to extend beyond classroom walls into all other aspects of students’ lives and education.

Soft skills are not just critical for hiring, but for retention as well. (Cline, 2005) To aid in retention efforts, companies today are beefing up their soft-skills training. Goldberg (2005) has suggested that companies can no longer afford to dismiss the importance of soft skills. Instead, he views soft skills training as a critical investment of companies to improve their financial performance by protecting the investment in talented human capital. Van Meter Industrial’s training program includes the administration of the DiSC Profile to assist their employees in improving their ability to understand themselves and others. The result has been better problem solving skills in their workforce.

Technical skills are simply not enough any longer. A 2006 Robert Half survey emphasized the growing importance of soft skills (especially communication and leadership) for employers. Ironically, only 25 percent of the survey respondents thought that technical skills would provide a competitive edge for job applicants. Instead, people management led the list of preferred skills (cited by 50 percent of respondents) followed by communication and leadership skills at 42 and 41 percent respectively. Acknowledging “limited social competencies” and poor communication skills among the top problems for new finance professionals, the need for soft skills training is reinforced. Ian Graves of Robert Half International said, “Historically, people have found themselves in leadership positions simply because of their outstanding technical ability. Today, this is no longer enough....Employers want to find the right mix of technical know-how and social awareness.” (Woods, p. 16)

Why is professionalism so important in business today? As business has evolved, it now finds itself in the “service” era. Service, at first, required competency in one’s profession, such as being an accomplished accountant or chemist. Now it extends beyond just being good at one’s profession to being good at communicating with others, both within the company and, of course, with customers or clients. “Service with a smile” is required to remain competitive in today’s business world, and professionalism on all levels fills that needs gap. In response to this, companies that provide this kind of training have thrived. Troy Waugh has established Rainmaker Academy and Five Star³ LLC, specializing in arming accountants with these important communication skills. Says Waugh, “Clients demand more than financial reports and tax returns, and stay with firms as a result of great service and communication.” (Stimpson, p.24)

Waugh’s point is further reinforced with the posing of two thought provoking questions: “What if we train our employees, and then they leave? The real question we must consider is, “What if we don’t train them and they stay?” (Stimpson, p.24) Consulting firms which offer these types of programs and workshops are increasing in numbers and being kept busy. There is such a need that many firms specialize in a particular field, such as accounting. And some firms are even more field-specific, focusing their efforts on one subset such as auditing.

Particularly in this day and age, with a diverse student population, professionalism is more important than ever. While this paper focuses on the definition of professionalism in American culture, the term has varying definitions in other cultures, and as business becomes increasingly global, familiarity with professionalism specific to other cultures becomes even more critical. For the purpose of this paper, however, the focus is on professionalism as viewed through the perspective of American business. It is noteworthy that it is a hot topic universally, with research revealing articles from other countries such as Canada, the United Kingdom, and New Zealand.

According to Hall, the current generation in the United States that is joining the workforce has grown up with much more structure than the Baby Boomers. They have gone to educational group work from structured play exercises and sports, while Baby Boomers were much more independent. The good news is that the current generation is used to working within teams and with others; the bad news is that if the Baby Boomers don’t pass on their knowledge, skills and best practices, the world of work will end up with employees who lack independent skills, e.g. how to professionally answer the phone, or how to book a boardroom. (Lougheed, p.NA)

While educators have been given credit for providing graduates with the required technical skills, there is concern and disappointment “that applicants lacked a sufficiently broad spectrum of skills, especially employability skills, necessary to efficiently apply and effectively leverage their technical skills.” (BATEC Study, 2006) Employers have been quite vocal in indicating their willingness to remedy a shortcoming in job applicants’ technical skills, but not in employability skills. This, then, places increasing pressure on educational institutions to continue to address these employability skills with renewed vigor.

Employability skills (also referred to as “job readiness” skills) have focused on social skills. They have been defined as “those basic skills necessary for getting, keeping, and doing well on a job” (Robinson, p.1). These skills are more generic in nature – transcending industries, job vocations, and major fields of study. According to Robinson (2000), they include the following personal qualities: “responsibility, self confidence, self control, social skills, honest, have integrity, adaptable style and flexible, team spirit, punctual and efficient, self directed, good work attitude, well groomed, cooperative, self motivated, and self management” (p.2).

A study was conducted in 2002 at Goldey-Beacom College in Wilmington, Delaware by Germack and Merritt to determine if there was a gap between the skill set employers are seeking and the skill set actually possessed by recent college graduates (both undergraduates and graduates). With 92 employer responses, a major conclusion of the survey was that there was a “lack of polish” and a concern with the “basics of decorum” on the part of employers in regards to undergraduate candidates. This survey was a great starting point to determine what skill gaps need to be filled for students by colleges and universities. It is only the beginning, however. To be effective, active and continuous solicitation of input from employers will be needed. There are many ways that colleges and universities can receive input, from questionnaires to advisory boards to workshops such as the one detailed below. From this gathering of information, a list of dos and don'ts can be compiled for students, as well as valuable updates and insight into employers' screening processes. As the business world continues to change and evolve, so will the recommendations.

“Acting fine,” or professionalism, has been a recurring theme from workforce employers across all industries and firms of all sizes. A report entitled “Are They Really Ready to Work?” cited “professionalism/work ethic” among the top of the list of those skills identified by employers as the most important in today's workforce. The frustration mounts, however, as college graduates continue to fall painfully short in their preparedness in this area.

“The study's findings are valuable to new (and future) workforce entrants as well as to business people, educators, policy makers, and members of community organizations – anyone who has an interest in ensuring the success of new entrants into the U.S. workforce. The preparedness and skill levels of its workforce are critical factors in the ability of the United States to stay competitive in the 21st century.” (Casner-Lotto, p.12)

“Professionalism” included such areas as work ethic, proper dress, an ability to communicate, punctuality, a grasp of the basics of the application process itself, accountability, and an understanding of how business operates in general (including basic expectations).

According to Cline (2005), “nine out of 10 times, companies will go with the candidate with more personality...The hard skills are important, but these soft skills are going to get them in the door.” (pNA) As educators, there is a responsibility to address student preparedness – both in and outside the classroom. Goldey-Beacom College heeded the advice given in the report that educators should consider “incorporating more hands-on and practical experience for students in the curricula and seek ways to involve community organizations and businesses to pilot workforce-applicable learning opportunities”. (Casner-Lotto, p.59)

Digital Dirt

Students must be adequately prepared to avoid potential pitfalls. One relatively new pitfall for many students seeking employment is “digital dirt,” and it is important that they be educated on this topic. Employers have access to job applicants' personal lives as never before in this technological era. Social networking websites like FaceBook and MySpace provide additional insights for perspective employers to learn more about their job applicants. The recently coined phrase, “digital dirt,” refers to the less than favorable information that many employers may find on prospective employees while conducting a search in cyberspace. Employers are using the information that they find online to make decisions about job candidates. If anything questionable is uncovered, employers don't hesitate to eliminate a job candidate from consideration. “In a recent survey of 100 executive recruiters, 35% said they dropped a job candidate because of information uncovered online.” Additionally, “77% of respondents said

they use search engines to learn more about prospective employees.” (“Digital Dirt Derailing Job Seekers; Careful how you pad those resumes”, p.NA)

Anyone seeking a job is urged to conduct a self-search online on a regular basis. Being proactive in this regard can prevent a candidate from becoming a casualty of an employer’s screening process. It will give the candidate an opportunity to rectify anything online that is negative or incriminating, as well as providing a chance to improve an online image through adding positive personal information. (“Digital Dirt Derailing Job Seekers; Careful how you pad those resumes”) Searches can include email addresses as well as names, and some recruiters have extended searches to include reading job applicants’ blogs online. The use of technology to research job candidates continues to expand, and will probably continue to do so for years to come.

With many college students heavily utilizing social networking sites, they inadvertently provide personal information to future employers. Discussing digital dirt in the classroom in courses such as ethics, human resource management, organizational behavior, technology, and business communication can better prepare students. Assignments highlighting new hiring approaches can also provide additional insight for students.

How to Wine, Dine, and Act Fine

Heeding advice for all stakeholders to partner together to educate the upcoming workforce, the Goldey-Beacom College Career Services Department and the student chapter of the Society of Human Resource Management (SHRM) partnered with the student SHRM chapter of another local college and the Delaware professional chapter of SHRM to sponsor a workshop entitled “*How to Wine, Dine, and Act Fine*”. This workshop was a 2½ hour program presented in three modules with voluntary student attendance. All of the presenters were members of the local professional chapter of SHRM and local employers (thereby building additional stakeholder relationships).

The first module addressed basic communication skills (including how to create the 15-second elevator speech), interviewing skills (including an interactive practice session shaking hands), and the importance of cleaning up their digital dirt. Students were reminded that the majority of businesses today conduct an Internet search (often referred to as “cybersleuthing”) of job applicants. These searches can range from sophisticated paid searches by outside firms specializing in these background investigations to some as basic as a *google* search. Recommendations for voice mail, e-mail addresses (such as dropping “hottie19@aol.com) and Facebook or MySpace entries were provided. An overview of the interviewing process itself was presented.

In the second module, dining was addressed. With more group interviews in a social setting and more interviews conducted over meals, basic etiquette tips were presented. Some reminders included keeping the right hand free to shake hands, remembering that the food does not represent the last supper, and avoiding that powdered donut while sporting a navy blue interviewing suit.

In the third module, appropriate interview attire was discussed. This had been approached as a “do” and “don’t” fashion show one year. The key point communicated was reminding students that they must dress the part to get the part.

This program has provided a win-win as local employers are able to present their workforce expectations (and pet peeves) while students are able to improve their professional preparedness for the workplace. This has enabled the college to keep the lines of communication open to

regularly assess changing expectations of local employers and identify how they believe the college can better prepare graduates.

Conclusions and Recommendations

The success of the U.S. economy will depend upon the nation's ability to produce the most well-rounded employees. This point was illustrated beautifully in a response to the findings of a 2005 Skills Gap Report survey in the manufacturing arena. John Engler (2007) succinctly stated, "The U.S. is never going to compete in the global marketplace on the basis of low wages. Our competitive edge instead must come from talent, innovations, smarts and skills. All these attributes begin with education." (p.44) Business and industry are crying out for help with the development of soft skills and higher education must partner with them to begin the process of providing a fundamental background of these skills to students.

This is corroborated by the findings of the Boston Area Advanced Technological Education Connections (BATEC) Information Technology Workforce Skills Study. Employers participating in the study confirmed that applicants lacked the following essential skills: communication skills (verbal aptitude), program solving skills (especially problem definition), greater facility with teamwork and collaboration, ability to manage and motivate one's self, and contextual knowledge of the work – not just the "how" but the "why" and "whom" and "when". (BATEC Information Technology Workforce Skills Study, p.5) This is consistent with Goldey-Beacom College's findings in their surveys of employers over the years. While, like many institutions, Goldey-Beacom College is doing a fine job with the technical aspects of student preparation, the areas of increasing concern are the soft skills. The BATEC study findings also echo the sentiment expressed by John Engler. To compete, American IT professionals will need to add value to intellectual capital and must possess the ability to leverage employability skills or they will lose the employment race to IT professionals from other countries.

A recommendation to higher education on how to impart employability skills without adversely affecting the time to degree or reducing technical skills focused on improved and more efficient methods of teaching and learning. More holistic methods of teaching that are interactive were suggested; perhaps partnering with business and industry to participate in the instructional process rather than just soliciting their input for content could be more effective for educators. Actually engaging students with potential employers in some activities can be helpful. (BATEC Information Technology Workforce Skills Study) Realistically, the degree to which this can be done may need to be carefully monitored. A balance of the total skills set must always be at the forefront of the educator's mind. However, going beyond advisory board input to actual interaction with employers should be a win/win/win situation for students, employers, and educators alike. At Goldey-Beacom College, employers participate in mock interviews, resume reviews, and various workshops, as well as guest lecturing on occasion. Internships are strongly encouraged for students as well. Continuation and expansion of such activities at institutions of higher learning must be strongly encouraged and actively pursued.

This problem of preparing the workforce for successful employment is not just one for educators, however. That is both the good news and the bad news. The bad news is that, because it is not self-contained, educators cannot "fix" the problem alone, and they do not have complete control. Educators must depend on other constituencies to assist in this charge. Industry, media, government, families, and society in general, are required to teach and reinforce these all-important soft skills. (Stephens and Scott) The good news here is that all are equal stakeholders in this process.

This workshop is proposed as an idea-sharing forum to facilitate an open discussion of what educational institutions are doing – both in and outside the classroom to better prepare graduates for the 21st century workforce. It might be noted that this workshop is a direct response to the recommendation for roundtable discussions among educators presented in the report “Are They Really Ready to Work?”

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SELECTING APPROPRIATE TAX TOPICS FOR COVERAGE IN A PRINCIPLES OF ACCOUNTING COURSE

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INTRODUCTION

Should students with a major (or even a minor) in business, be exposed to the basics of the tax structure that drives most business (and even personal) decisions? Should business students be expected to know the basics about their own personal responsibilities to the federal (and possibly state) tax system? If so, where in the business curriculum should the topic be covered? Since tax courses are most often housed in the accounting department, the principles of accounting courses that are usually required of all business majors warrant consideration. Consequently, the focus of this paper is on what tax topics would then be included in principles of accounting so that students would receive at least a brief but critical exposure to the tax requirements of modern society.

OVERVIEW OF TAXES

A few students, especially non-traditional students, may have had an in-depth exposure to taxes. However, students in the traditional 18-to-24-years-old age range sometimes hardly know the basics. For example, two recent questions I have encountered from students are: 1) I had income tax withheld, and my friend said I could file and get it back, but I don't think I can because on my first job a couple of years ago, I asked about social security taxes that were withheld and was told that I couldn't get that back until I was 67, and 2) Where on my 1040A do I deduct my Roth IRA? So, as can be seen, future business graduates need to know more about tax basics. Where to start? First, it is important for students to know that there are several types of taxes. A brief discussion of each of these is a good starting point. Students are often surprised to discover that taxes include a long list of items – income taxes (federal and state), sales taxes, gift and estate taxes, excise taxes (gasoline taxes and taxes on phone calls, cigarettes, alcohol and other items), property taxes, and other taxes such as social security (including employer matching amounts). In fact, anything that a government agency requires that would not otherwise be an expenditure could be considered to be a tax (such as a fee for a sticker to renew a car's license plate). In addition, there are well-hidden taxes. For example, if a student goes to the mall and spends \$50, how much of the \$50 went to pay for hidden taxes such as the gasoline tax on the gasoline in the truck that delivered the goods to the mall, or income taxes paid by workers on wages paid to them by the manufacturers of the products sold in the mall? It does not take long for students to begin to see just how much taxes drive economic and business decisions.

TOPICS TO BE COVERED

Perhaps the most relevant way to present and discuss income tax topics is to pass out copies of an IRS Form 1040 and then go to the IRS Web site (www.irs.gov) and bring up a Form 1040 (or put up an overhead transparency of the form) and then go down the form pointing out relevant information. For example, under Filing Status, mention should be made that the marital status on December 31st determines the marital status for the whole year. Under Exemptions, students need to know that if they can be claimed as a dependent by someone else, they cannot claim themselves. (Students should note that it states “can be claimed,” not “could be claimed” – so parents cannot forego the claim in deferral to the child claiming himself or herself.)

The section for Income can be prefaced by a discussion of what constitutes “gross income from whatever source derived.” Then, a careful reading and brief discussion of each item listed under Income would be prudent to alert students to the taxability of these items. Of particular note would be Wages, Salaries, Tips, etc. which should be applicable to all students (and which can include scholarship income in excess of certain amounts) – as well as taxable interest and ordinary and qualified dividends. Also, this would be an appropriate place to show a Schedule C for Business Income or (Loss), a Schedule D for Capital Gains or (Losses), and Schedule E (for rental real estate, royalties, partnerships, S corporations, estates, trusts, etc.). Before leaving this section, a few other important (and interesting) items should also be pointed out – the line item for “other income” can include many items. For example, gambling winnings in excess of losses are taxable and most prizes and awards are taxable. Gifts received, however, are not taxable. Above certain limits, gifts are taxable, but the gift tax is paid by the giver, not the recipient of the gift. Also, currently, anyone can give \$11,000 per year, per person without having to pay a gift tax. However, in all these cases, the money given has to be a gift and not for “services provided,” which would make the “gift” a payment for wages, tips, etc. “Treasure trove” is also considered to be “other income” and is taxable in the year of discovery. Also, the IRS can conduct a “net worth” audit and the taxpayer has to account for the change in net worth. For example, if a taxpayer is determined to have a net worth of \$10,000 and then one year later, the net worth of the taxpayer is determined to be \$250,000, the taxpayer has to explain where the \$240,000 increase came from. Sometimes this is where “treasure trove” shows up – whereby the taxpayer “remembers” that he or she “found” \$240,000 in an old chair or a piano, etc. Nevertheless, the \$240,000 is taxable. Also, illegal income is taxable, as is barter income. These are facts that all college students need to know, especially business students. Also, it is fortunate that once students know this information, it is usually easily remembered by the students and hopefully will serve them well in meeting their tax responsibilities throughout their lives.

Under the Adjusted Gross Income section, it shows that a deduction is allowed for a traditional IRA (which is taxed later when withdrawn). This can then be contrasted to the Roth IRA, which is not allowed as a deduction (but which is not taxed later when withdrawn – nor are the earnings taxed as long as there are no withdrawals within five years). It should be noted that both IRAs serve the purpose of encouraging savings for retirement and are subject to penalties if withdrawn before the age of 59½, unless the reason for withdrawal meets the criteria for exemption of the penalty under the tax statutes.

Under the section for Tax and Credits, Schedule A is referenced which can lead to a discussion about whether to itemize deductions or take the standard deduction. A detailed look at Schedule A helps highlight items such as taxes paid, charitable contributions, mortgage interest expense, and other items that are currently deductible and for which substantiation is required. It should be emphasized that, if itemization is chosen, substantiation of the itemized deductions is crucial. Also, the rules about charitable contributions (and substantiation from the charitable organization for items above certain limits) are very important to know before the return is filed. Also, the difference between a deduction and a credit is a very important concept that can be illustrated here since itemized deductions are put on Schedule A and taken before the tax is calculated (or not used at all if the standard deduction is taken), but tax credits are taken off dollar-for-dollar from the tax owed.

Under Other Taxes, one item of interest is Schedule H, Household Employment Taxes – an item that has proven to be an omission and embarrassment to several politicians over recent years. Also Schedule SE where self-employment taxes are reported is in this section.

Under the Payments section, several important items show up. First, tax withholdings are shown in this section. Students need to know that federal income taxes are a “pay as you go” system and that estimated taxes may need to be paid in some cases. Students may not know that it is not a problem to claim less dependents than entitled, but it is a problem to claim more. So, if a student is married, he or she does not have to put M2 on Form W-4, but can put M0 if the student desires that more taxes be withheld. Also,

anyone can have additional taxes withheld beyond the regular amounts. Students should be reminded, however, that withholding too much is giving the government an “interest-free” loan. However, withholding too little can also cause problems. Another item in the Payments section is the Earned Income Credit (EIC) which is too often overlooked by those entitled to receive the credit. It should be noted that the EIC is payable to the recipient even if no tax is due (sometimes called a negative tax).

EXAMPLES

Once the Form 1040 has been reviewed and discussed in some detail, it is usually a good idea to run some numbers to see how they show up on the forms. It is usually best to start with a straightforward situation of a student with one job and one Form W-2 and perhaps some interest income and a scholarship that is partially taxable. This, of course could be done on a Form 1040A. So, a handout question with the appropriate forms could be distributed to the class and then a few minutes allowed to fill out the form and then the results can be checked in class. Next, a similar problem could be handed out for homework as well as an additional problem that is more advanced – say a married couple, both of whom work, and who have two children. In addition to their wages, the couple could have interest and dividend income. A third case could involve a single individual with a business (Schedule C). These cases could then be reviewed, and their answers checked and discussed at the next class period.

GRADING

One concern is how to grade this information. Since actually attending class and hearing the information is crucial to assimilating this material, this might best be graded in a non-exam way. One way to accomplish this would be to award some points on the next exam (for example 20 points on a 100-point exam) to the tax information. However, the 20 points would be earned by attendance and attention paid to the material covered. Therefore, if a student attends the class session on tax and is there the entire time and pays attention and turns in the problems, the 20 points would be earned. If a student is not there, then some portion of the points (maybe one-half) could be received if the student turns in the problems and a four-to-five-page paper on the tax topics covered.

SUMMARY AND CONCLUSIONS

By focusing on taxes, students should begin to realize how much business and personal decisions are driven by tax consequences. By covering the basics of tax information, business students should receive vital relevant information to help them with their tax calculations and tax responsibilities that will go well beyond the receipt of their business degree. Students need to be reminded that the responsibility for their tax calculations and payments cannot be shifted to someone else, not even to a paid tax preparer. Students also need to be reminded that the tax statutes are ever-changing. Therefore, before making final decisions in which tax considerations play a role, the current statutes (at www.irs.gov) need to be checked.

A STUDENT ASSIGNMENT TO COMPLEMENT IN-CLASS INSTRUCTION IN REGRESSION ANALYSIS

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ABSTRACT

This paper describes an assignment designed to both reinforce in-class instruction in regression analysis and demonstrate to students the broad applicability of regression theory to practice. The assignment involves students identifying an application of regression analysis in the published literature. This paper further reports on student ($n = 82$) performance on the assignment and student perceptions of the assignment's "value added."

INTRODUCTION

In our college, all business majors take a junior-level quantitative methods course having as one of its major curricular components an introduction to simple and multiple linear regression. Approximately ten hours of class time are devoted to (ordinary least squares) regression. In-class instruction and associated homework exercises address: translating a verbal description of relationships between variables into a model specification; using Excel to perform a regression analysis on sample data; assessing the validity of model assumptions; testing for the significance of model coefficients; interpreting estimates of model parameters; and using a sample regression equation for estimation and prediction.

With the intention of both strengthening students' understanding of regression concepts and demonstrating to students the broad applicability of regression theory to practice, we designed an assignment whereby students are instructed to locate an application of regression analysis in the published literature. The assignment was offered as an optional bonus problem on a test to students in three sections of the aforementioned course; the students picked up a copy of the assignment upon turning in their tests. Approximately two-thirds (82) of the students elected to submit the assignment. In the sections that follow, we describe the assignment, summarize the students' performance on the assignment, and share the students' evaluations of the assignment.

ASSIGNMENT FOR STUDENTS

The assignment instructed students to locate, within a scholarly journal, an article that: (a) posed a research question related to business; and (b) presented the results of a regression analysis that was performed to assist in addressing that research question. Instructions provided for students are as follows:

Submit a hard copy of:

- (1) The first page of the article (so as to convey the name and author(s) of the article, the journal and year of publication, and an abstract of the article).

- (2) The page(s) containing the specification of a regression model subsequently assessed. Note: The specification may be in the form

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k + \varepsilon \quad (1)$$

or may be expressed or implied in words. For time-series data, a model uses the subscript t to denote the time period. If the article contains more than one regression model, select one to focus upon.

- (3) The page(s) containing estimates of the model coefficients. Note: It is highly likely that those estimates will be listed in a table along with associated measures.

Mark up by hand your submission as follows:

- (1) Draw a vertical line in the right margin to indicate where the regression model is specified.
- (2) Draw a vertical line in the right margin to indicate where estimates of the model coefficients are provided.

The above instructions were accompanied by further assistance and guidance in the form of the following “For your information” notes, the first of which is shown in modified form so as to remove online access instructions specific to University System of Georgia institutions and the second of which refers to the study by Bebchuk and Grinstein (2005) highlighted in the Appendix.

For your information:

- (1) One approach for locating an appropriate article is as follows: Access the ABI/INFORM Complete (at ProQuest) database. Enter a search term for a business-related topic or issue of interest to you.* Check the “Full text documents only” and “Scholarly journals, including peer-reviewed” boxes before requesting the search. Request the search. Peruse the listed articles for indications that a regression analysis was performed.
- (2) A sample submission—related to the issue of executive pay—is attached and “marked up” as requested in the instructions.
- (3) You may, of course, encounter in an article equations that are not regression models. In this regard, note that every regression model contains an error term ε .

*For example, you may be interested in one or more of the following: leadership styles; customer retention; quality assurance; health care costs; corporate bankruptcy; corporate ethics; leveraging technology; Sarbanes-Oxley; auditing; employee stock ownership; portfolio selection; energy conservation; developing economies; privatization.

STUDENT PERFORMANCE ON ASSIGNMENT

We employed a grading rubric that awarded four points for each of: (1) submitting an abstract of an article related to business that employed a regression analysis, (2) correctly marking the location of a regression model specification, and (3) correctly marking the location of the estimates of the model coefficients. Partial credit (two points instead of four) was awarded for item (2) above in the case of either “extra” marking (i.e., marking extraneous discussion or an extraneous equation in addition to the actual specification of a regression model) or “incomplete” marking (e.g., when the author’s regression model specification is expressed verbally as opposed to conveyed in equation form, marking reference to some but not all the variables used in the model). Partial credit (two points instead of four) was awarded for item (3) for marking an extraneous table (e.g., a table summarizing the mean and standard deviation of each variable used in the model) in addition to the table containing estimates of the model coefficients.

The distribution of student scores (out of a maximum of 12 points) on the assignment is provided in Table 1. Fifty percent of the students earned a perfect score, and all but one student submitted an application of regression analysis related to business (the one exception submitted a didactic article on regression that employed an application in education as an example). Errors related to identifying the specification of a regression model fell into four categories: no attempt at identification; incomplete identification; identification with “extra” marking; and total misidentification. Errors related to identifying the estimates of model coefficients fell into three categories: no attempt at identification; identification with “extra” marking; and total misidentification. It is noteworthy that no guidance (e.g., no in-class discussion of the assignment) was afforded students beyond the aforementioned instructions, “for your information” notes, and example of a “correctly marked up” submission.

Score	# of Students	% of Students
12	41	50%
10	8	10%
8	23	28%
6	7	9%
4	3	4%

Table 1. Student Performance on Assignment

STUDENT PERCEPTIONS OF ASSIGNMENT’S VALUE ADDED

To informally assess the value added by the assignment, we additionally requested students to, on the first page of their submission:

Indicate your level of agreement (A = strongly disagree, B = disagree, C = slightly disagree, D = slightly agree, E = agree, F = strongly agree) with each of the following questionnaire items. Your responses will not affect your grade; honest responses are being requested.

- (1) This assignment reinforced the fact that regression analysis is an approach for assessing the relationship between a dependent variable and a set of independent variables.
- (2) This assignment reinforced what we discussed in class about model specification.
- (3) After completing this assignment, I better understand why the study of regression analysis is part of the business core curriculum.
- (4) After completing this assignment, I am more confident that I, too, could specify a regression model and gather sample data to test the model.

The distribution of student responses to each item is given in Table 2. We realize that lack of anonymity may have led some students to inflate their levels of agreement with the questionnaire items; note, however, that we explicitly requested honest responses and gave assurances that the responses would not affect the grade. The percentage of students strongly agreeing or agreeing with questionnaire items 1, 2, and 3 were 79%, 78%, and 72%, respectively. The considerably lower percentage (56%) strongly agreeing or agreeing with item 4 is to be expected and, as such, suggests that student responses across the four items involved reflection and discernment. We believe that the student responses suggest that, overall the students perceived that the assignment added value to the in-class instruction on regression analysis.

Response	Questionnaire Item			
	1	2	3	4
Strongly Agree	41%	34%	29%	13%
Agree	38%	44%	43%	43%
Slightly Agree	9%	7%	16%	26%
Slightly Disagree	4%	2%	4%	10%
Disagree	5%	6%	5%	6%
Strongly Disagree	4%	6%	4%	2%

Table 2. Percentage distribution of responses to questionnaire items

CONCLUSION

In light of the results of our above described “trial run” of the assignment, we intend to require (rather than make optional) the assignment of all students in future sections of the course in question. Furthermore, to better prepare students for the assignment, we intend to (rather than merely provide one sample submission in writing) illustrate and discuss in class how to correctly identify a regression model specification and correctly identify the estimates of the model’s coefficients with respect to three published studies; three of the innumerable studies that could be used are highlighted in the Appendix.

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APPENDIX

Highlights of three applications of regression analysis in published research

Bebchuk & Grinstein (2005)

Portion of abstract on page 283: “This paper examines both empirically and theoretically the growth of US executive pay during the period 1993-2003. During this period, pay has grown much beyond the increase that could be explained by changes in firm size, performance, and industry classification.”

Regression model specification, equation (1) on page 286:

$$\begin{aligned} \text{Log}(\text{compensation}_{i,t}) = & a_0 + a_1 \text{Log}(\text{sales}_{i,t-1}) + a_2 \text{Log}(1 + \text{ROA}_{i,t-1}) + a_3 \text{Log}(1 + \text{Return}_{i,t-1}) + \\ & a_4 \text{Log}(1 + \text{Return}_{i,t-2}) + \text{Yeardummies}(1994 - 2003) + f_i + \varepsilon_{i,t} \end{aligned} \quad (\text{A.1})$$

Estimates of model coefficients using each of two operationalizations of the dependent variable--Log(total CEO compensation) and Log(total top-5 compensation)--are in Table 2 on page 287.

Sulek & Hensley (2004)

Portion of abstract on page 235: “Food quality came out as the only one of nine factors being tested that had a significant effect on intent to return for 239 diners at an Irish-pub-style full-service restaurant in the southeastern United States....Examining customer satisfaction, food quality again was at the top of the list, but the restaurant’s atmosphere and the fairness of the seating procedures also had significant effects.”

Verbal reference on page 239 to a regression model specification: “The first full model regressed the design attributes against overall dining satisfaction...”

Estimates of model coefficients are in Exhibit 2 on page 242.

Chen et al (2005)

Portion of abstract on page 159: “...the authors construct regression models to examine the relationship between corporate value creation efficiency and firms’ market-to-book value ratios, and explore the relation between intellectual capital and firms’ current as well as future financial performance.

Regression model specification on page 164:

$$M / B_{it} = \alpha_0 + \alpha_1 VACA_{it} + \alpha_2 VAHU_{it} + \alpha_3 STVA_{it} + \varepsilon_{it} \quad (A.2)$$

Estimates of model coefficients are in Table VII on page 169.

THE USE OF SPREADSHEETS TO TEACH MASTER PRODUCTION SCHEDULE (MPS) AND MATERIALS REQUIREMENTS PLANNING (MRP)

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Abstract: Master Production Scheduling (MPS) and Materials Requirements Planning (MRP) are difficult techniques to explain, even with detailed explanations in the textbook. Using spreadsheets with “what-if” and graphical capabilities helps students to grasp some of the more elusive concepts, such as Available-to-Promise, Lot-for-Lot vs. fixed order quantity, and infinite vs. finite capacity. This paper describes some of the spreadsheets designed for this purpose.

PRODUCTION PLANNING HIERARCHY

This is a paper about using spreadsheets to show how master production schedules (MPS) and materials requirements planning (MRP) schedules are prepared. Beginning with a production planning hierarchy, we show how production planning leads into MPS and, subsequently, MRP scheduling. We also show the effects of lumpy demand and level demand on the MRP schedule.

Figure 1 shows the production planning hierarchy. In this paper, we will describe only the MPS and MRP scheduling. We described production planning in an earlier conference (Crandall and Main 2006).

Production-Planning Activities and Levels

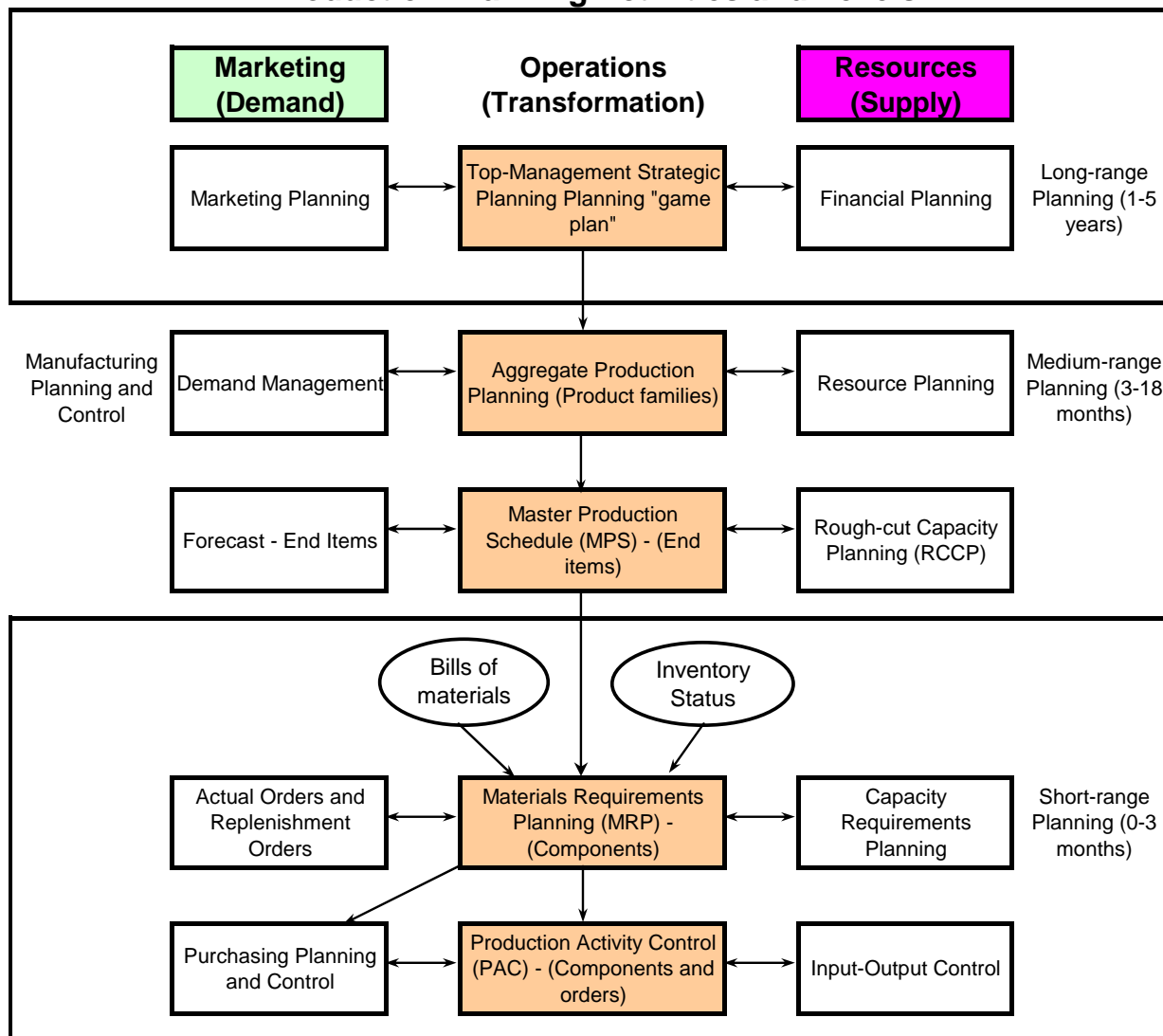
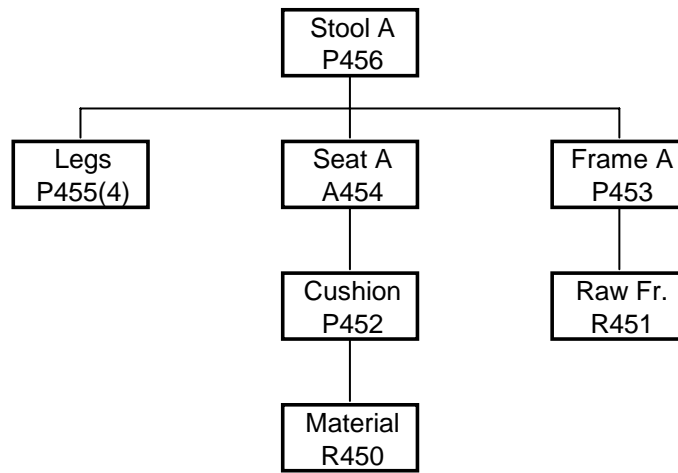


Figure 1. Production Planning Hierarchy

PRODUCT EXAMPLE

To keep the explanation of MPS and MRP simple, we used a stool as the product being planned. Figure 2 shows graphical bills of material for the stool. In addition to being simple, it is a product to which all students can relate.

GRAPHIC BILL OF MATERIALS - STOOL



TIME-PHASED BILL OF MATERIALS

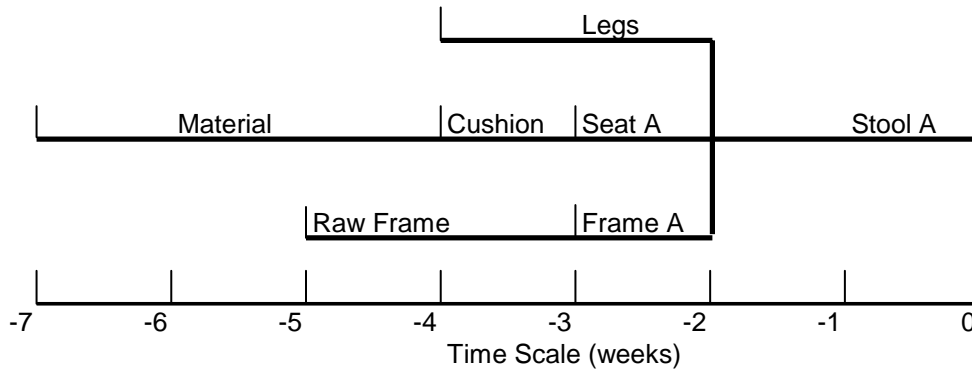


Figure 2. Bills of Material for Stool

MASTER PRODUCTION SCHEDULE (MPS)

The production plan usually covers a 6 to 18 month period but the MPS is usually limited to a shorter period. Our example will be for a 12-week period. Figure 3 shows the format of the MPS and sample schedule for two different end items. In the conference presentation, we will be able to show how each part of the schedule is developed. The spreadsheet design makes it possible to change some of the variables to show their effect on the overall schedule. This is especially helpful in trying to explain such variables as lot size, lead times and the available-to-promise concept.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	MASTER PRODUCTION SCHEDULE															
2	Periods															
3			1	2	3	4	5	6	7	8	9	10	11	12	TOT	
4	ITEM:	A					LOT SIZE-UNITS			500		LEAD TIME-WKS			1	
5	DESC:						LOT SIZE-WEEKS					QTY ON HAND			600	
6	Forecast		550	300	400	450	300	350	200	300	450	400				3700
7	Orders booked		300	350	250	250	200	150	100	100	100	100				1900
8	Projected on hand	600	50	200	300	350	50	200		200	250	350	350	350		
9	MPS receipt			500	500	500		500		500	500	500				3500
10	MPS start		500	500	500		500		500	500	500					3500
11	Avail. To promise		300	150	250	50		250		400	400	400				2200
12																
13										WEEKS						
14			1	2	3	4	5	6	7	8	9	10	11	12	TOT	
15	ITEM:	B					LOT SIZE-UNITS			125		LEAD TIME-WKS			1	
16	DESC:						LOT SIZE-WEEKS					QTY ON HAND			50	
17	Forecast		10	15	20	30	40	60	80	120	120	120				615
18	Orders booked		12	9	11	5	2		4							43
19	Projected on hand	50	38	23	3	98	58	123	43	48	53	58	58	58		55
20	MPS receipt					125		125		125	125	125				625
21	MPS start				125		125		125	125	125					625
22	Avail. To promise		18			118		121		125	125	125				632
23																
24	Summary of Orders to be Received															
25		A		500	500	500		500		500	500	500				3500
26		B				125		125		125	125	125				625
27																
28	Note:		These cells contain formulas. Other cells require data to be entered.													
29			The tables above have room for two different products.													
30			You can change the lot size, lead time and beginning quantity to see the effects.													
31			ATP formula only works if there is an order at least once every four weeks. It can be extended.													

Figure 3. MPS Schedule

MATERIALS REQUIREMENTS PLANNING (MRP)

Once the MPS has been developed, the next step is to prepare an MRP schedule. Figure 4 shows the format of this schedule for all levels of the stool. When used in an oral presentation, it is possible to show dynamically the effect of changing requirements, lead times, lot size rules, safety stock requirements, and dependent demand relationships.

File: **MRPExample (Lumpy Demand)**
 Name:
 Section:

Topic: **MRP**
 Problem: Chapter: **14**
 Date:

	PERIOD NUMBER										TOTAL	
	1	2	3	4	5	6	7	8	9	10		
Item No. Stool				On Hand			Size Rule: L4L					
Parents:				Lead time 2			Lot Size:					
				Safety Stock			Action:					
Gross Requirements							80			120	200	
Scheduled Receipts												
On hand - No action							-80			-80	-200	
Net Requirements							80			120		
Plan Order Receipt							80			120	200	
Plan Order Release				80			120			200		
Projected on Hand												
Item No. Frame				On Hand			Size Rule: L4L					
Parents: Stool	1				Lead time 1			Lot Size:				
				Safety Stock			Action:					
Gross Requirements				80			120			200		
Scheduled Receipts												
On hand - No action				-80			-80			-200	-200	
Net Requirements				80			120					
Plan Order Receipt				80			120			200		
Plan Order Release				80			120			200		
Projected on Hand												
Item No. Seat				On Hand			Size Rule: L4L					
Parents: Stool	1				Lead time 1			Lot Size:				
				Safety Stock			Action:					
Gross Requirements				80			120			200		
Scheduled Receipts												
On hand - No action				-80			-80			-200	-200	
Net Requirements				80			120					
Plan Order Receipt				80			120			200		
Plan Order Release				80			120			200		
Projected on Hand												
Item No. Legs				On Hand			Size Rule: FOQ					
Parents: Stool	4				Lead time 2			Lot Size: 600				
				Safety Stock			Action:					
Gross Requirements				320			480			800		
Scheduled Receipts												
On hand - No action				-320			-320			-800	-800	
Net Requirements				320			480					
Plan Order Receipt				600			600			1200		
Plan Order Release	600			600						1200		
Projected on Hand				280			280			400	400	204
Item No. Cushion				On Hand			Size Rule: FOQ					
Parents: Seat	1				Lead time 1			Lot Size: 400				
				Safety Stock			Action:					
Gross Requirements				80			120			200		
Scheduled Receipts												
On hand - No action				-80			-80			-200	-200	

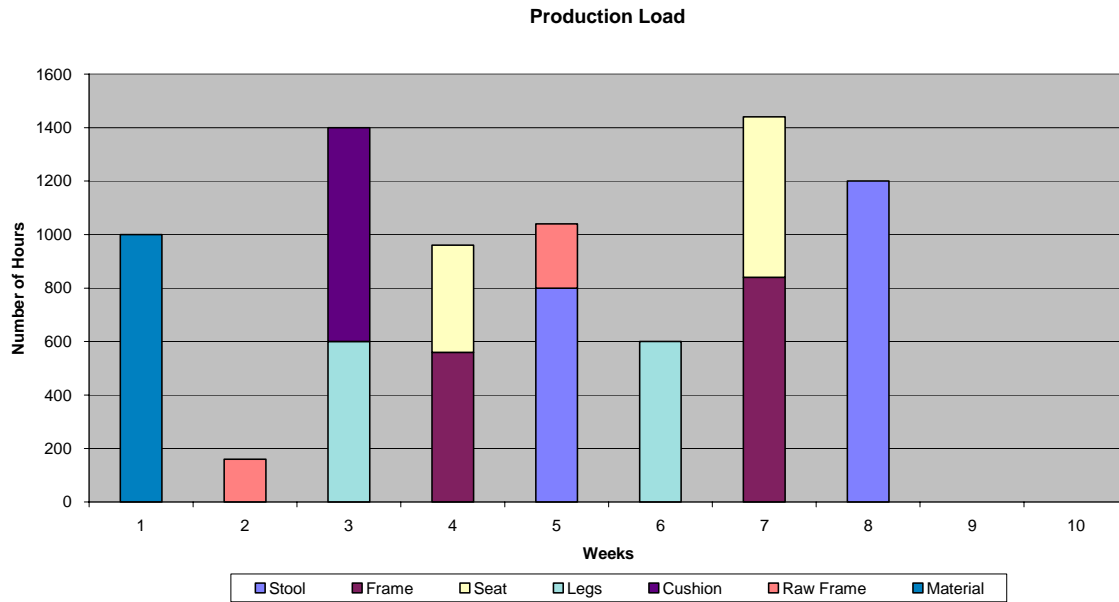


Figure 5. Production Load with Lumpy Demand

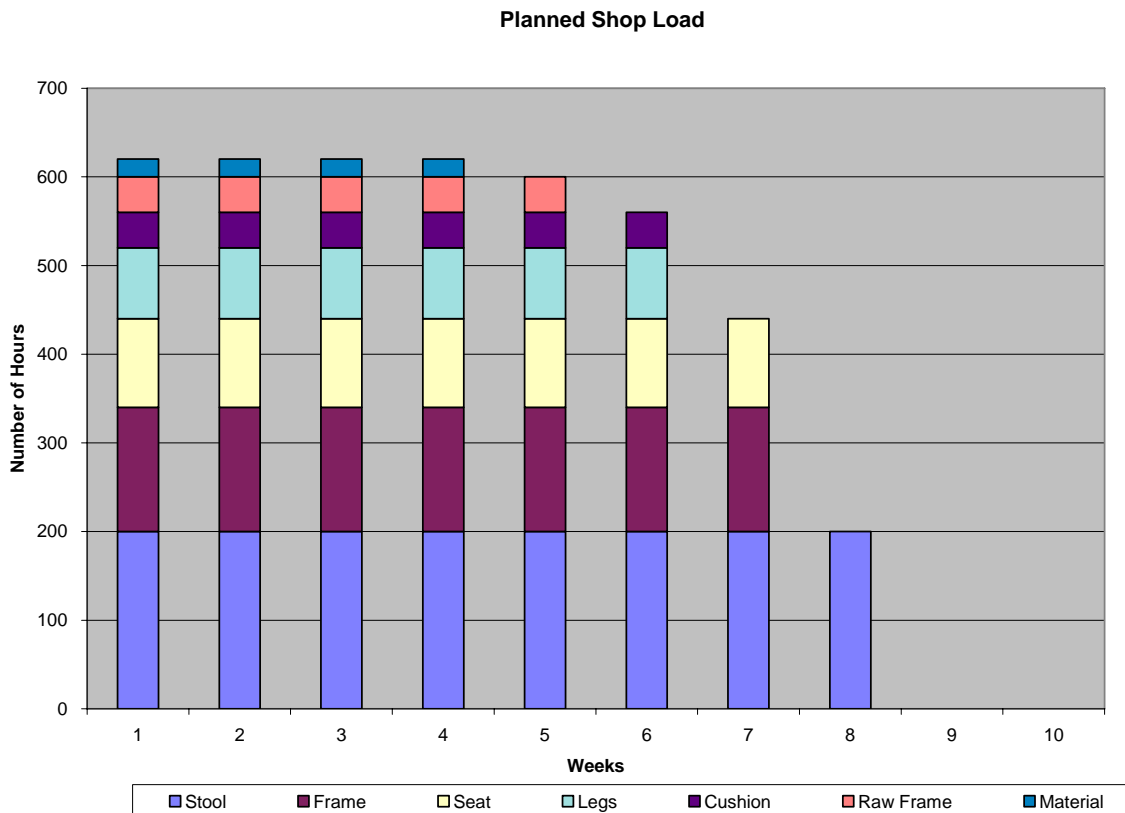


Figure 6. Production Load with Level Demand

SUMMARY

MPS and MRP are difficult to explain even with step-to-step explanations in the textbook. Using spreadsheets with “what-if” and graphical capabilities helps the students to grasp the concepts. They also respond positively to presentations that are not static, such as in a textbook, but include movement and change.

References

1. Crandall, Richard E. and Karen T. Main, Why Production Planning is for Everyone, *Proceedings of the SEDSI Meeting*, February 2007.

Making it Real: Engaging Traditional Undergraduate Students in the Organizational Behavior Course

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ABSTRACT

Organizational behavior (OB) is a multidisciplinary field that does not represent a functional area in organizations. Many of the concepts and theories taught in organizational behavior tend to be abstract and often require higher levels of reasoning. For these reasons, engaging traditional undergraduate students in the organizational behavior course has been an ongoing challenge. This paper describes specific assignments designed to help students see the real-world applications of organizational behavior theories and concepts. With the two-part “Manager Assignment,” the first assignment sets the stage for the student to recognize the real-world applications of OB concepts, followed by the application of OB concepts and theories to real-world problems in the second.

INTRODUCTION

Burke and Moore (2003) noted that despite many calls for graduates with strong people skills, traditional undergraduate students generally do not believe that organizational behavior is relevant. Because they do not see the need to study OB – they see it as something that is common sense – it is difficult to engage students in the OB classroom. Our own experience and other anecdotal findings agree with this.

In this paper, we describe specific assignments designed to help students see the real-world applications of organizational behavior theories and concepts. The assignment is the “Manager Assignment,” a two-part assignment developed to set the stage for the student recognizing the real-world applications of OB concepts with the first assignment, and to come full-circle by applying OB concepts and theories to real-world problems in the second.

The Manager Assignment

Part One: Identifying Managerial Issues

The first part of the manager assignment is assigned on the first day of class, with a due date approximately three weeks into the semester. Students are instructed to interview a practicing manager. For the purposes of the assignment, a manager is defined as anyone who supervises other people.

Two questions are required in the interview. They are: “Describe a typical day at work” and “What is your greatest challenge in managing other people?” The first question is intended to help the students learn about the wide range of duties that the job of manager entails. The second question is the basis for the second part of the manager assignment. Students are also required to develop two to three additional questions for the interview.

Students are instructed to schedule the interview with the manager in advance, and to prepare for the interview as they would for a job interview by doing background research on the employing company if information is publicly available. They are also instructed to keep their interview fairly brief – approximately 20 – 30 minutes.

After they complete their interview, students are required to write a 2-3 page summary of the interview. Their summary should include a brief description of the company, the manager’s name and job title, and a report on the interview. The report should include the answers to both the required questions and those they develop. In their conclusion, they are encouraged to include their reactions to the job and the work setting. A list of the questions they developed for the interview are attached to their summary report.

Written instructions for the first assignment are presented in Appendix A. The assignments are graded using a rubric developed specifically for the assignment, and returned to the students. The grading rubric is presented in Appendix B. The students are instructed to keep the graded assignment until the end of the semester when they must do the second part of the “Manager Assignment.”

Part Two: Applying OB Concepts and Theories

The second part of the manager assignment requires the students to reflect on the manager’s reported greatest challenge in managing other people, and apply a concept or theory learned during the semester to the challenge. Students are instructed to put themselves in the role of a consultant advising the manager and to make recommendations for addressing the manager’s greatest challenge by applying organizational behavior theories or concepts. Please note: they do not submit their reports to the manager they interviewed, this is submitted only as a class assignment.

In this second 2 – 3 page report, they are asked to briefly re-state information about the manager and his/her greatest challenge in managing others. In addition, they are asked to state the theory or concept they recommend applying to the manager's greatest challenge in managing people and to state specifically how they would apply the theory or concept.

One goal of the second part of the assignment is to see how well the students can choose an appropriate theory or concept to fit the manager's greatest challenge and clearly communicate their knowledge of the theory or concept in writing.

The written instructions for the second assignment are presented in Appendix C. The second assignment is graded using the rubric presented in Appendix D.

PRESENTATION

In our presentation, we will describe the assignment and discuss student and faculty reactions to the exercise. We will also discuss the next steps in our project, including developing and administering a questionnaire to measure effectiveness of the assignment and adapting the assignment for other courses.

APPENDIX A

Instructions for Manager Assignment - Part 1

The purpose of your first assignment is to help you become more aware of the issues faced by managers in the world of work, and to be able to better relate course materials to the “real world” of business. This assignment is in two parts. The first part consists of interviewing a practicing manager to gain some perspective on her/his job and what issues she/he faces on a regular basis. The second part will be completed later in the semester after we have covered most of the course material. In this part, you will write a brief paper applying theories of organizational behavior to the issues presented in the manager’s job.

In this part of the assignment, your task is to interview a practicing manager. The manager may work at any level in an organization, from supervisor to CEO. The only restriction is that the manager you interview must supervise other employees. As part of this process you must:

1. Conduct background research on the organization that the manager works for. Sources of background information include (but are not limited to) the company’s website, annual report (often found on the website), and news reports about the company. Prepare for this interview as if you were preparing for a job interview. Knowledge of the company will enable you to ask better questions.
2. Develop a list of questions to ask the manger. Two questions that you must include are:
 - a. Describe a typical day at work.
 - b. What are your biggest challenges in managing other people?

You should add a few other questions of your choice. You might include questions about the manager’s own career, and what career advice she/he would give to a college student.

3. Interview the manager. (Note: Be sure to schedule your interview in advance. Your interview should be fairly brief -- approx. 20-30 minutes).
4. Write a brief report of your interview with the manager (2-3 pages, typed, double-spaced). Your introduction should include a brief description of the company, and the manager’s name and job title. The body of the paper should report on the interview. The conclusion should include your reactions to the interview (for example, would you like a job like this one, were you surprised by what the manager encounters on her/his job). Attach the list of questions that you developed for the interview to the final report.

APPENDIX B

Grading Rubric for Manager Assignment - Part 1

<u>Factors in Assignment</u>	<u>Maximum points</u>
<u>Company research reported in introduction</u>	10 points
Is the description of the company complete? Is information from outside sources paraphrased or enclosed in quotation marks? Is the source of the information footnoted?	
<u>Body of report</u>	60 points
Does the body of the report provide a complete and clear description of the information gained from the interview? Are the answers to both of the required questions clearly reported in the body of the report?	
<u>Reactions to interview</u>	10 points
Did the student reflect on the information gained in the interview and write a reaction to the interview? Is the written reaction well thought-out?	
<u>Interview questions developed</u>	10 points
Were 3-5 additional questions generated? Were the questions well thought-out? Is the list of questions attached to the final report?	
<u>Grammar, spelling, etc.</u>	10 points
Is the paper free from errors in grammar, spelling, and punctuation? Is the paper neat and otherwise nicely presented?	

APPENDIX C

Instructions for Manager Assignment - Part 2

The first part of the manager assignment required you to interview a practicing manager and to find out his or her greatest challenge in managing other people. The second part of the manager assignment requires you to make recommendations for addressing the manager's greatest challenge by applying organizational behavior theories or concepts. Put yourself in the role of a consultant advising the manager. How would you suggest that the manager address his or her greatest challenge? (Note: you will not be sending your report to the manager you interviewed, you will simply be submitting it as a class assignment.)

Your assignment is to write a 2-3 page report. In your report:

1. Briefly re-state who the manager is and what his/her position is.
2. Briefly re-state the manager's greatest challenge in managing others.
3. State what theory or concept you recommend applying to the manager's greatest challenge in managing people.
4. State specifically how you would apply the theory or concept.

As you write your report, be sure that you provide a thorough description of the theory or concept that you are recommending, and make very specific suggestions as to how to apply it. The goal is to show your knowledge of the theory or concept you choose.

APPENDIX D

Grading Rubric for Manager Assignment - Part 2

Introduction

10 points

Is the introduction well-written?

Is there a brief statement of where the manager works and what his/her job is?

Is the manager's greatest challenge in managing other people presented?

Understanding of Theory or Model Applied

50 points

Does the paper include a clear description of the theory, model or other course material that is being applied?

Does the description reflect an understanding of the theory, model, or other course material that is being applied?

Would a reader have a clear understanding of the theory, model, or other course material from reading the paper (if she was not already familiar with it)?

Application of Course Material to Manager's Challenge

20 points

Was the theory, model, or other course material applied to the manager's greatest challenge?

That is, was there a discussion of how the course material could be applied to the manager's greatest challenge in managing others?

Grammar, Spelling, Etc.

10 points

Is the paper typed and double-spaced with standard one-inch margins?

Is the paper free from errors in grammar and spelling?

Is the paper neatly presented with the pages stapled together?

Are reference sources (if any) properly cited?

Assignment Details

10 points

Is the Manager I assignment attached?

REFERENCES

- [1] Burke, L. A. and Moore, J. E. (2003). A perennial dilemma in OB Education: Engaging the traditional student. Academy of Management Learning and Education, 2: 37-52.

DETERMINING THE PATTERNS AND IMPACT OF NATURAL PROPERTY GROUP DEVELOPMENT IN “-OPOLY” TYPE GAMES THROUGH COMPUTER SIMULATION

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ABSTRACT

This paper extends earlier work on a computer simulation that determines patterns of natural property group development during play of a game and the impact of this development on the results of ~opoly type games. This extension adds the dimensions of developing natural property groups and a more sophisticated mortgaging strategy to the previous simulation which focused on a simplified set of constraints and the dimensions of cash position and simulated buying behavior. In this paper our focus is on examining the effects of introducing property development into the simulation especially in terms of the impact on cash flow and on game termination. Both these factors have the potential to determine when and how such a game can be effectively used as a classroom simulation. Previous results, reviewed in this paper, indicate that chance or luck play a less important role than one may suspect. Once again there seems to be a consistent first player advantage in being able to gather property groups and, with a twist, winning the game. A key question addressed in this simulation is to what extent this “first-mover advantage” is sustained when property development is added. Results indicate that, while there are some exceptions, the first player advantage appears to hold when property development is added. These results add substance to the discussions and strategic implications of using this game as a classroom simulation.

INTRODUCTION

With numerous versions on the market, both licensed and non-affiliated, the basic rules and layout of “~opoly” type games are standard and generally familiar. One of the reasons for the popularity of the game and its various versions is a perceived combination of risk and strategy that people find intriguing. While using the game in certain modified arrangements as a class simulation, questions arose regarding how much risk and how much strategy can be experienced in the limited time frame that a class allows. In our previous versions of the simulation we examined attempts to “speed-up” the game; versions were tried with modifications to shorten the game that require a certain number of properties be distributed and purchased prior to the initiation of play. This previous work illustrated that even as the number of players in the game increases, the number of total turns needed to complete the distribution and purchase of properties (average turns per player x the number of players) is consistently about 124.

Since, in essence, one would win the game by eliminating the cash and equity of competing players, the ability to collect substantial rents following property development is an important part of game play. This expectation motivated the additions made in this version of the simulation and the change in parameters that were central to our investigation.

The key reporting items of the simulation were the cash/resource position of each of the players, the number of wins for each of the players, and the dependence of wins on the number of turns the players have. The simulation was run for 3, 4, 5 and 6 player games. Further the simulation was run modifying the number of total turns for the game beginning at 200 turns and stopping with 600 turns proceeding in increments of 50.

THE PREVIOUS SIMULATIONS

The simulation is written in Java, and uses a random number generator for rolls of the dice. The simulation can be run for any number of players. With any fixed number of players the simulation can be run for a large number of games. The simulation continues until all available properties are allocated, in general following the rule of such games that even if a player who lands on a property chooses not the purchase it – the property is distributed by means of an auction. In the first version of the simulation, whenever a player landed on a property the player was allocated that property. All prices and currency levels will be set according to those used in the original and most traditional version of the game now copyrighted Hasbro. In the second version of the simulation, players purchase un-purchased properties if they have the cash available, and if they do not the properties are “auctioned” based on several variables. Players are also required to pay or receive cash based on the standard rules of the game. To simplify this version of the simulation, no property improvements were included, as the primary questions deal with property distribution and not cash position.

During an auction the simulation acts in place of the players; the basic assumption is the players act in a manner, whenever reasonable, to prevent the establishment of a natural property group by another player. Though all players utilize a single strategy when one considers all the cases it does appear somewhat complicated.

If the current player does not have the resources required to purchase the property and no natural property group is possible, there are two possibilities for subsequent action that depend upon whether the property could lead to a monopoly or not. If not, there is first a cash auction. The player with the largest cash balance wins the auction. If auction winner has a cash balance that exceeds half the purchase price of the property then that player pays the smaller of the purchase price and the player’s cash balance. If the auction winner does not have the requisite cash, the price of the property is set randomly at 0.5, 0.6, 0.7, 0.8, 0.9 or 1.0 the purchase price and the player pays by mortgaging the needed amount of property. If the auction winner does not possess sufficient property to meet the set price they receive the property but are left with no resources.

The remaining case occurs when the available property can lead to a natural property grouping. The player with the possibility of a natural property grouping can allocate up to 90% of their resources (not including properties from natural property groupings) to the winning the auction. The remaining players can allocate up to 75% of their resources to winning the auction. The auction winner is the player with the largest auction allocation. The actual cost of purchasing the property via this auction process is the minimum of three times the purchase price of the property and \$1 more than the second highest bid in the auction.

THE CURRENT SIMULATION

There are three areas, natural property group development (improvement), paying off mortgages, and an enhanced mortgaging strategy, that were developed or modified to implement this version of the simulation. Each is examined briefly in turn.

Natural property group development (improvement).

During each turn a player with a property group and a minimum cash balance of \$400 can allocate up to 50% of that balance toward development of their property group(s). The houses are purchased and placed uniformly on the properties within a property group from the last property in the group to the first in the group. If a player has multiple property groups, a maximum of three houses are built on a property group

until all properties in all property groups have been developed to the three house level. The development is performed in order from the lowest cost property group to the highest cost property group.

Paying off the mortgage on properties.

Each turn a player has the opportunity to pay off mortgaged property, however property group development occurs before paying off a mortgage. To be eligible for mortgage pay off, the player must have a minimum cash balance of \$500 and can spend up to 25% of their cash balance for this purpose. The order in which property is selected for pay off is clockwise around the board from properties in the least expensive property groups to the most expensive property group.

Mortgaging strategy.

A player’s mortgaging strategy occurs in four phases. In phase one, property not currently mortgaged, that is not a railroad, and is not part of a natural property grouping held by the player is available for mortgaging. In phase two, the simulation allows railroad holdings to be available for mortgaging. In phase three, all natural property groupings that are not developed (have no improvements) are available for mortgaging. In phase four, first houses on a natural property grouping and then the property itself are available for mortgaging. Each phase terminates when enough monies have been collected to pay the bill or all property available during the phase is mortgaged. If the monies obtained from mortgaging during phase j are not sufficient to pay the bill, the simulation moves to phase j+1. If phase four does not provide sufficient funds to pay the bill the player is bankrupt.

QUESTIONS

The previous simulation, with no initial property distribution, indicated that approximately 124 turns were needed before all properties were distributed, and this number was independent of the number of players (from two to six). In addition, the likelihood of natural property groupings was fairly low (see Table 1 and Chart 1)

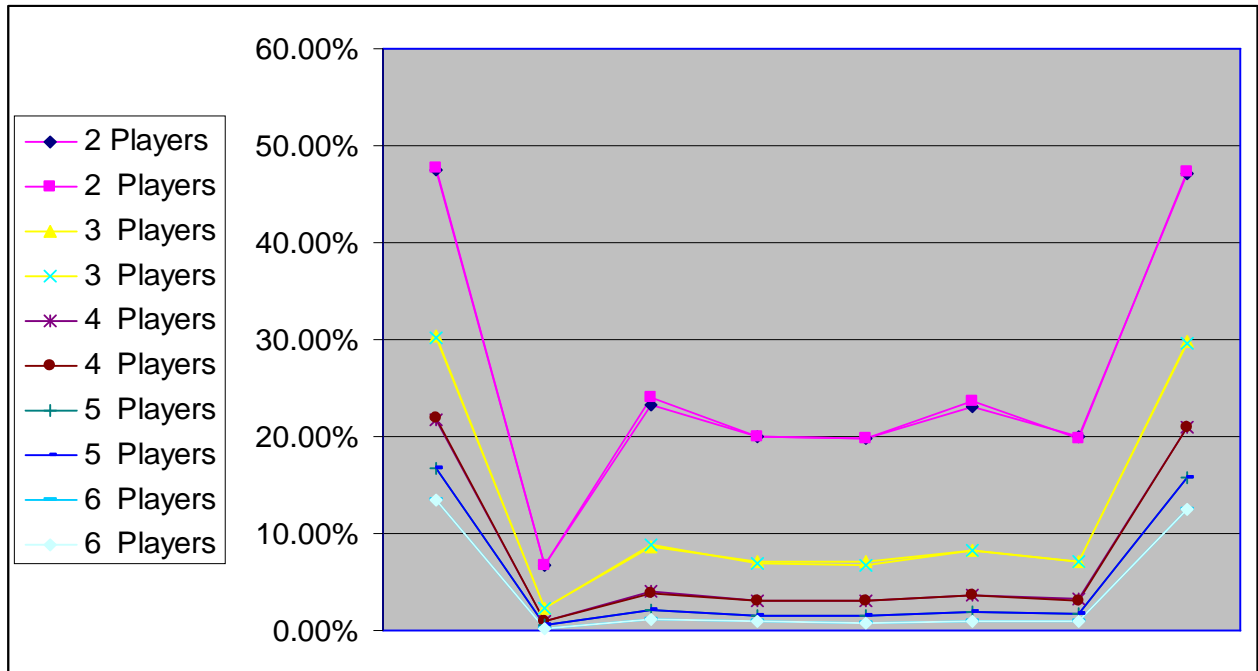
Table 1: Probabilities of a natural grouping (average of 2,000,000 trials)

Property Group	0	1	2	3	4	5	6	7
2 Players	47.53%	6.77%	23.70%	19.98%	19.76%	23.37%	19.91%	47.16%
3 Players	30.28%	2.35%	8.77%	7.02%	6.89%	8.24%	7.05%	29.72%
4 Players	21.81%	1.01%	3.96%	3.14%	3.07%	3.65%	3.17%	21.00%
5 Players	16.78%	0.49%	2.08%	1.59%	1.55%	1.84%	1.64%	15.82%
6 Players	13.41%	0.25%	1.15%	0.89%	0.83%	1.02%	0.91%	12.46%

Property Groups 0 and 7 have two properties - others have three

The previous simulation also showed a consistent bias in favor of the earlier players in achieving natural groupings (a first-mover advantage), and this was repeated regardless of player number. The runs of the simulation indicated that there was approximately a seven to ten percent reduction from each player to the next, regardless of the number of players. Of the results found by running the simulation, the positive bias toward moving earlier was one of the most interesting.

Chart 1: Graph of Probabilities of a natural grouping



With the addition of the cash constraints on the simulation, we address the following questions:

- **Question 1: Is there an significant advantage to going first in the game as opposed to second or later positions in terms of:**
 - a) Number of property groups gathered?
 - b) Cash?
 - c) Property value?
 - d) Likelihood to win the game?
- **Question 2: How does the number of players impact the previous answer?**
- **Question 3: How does length of play (number of moves) impact Questions 1 and 2?**

RESULTS AND ANALYSIS

A series of simulation runs provided the data for the results shown in the following charts and tables. Each simulation was set to run one million games for a set number of players from 3 to 6, and for a set number of turns. In an effort to determine that the simulation results were consistent, in several cases the same run was done multiple times. While there was some variation between identical runs (which is to be expected when using simulation to help determine trends and estimate probabilities) the trends from run to run were remarkably consistent indicating that a one-million game simulation run is of a sufficient length to use for the purposes of comparison and analysis.

As a base comparison, Chart 2 shows data for a four-player game of multiple lengths (one million simulated games at each length) with Cash and Property Value (determined as the stated mortgage value of owned but un-mortgaged properties) averages for all players in the game. Chart two also shows frequencies for total number of Bankrupt Players as well as for the total number of games won (the simulation terminates a run when the number of remaining players equals 1, and totals are averaged at that point.)

Chart 2:

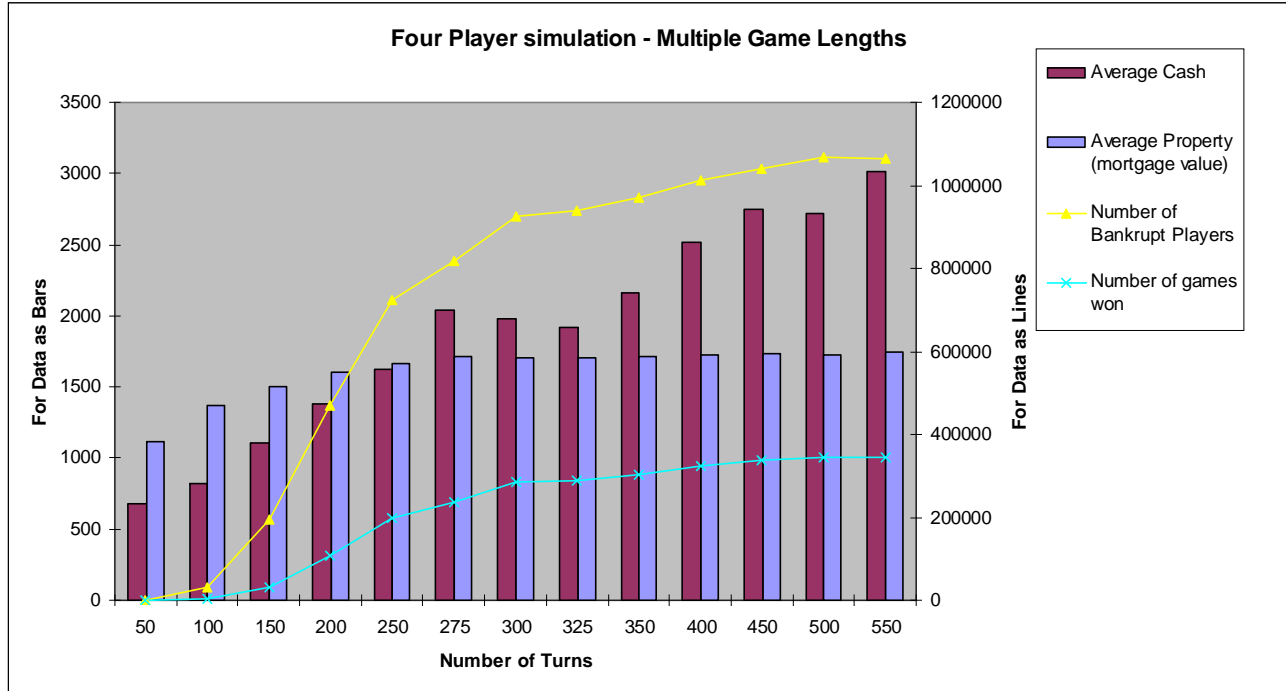


Chart 2 shows that for four players that with property development the number of bankruptcies and games won increases dramatically once the average point of all properties being distributed is reached (approximately 125 turns [10]) then begins to level off about 250 turns. At that point property values reach their average maximum (all properties which can be developed are fully developed, after which there is a slight decrease in average cash until about 325 turns. After that point, few additional games are won, and few additional bankruptcies occur, however average cash continues to increase. At 600 turns for 4 players only about 35% of all the games played have been won. Extrapolating from this data, we infer that based on the constraints of the current simulation the vast majority of four player games will never end in a winner, regardless of the length of the simulation. The pattern of these results is very similar for three, five and six player games as well. For comparison purposes, for a three player game at 600 turns, 53% of the games played resulted in a winner. A five-player and a six-player game, the 600 turn win percentages were 23% and 17% respectively. Interestingly, these results are not far different at 600 turns than they are at 400 turns, where the 3, 4, 5 & 6 player win percentages are: 52%, 32%, 22% and 16%.

A key question for this paper is whether the addition of property development (houses & hotels) and the corresponding changes in player cash flows has a significant impact on the game. A comparison of the data presented in tables 2 and 3 provide insight. Table 2 is drawn from the earlier version of the simulation which did not include property development while Table 3 is constructed from the results of the current simulation. The average mortgage value of all distributed property is 2865, so if evenly divided the expected value of undeveloped un-mortgaged property among the players would be that

shown in Table 2. Both simulations allowed players to mortgage properties to raise cash. The difference between the expected value of property and the results of the simulation shown in the fourth column is thus explained by players owning properties that remain mortgaged at the termination point of the simulation.

**Table 2: Data from an average 1 million runs without property development [6]
(based on an average of 5 1-million game runs terminating when all properties were distributed)**

Players	Average Cash	Expected Value of Property (mortgage value)	Average Property (mortgage value)	Number of Bankrupt Players	Number of games won
3	939	955.0	835	1700	58.60
4	1013	716.3	683	320	0.20
5	1062	573.0	560	73	0.00
6	1134	477.5	471	24	0.00

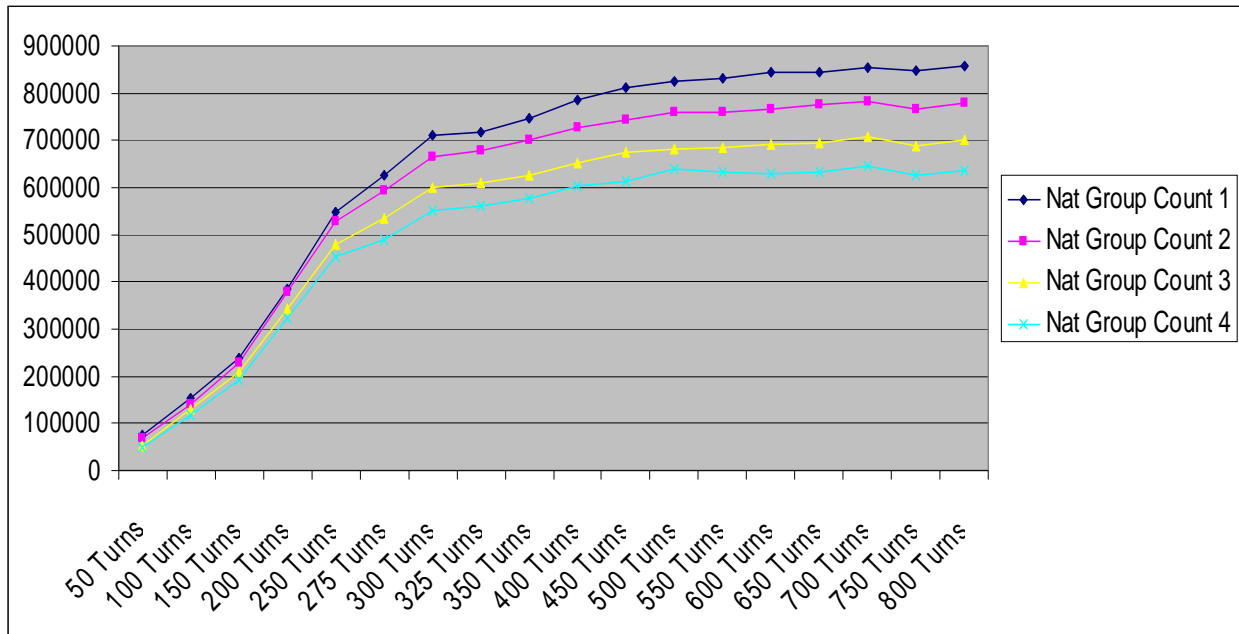
Table 3: Data from a 1-million game run with property development terminating at 125 turns (the average point at which all properties are distributed)

Players	Average Cash	Expected Value of Undeveloped Property (mortgage value)	Face Value of Owned Properties and Improvements	Average Property (mortgage value of properties and improvements)	Number of Bankrupt Players	Number of games won
3	785	955.0	1828	914	123653	33575
4	897	716.3	1426	713	90617	10719
5	991	573.0	1151	575.5	69691	3846
6	1081	477.5	958	479	55653	1397

The differences between the result without property development (Table 2) and with property development (Table 3) are substantial. With development, property values are slightly higher than those of the previous simulation indicating that some amount of development has taken place by this point in the game. Perhaps the starkest contrast between the two simulations is in the number of bankrupt players and games won. In the earlier simulation (no development) there was only one game won at this point out of 5 million 4 player simulations, and no games won out of 5 million 5 player or 6 player simulations. While the raw numbers of bankrupt players and wins out of a million games are still fairly low in the second simulation, the magnitude of the differences indicates that property development plays a key role in the game – slightly decreasing average player wealth (the total of cash and property) and substantially increasing the probability that one or more players will be forced out of the game by the average point at which all properties have been distributed.

From this point we can begin to explore whether property development impacts the advantages found in the previous simulation of going first, or before later players. Charts 3, 4, 5 & 6 show how property groupings, cash, property values, bankruptcies and wins vary for a four-player set of simulations over various game lengths from 50-800 turns

Chart 3: Property Groups for a Four-Player Simulation over Various Game Lengths



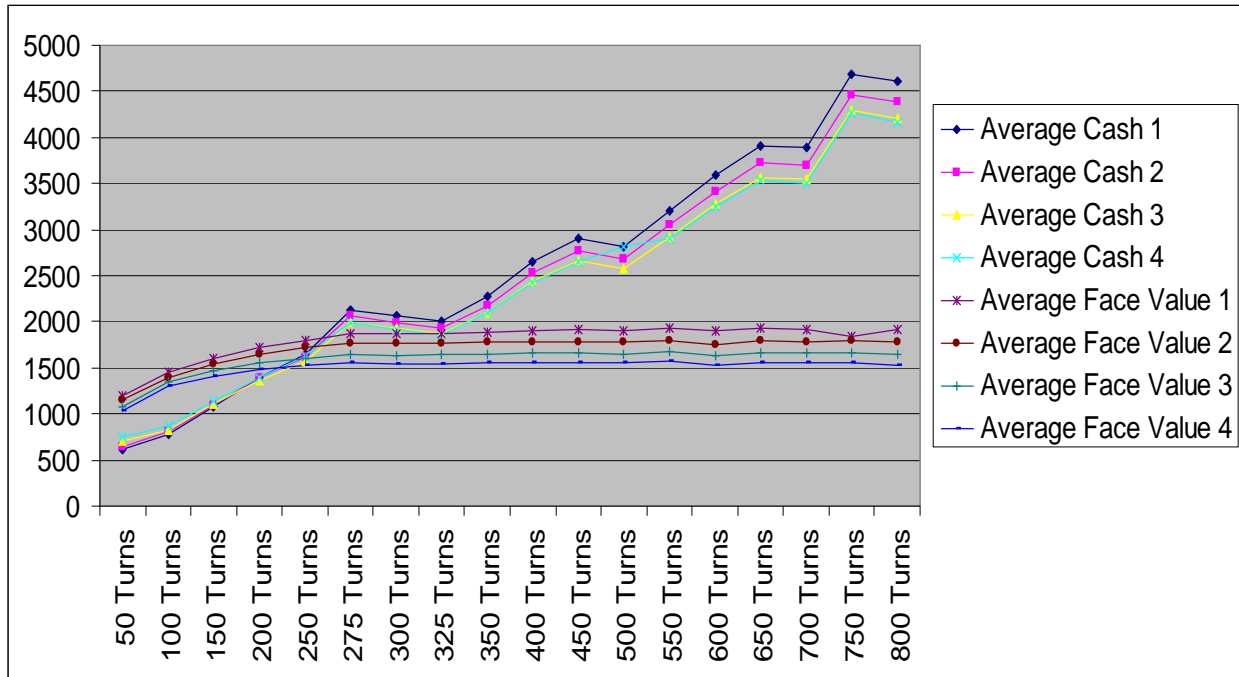
Data based on one million games per simulation run.

Chart three shows how property groups vary from player to player. It is interesting to note that the number of property groups owned by any given player levels off at about 275 turns, the same place where average property for all players trails off. Since previous simulations [10] have indicated that all properties should be distributed at an average of 125 moves, some explanation for property groupings to continue to increase is warranted. Trading of properties from one player to another is not allowed in this simulation (this will be added in future simulations) so that cannot account for this discrepancy. The only way that a player can gain additional properties to create a property group is to bankrupt another player, thus obtaining the bankrupt player’s properties. Chart 5 indicates a significant shift in bankrupt players over the same range that the natural property groups continue to increase, thus providing an explanation for the phenomenon.

Player 1 retains a significant advantage over later players, and there appears to be a consistent advantage for each earlier player over later players. This result is consistent with findings from the earlier version of the simulation, and indicates that while development does impact property group holdings later in the game as a result of wins and losses; there remains a consistent and predictable first mover advantage in obtaining property groups.

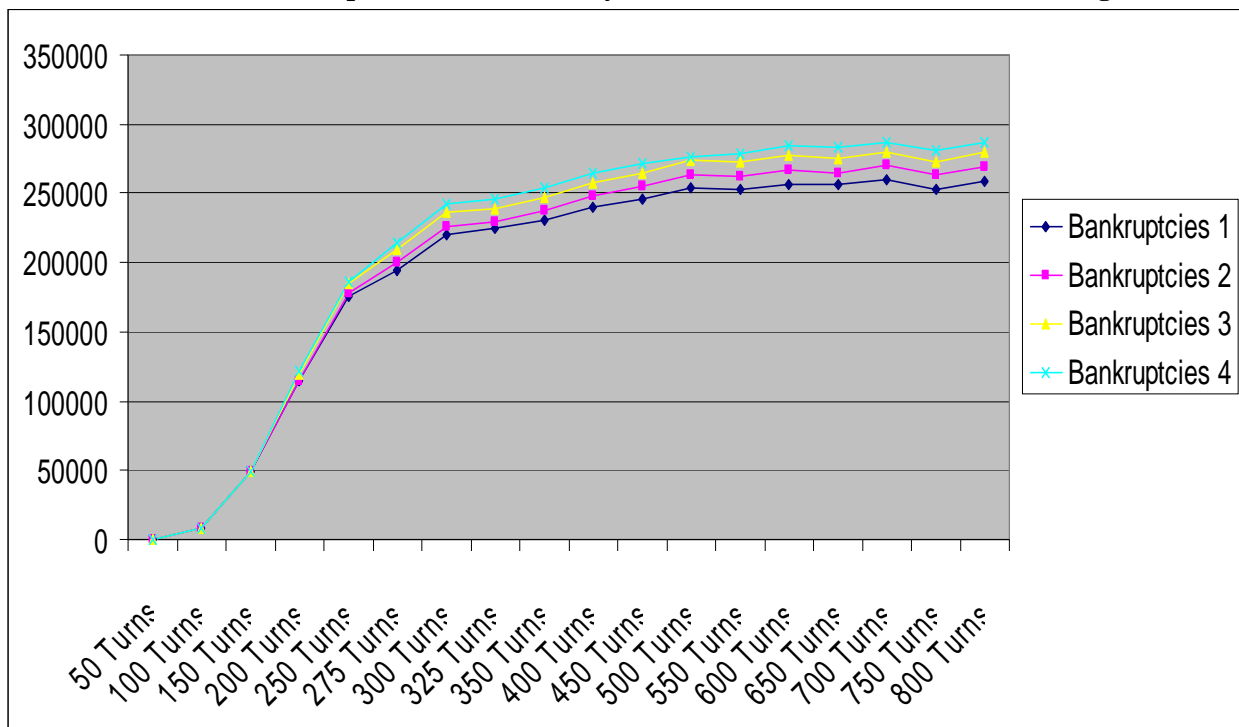
Chart four shows cash and face value by player over several game lengths. Because face value should be related to property groups (complete or partial) a similar pattern between number of property groups and face value is to be expected. This pattern does emerge, and once again player one has an advantage in property ownership as measured by face value. Amount of cash on hand presents a slightly different, but again predictable story. Early in the game (before about 250 turns) player one has a lower amount of cash than other players, with player four having the highest amount. This is due to the increased opportunities that the earlier players have to purchase properties. This situation reverses at about 250 turns, and player one again emerges with an advantage and the first mover advantage seems to remain fairly consistent throughout the remainder of the game lengths investigated.

Chart 4: Cash and Face Value for a Four-Player Simulation over Various Game Lengths



Data based on one million games per simulation run.

Chart 5 Number of Bankruptcies for a Four-Player Simulation over Various Game Lengths

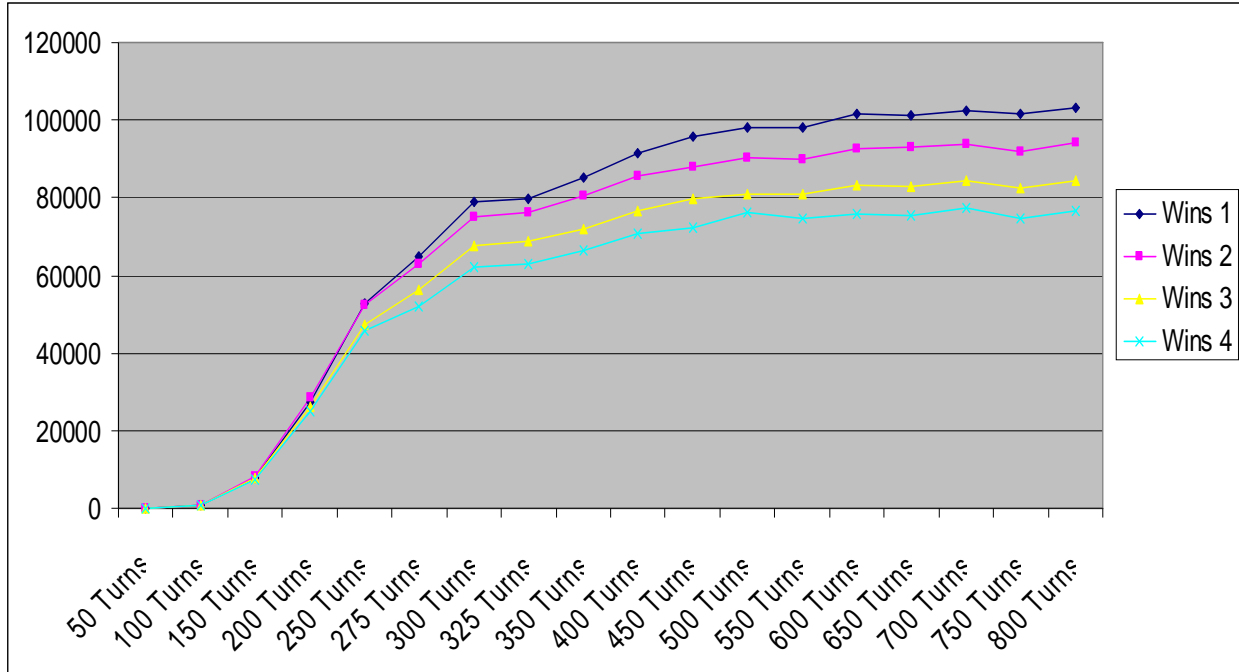


Data based on one million games per simulation run.

Bankruptcies per player at various game lengths are presented in Chart 5. Up through approximate 250 moves the number and rate of bankruptcies for each player is fairly consistent. A clear pattern emerges

from that point on, however, indicating that later players are more likely than earlier players to have gone bankrupt, thus again reinforcing the concept of a first-mover advantage in the game.

Chart 6 Number of Wins for a Four-Player Simulation over Various Game Lengths



Data based on one million games per simulation run.

The last issue then is whether or not the other variables measured do in fact relate to the likelihood of a player winning the game. As expected, Chart 6 indicates that earlier players do have a higher likelihood of winning the game than later players, and this manifests quite clearly after about 250 turns. While not presented in this paper in the interest of space, the results for three, five, and six players are all quite similar to the results for four players shown. In each case, 250 moves seems to be the point after which a first mover advantage is clear and sustained. This is also about the point where property development reaches its maximum (see Chart 2).

Of some key interest is the likelihood of winning earlier in the game (prior to 250 turns). Tables 4, 5 and 6 present an analysis of multiple player numbers and key variables at 200, 400 and 600 turns respectively. The 400 and 600 turn data indicate a clear and convincing advantage for earlier players at these points, regardless of player number. In stark contrast, at 200 moves the second player is more likely to have won the game than the first player, and in a six player game that advantage extends to player three as well. A probable explanation for this phenomenon is that of cash flow. Earlier in the game, early players have more opportunities to purchase properties and thus are cash poor relative to later players, but at this point the earlier players have not had the opportunity to develop those properties to a sufficient level to take advantage of their assets. The second player, however, has a sufficient amount of cash to have a slightly better “survival” rate at this point. While this is an interesting result, and certainly worthy of discussion when using the game as a classroom simulation, it is important to note that while there are real differences in win rates at this point in the game, the raw number differences are small, reflecting less than 2/10ths of 1% of all the games played in a simulation run.

CONCLUSIONS AND OBSERVATIONS

In general, the simulation is designed to answer some specific questions that will help the instructor use such a game in a classroom. Of particular interest are implications regarding business policy and strategy. Effective classroom exercises require a short learning curve, which is one reason that ~opoly type games make an attractive exercise. On the other hand, the length of such games is a negative in a classroom setting. The simulation presented in this paper can help in determining the factors that influence strategic success, and how various uncertain decision environments can be improved through modeling. Connections between the research questions and intended course use include first mover advantages in the market, the impact of long term vs. short term strategic planning and the impact of additional competitors in the environment. Record keeping and investment returns can also be tracked by students and discussed in the classroom setting.

The simulation provides a basis for discussion in a business strategy/policy class that substantially enhances the use of the game as a classroom exercise. In any given semester, only a limited amount of time can be used for game play, and it is not only impractical but impossible for enough games to be played for students to see what can be observed through analysis of the simulation data. In addition, any one game is likely to have enough variance from the means that students will be unable to discern patterns that become clear when multiple games are played.

This simulation and those leading up to it are at best approximations of player behaviors. In addition, none of these simulations allow properties to be traded, which is a key behavioral part of the game. The largest remaining question then is whether trading of properties between players will impact the win/loss patterns and first mover advantages seen in the current simulation. Adding trading to the simulation is the next logical step in this research path, and should be completed and reported in an upcoming paper.

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Table 4: 200 turns

3 players		Average Cash	% change from Previous Player	% change from First Player	Average Face Value	% change from Previous Player	% change from First Player	Nat Group Count	% change from Previous Player	% change from First Player	Bankruptcies	% change from Previous Player	% change from First Player	Wins	% change from Previous Player	% change from First Player	
	1	1405			2235			958036			206719			89574			
2	1384	-1%	-1%	2143	-4%	-4%	935295	-2%	-2%	207963	1%	1%	91384	2%	2%		
3	1374	-1%	-2%	2011	-6%	-10%	856356	-8%	-11%	214938	3%	4%	84271	-8%	-6%		
4 players	1	1394			1715			383405			114248			27248			
	2	1386	-1%	-1%	1653	-4%	-4%	377070	-2%	-2%	114394	0%	0%	28578	5%	5%	
	3	1361	-2%	-2%	1558	-6%	-9%	342793	-9%	-11%	119975	5%	5%	26102	-9%	-4%	
	4	1385	2%	-1%	1487	-5%	-13%	321928	-6%	-16%	121812	2%	7%	25038	-4%	-8%	
5 players	1	1436			1398			230082			92944			16325			
	2	1430	0%	0%	1345	-4%	-4%	229213	0%	0%	93037	0%	0%	17605	8%	8%	
	3	1415	-1%	-1%	1269	-6%	-9%	209046	-9%	-9%	96280	3%	4%	16008	-9%	-2%	
	4	1404	-1%	-2%	1206	-5%	-14%	193269	-8%	-16%	98831	3%	6%	14955	-7%	-8%	
	5	1440	3%	0%	1151	-5%	-18%	183450	-5%	-20%	99246	0%	7%	14571	-3%	-11%	
6 players	1	1501			1159			113281			51367			5329			
	2	1500	0%	0%	1110	-4%	-4%	111237	-2%	-2%	51830	1%	1%	5794	9%	9%	
	3	1487	-1%	-1%	1052	-5%	-9%	102068	-8%	-10%	52480	1%	2%	5400	-7%	1%	
	4	1482	0%	-1%	998	-5%	-14%	94596	-7%	-16%	53636	2%	4%	5017	-7%	-6%	
	5	1478	0%	-2%	951	-5%	-18%	88354	-7%	-22%	54999	3%	7%	4767	-5%	-11%	
	6	1523	3%	1%	906	-5%	-22%	81565	-8%	-28%	54910	0%	7%	4441	-7%	-17%	

Table 5: 400 Turns

3 players		Average Cash	% change from Previous Player	% change from First Player	Average Face Value	% change from Previous Player	% change from First Player	Nat Group Count	% change from Previous Player	% change from First Player	Bankruptcies	% change from Previous Player	% change from First Player	Wins	% change from Previous Player	% change from First Player
	1	2461			2372			1546650			338313			185484		
2	2322	-6%	-6%	2197	-7%	-7%	1437765	-7%	-7%	352246	4%	4%	173133	-7%	-7%	
3	2241	-3%	-9%	2032	-8%	-14%	1308320	-9%	-15%	368930	5%	9%	157555	-9%	-15%	
4 players	1	2649			1908			785372			240398			91661		
	2	2535	-4%	-4%	1785	-6%	-6%	728372	-7%	-7%	247933	3%	3%	85520	-7%	-7%
	3	2439	-4%	-8%	1656	-7%	-13%	653726	-10%	-17%	257968	4%	7%	76485	-11%	-17%
	4	2421	-1%	-9%	1557	-6%	-18%	602617	-8%	-23%	264403	2%	10%	70627	-8%	-23%
5 players	1	2611			1532			444880			172701			50620		
	2	2526	-3%	-3%	1443	-6%	-6%	414839	-7%	-7%	176784	2%	2%	47560	-6%	-6%
	3	2454	-3%	-6%	1354	-6%	-12%	378281	-9%	-15%	181867	3%	5%	43328	-9%	-14%
	4	2389	-3%	-9%	1271	-6%	-17%	342532	-9%	-23%	186610	3%	8%	39168	-10%	-23%
	5	2336	-2%	-11%	1200	-6%	-22%	315616	-8%	-29%	190261	2%	10%	36018	-8%	-29%
6 players	1	2466			1277			284643			130688			32067		
	2	2397	-3%	-3%	1200	-6%	-6%	262088	-8%	-8%	133623	2%	2%	29685	-7%	-7%
	3	2340	-2%	-5%	1131	-6%	-11%	240182	-8%	-16%	136655	2%	5%	27221	-8%	-15%
	4	2289	-2%	-7%	1065	-6%	-17%	219929	-8%	-23%	139447	2%	7%	24894	-9%	-22%
	5	2240	-2%	-9%	1005	-6%	-21%	201475	-8%	-29%	141869	2%	9%	22781	-8%	-29%
	6	2286	2%	-7%	953	-5%	-25%	187524	-7%	-34%	143175	1%	10%	21250	-7%	-34%

Table 6: 600 Turns

3 players		Average Cash	% change from Previous Player	% change from First Player	Average Face Value	% change from Previous Player	% change from First Player	Nat Group Count	% change from Previous Player	% change from First Player	Bankruptcies	% change from Previous Player	% change from First Player	Wins	% change from Previous Player	% change from First Player	
	1	3270			2390			1636720				355492			199560		
2	3086	-6%	-6%	2205	-8%	-8%	1508761	-8%	-8%		372176	5%	5%	184016	-8%	-8%	
3	2982	-3%	-9%	2037	-8%	-15%	1369545	-9%	-16%		389878	5%	10%	167014	-9%	-16%	
4 players	1	3590			1898			844785				256700			101771		
	2	3415	-5%	-5%	1754	-8%	-8%	767413	-9%	-9%		266643	4%	4%	92743	-9%	-9%
	3	3275	-4%	-9%	1629	-7%	-14%	691270	-10%	-18%		276901	4%	8%	83396	-10%	-18%
	4	3247	-1%	-10%	1523	-7%	-20%	628259	-9%	-26%		284447	3%	11%	75718	-9%	-26%
5 players	1	3408			1552			483391				184569			56756		
	2	3270	-4%	-4%	1451	-7%	-7%	442507	-8%	-8%		189913	3%	3%	52004	-8%	-8%
	3	3155	-4%	-7%	1354	-7%	-13%	398469	-10%	-18%		195801	3%	6%	46720	-10%	-18%
	4	3046	-3%	-11%	1267	-6%	-18%	360883	-9%	-25%		200987	3%	9%	42271	-10%	-26%
	5	3075	1%	-10%	1200	-5%	-23%	335552	-7%	-31%		203535	1%	10%	39294	-7%	-31%
6 players	1	3271			1289			303482				138530			35172		
	2	3149	-4%	-4%	1209	-6%	-6%	278347	-8%	-8%		141836	2%	2%	32241	-8%	-8%
	3	3051	-3%	-7%	1138	-6%	-12%	254903	-8%	-16%		145127	2%	5%	29479	-9%	-16%
	4	2955	-3%	-10%	1067	-6%	-17%	229846	-10%	-24%		148656	2%	7%	26523	-10%	-25%
	5	2875	-3%	-12%	1009	-5%	-22%	212812	-7%	-30%		150876	1%	9%	24560	-7%	-30%
	6	3066	7%	-6%	953	-6%	-26%	195519	-8%	-36%		151404	0%	9%	22545	-8%	-36%

Reflection as a Supportive Component of Team Based Project Management

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Appropriate Tracks: Educational Innovation, Educational Practice

Paper submitted to the SEINFORMS meeting, Myrtle Beach, SC, October 4-5, 2007

Reflection as a Supportive Component of Team Based Project Management

Project-based team work is an integral part of many upper-level business school courses, and often these projects comprise a substantial proportion of the individual student's grades (Bacon, Stewart & Silver, 1999; Hirsch, Shwom & McKenna, 2003). Advantages of team work are said to include: greater motivation and challenge than individual assignments, a context where students can benefit from the interaction with and learning from one another, and a reduction in the instructor's grading load (Dommeyer, 2006). In addition, team work gives students a forum for discussion of new ideas and concepts, and such collaborative learning is widely considered to be good training for future employment in the business world (Brooks & Ammons, 2003). Hansen (2006) also notes that in the current business context, a large percentage of organizations utilize various types of teams in the workplace. Furthermore, employers view teamwork and collaboration as crucial work skills (Tarracone & Luca, 2002).

However, as Dyer (1995, p. 152) noted, "...professors may put students into study or project teams and grade the team project but will spend no time at all in helping these students understand how a good team functions and how to manage group problems that arise... The end result is that usually a few students take over and get the group paper or project completed while others goof off or slide along and get rewarded for the efforts of others. This leaves many students with a negative feeling about group activities as they leave school and go into the work force." This challenge is further exacerbated because often the project represents a significant portion of the individual student's course grade. Consequently, the effective functioning of the formed groups is crucial to the student's individual success in the course. While the choice or assignment of team membership can be, for the most part, under the instructor's control, the internal functioning of the group cannot since groups mutually agree upon their own meeting

times, their own meeting places, their own schedules and their own work processes, most of which is beyond the instructor's control or view. Obviously, the instructor cannot observe every group's process and functioning (May & Gueldenzoph, 2003).

Another fairly consistent concern about having students work in teams to produce a single team project paper or presentation is how to fairly assess the contributions of individuals in the team and assign grades. One solution to this problem has been the use of peer evaluations. "Peer evaluation is the process of having the members of a group judge fellow members on specified traits, behaviors, and achievements" (Sherrard & Raafat, 1994, p. 43). Peer evaluation has received much attention in the literature. It has its proponents (e.g., Gueldenzoph & May, 2002) and its critics (e.g., Bacon, Stewart & Silver, 1999). Studies have focused on the outcomes of peer evaluation as well as the process; i.e., what happens because of peer evaluation and how it is done.

One thing that is sure is that the final team work product is neither an adequate nor an accurate reflection of the effort of individual team members. Nor is the post hoc peer evaluation via a format prescribed by the instructor. With instructor-devised measures, students often respond either too positively (not wishing to offend anyone), too negatively (taking the opportunity to work out frustrations or personal issues), or exactly at the mid-point (assessing everyone's work and effort as equal). Some studies have documented instances of gender- or minority-based bias (Johnson & Smith, 1997). Because the assessment instrument is instructor-devised, students are often pre-occupied with trying to guess what the instructor wants them to say, and they are not really sure how to use the instrument to reflect accurately what went on in the group, or they perceive the evaluation sheet be something that should be dispatched

summarily, rather than carefully considered. In the studies reviewed for this project, none involved student-developed assessment instruments or methods.

We introduce the concept of comparative reflection as a way to further explore the manner in which team process evolves within the team, and we sought to identify whether a comparison between reflection through the articulation of explicit group process norms and an internally team developed and approved team member evaluation process resulted in the identification of a different set of process expectations than did reflection on implicitly held group process norms not specifically articulated within the group. Then we sought to identify whether the internally developed team member evaluation tool completed as an outcome of the explicit group process was more effective in evaluating team member contributions to process and content of the work product than was a professor developed team member evaluation tool.

In the following paragraphs, a literature review integrating control theory with shared mental models work is presented, basic hypotheses are developed, the methods used in the present study are discussed, the results of the analysis described, and discussion is provided of the impact and future direction of this research stream.

LITERATURE REVIEW

Control Theory, Shared Mental Models, and Team Process

At the core of team-based project assignments is the desire for students to not only interact critically with the materials under consideration, but to do so in a simulated organizational setting, the work group. As such, it is crucial to identify how the process of the work group may affect performance in team-based projects. Since the professor cannot normally be present during all of the team meetings and interactions, understanding how the group

remains on task and attentive to process is all the more important to the realization of both the goals mentioned above. Control theory may help to explain this process.

Control theory initially considered the organization as the appropriate unit of analysis (Ouchi, 1979; Eisenhardt, 1985); however, more recent work has drawn the focus of analysis to the smaller work group level (Piccoli & Ives, 2003), such as project teams (Kirsch, 1997). Kirsch (1997: 216) studied control in the development of IS projects, and defined control “as attempts to ensure that individuals working on organizational projects act according to an agreed upon strategy to achieve desired objectives.” Levels of control, though, may differ greatly. Eisenhardt (1989) stressed the difference between formal behavioral controls and formal outcome controls, and noted that behavioral controls on work implies the articulation of specific policies and procedures, which if followed, lead to the hoped for outcomes; formal outcome controls, on the other hand, relate to the product at the conclusion.

Certainly professors provide student teams with guidance on the outcomes of what the team project assignment should be when it is finished (page length, presentation format, organization, structure, analysis to be included, etc.), but limited guidance is often provided about *how* to enact behavioral control within the group. As Dyer (1995, p. 152) noted, “..professors may put students into study or project teams and grade the team project but will spend no time at all in helping these students understand how a good team functions and how to manage group problems that arise... The end result is that usually a few students take over and get the group paper or project completed while others goof off or slide along and get rewarded for the efforts of others. This leaves many students with a negative feeling about group activities as they leave school and go into the work force.” As such, outcome controls are clearly provided by the supervising professor, but much about what happens to get to the outcome is not

controlled through such formal mechanisms. Limited attention to peer evaluation, and to expulsion or other group problem handling may be the exception to this rule. Kirsch (1997: 236) noted, “While coordinating task-related activities is obviously important, the results of this study suggest that individuals also exercise control to foster relationships in order to engender cooperation and elicit individual cooperation.”

Clearly then it is important to understand how control is exercised at the behavioral level through informal means as well as formal means. Kirsch (1997) and Eisenhardt (1985) suggested that attention to informal control provided attention to people and social strategies. Jaworski (1988) noted that these measures are often undocumented and happen at both the clan (group) level and self (individual) level. According to Kirsch (1997), these clan level processes involve socialization to assist the group in enacting and preserving processes and behaviors that are appropriate to group functioning. In a semester long project, teams are created and dissolved in a very short time period, yet much is often expected from the teams in that small time period.

How do such processes happen within a semester-long team based project? To jumpstart the process, professors often prescribe the group size and either assign the group membership or provide constraints to class members in their own group formation. In many cases students are simply expected to be able to enact a “successful” process of team work without any further guidance (Hansen, 2006; Bacon, et al., 1999). As one example of how limited the coaching and mentoring of teams can be, Bolton (1999: 232) found that 72 percent of instructors in the business school at San Jose State University assigned students to teams in at least one class, but that 81% gave “modest, limited, or no support to students assigned to teams.” The research on shared mental models may provide a foundation upon which to view this process.

Shared mental models have been applied to team work for many years. Stronger team performance has been attributed to shared mental models (Mathieu, Goodwin, Heffner, Salas, & Cannon-Bowers, 2000; Gurtner, Tschan, Semmer, & Nägele, 2007). While Mathieu, Goodwin, Heffner, Salas, and Cannon-Bowers (2000: 274) note that many different mental models may simultaneously exist on a team, they note “team members must hold shared conceptions of how the team interacts. These models describe the roles and responsibilities of team members, interaction patterns, information flow and communication channels, role interdependencies and information sources.” As Bettenhausen (1991) notes, the combination of a true concern for one another and the collective commitment to the project task at hand will contribute to the best teams.

In addition, Gurtner, Tschan, Semmer, and Nägele (2007) advocated reflection as a tool to help maintain focus on both task and personal interaction within the project team. They noted (Gurtner, et al., 2007; 128 – 129), ‘Reflection can be conceived as a group discussion, or can also be done by each group member.’ The outcome of reflection was a stronger commitment to both process and task and an ability to be more adaptive on the part of the group as a whole. These outcomes were associated positively with team outcomes. Since a team-based reflection process in which the team members all collectively define and agree to a contract of behavioral norms shared by all team members for the duration of the team existence and since as they design their own evaluation process based on that contract, they will have engaged in greater commitment and clarity about the rest of the members of the team, we propose the following hypothesis:

Hypothesis 1: Teams which developed a team contract will have higher Explicit Agreement of Importance than will teams without an explicitly agreed upon contract.

In addition, we propose that the task of the reflection upon articulating tacit expectations for group interaction during the process of group formation can provide a legitimate baring of the soul of previous experience with shirking, free riding, and other behaviors experienced in low performing groups. The very fact that groups go through this process builds solidarity and commitment across the team. Discussing the experiences and processes of what is important to one within group settings can result in an elevated commitment across the entire team. As a result, we propose that beyond what Gurtner et al. (2007) proposed in their study, the connection made between team members on this process enables a level of agreement that is transferable across the project. As such, we propose that the development of this reflection at the team level provides a stronger commitment by the team to the task and process outcomes of the team. As the connection between team effectiveness and shared mental models has been well established (Gurtner, et al. 2007; Mathieu, et al. 2000, among others), we also propose the following additional hypotheses as an exploratory extension of the robustness of the construct of shared reflection.

Hypothesis 2: Groups who have developed explicit agreement on acceptable team behaviors will demonstrate higher team effectiveness than will those who individually articulated their perceptions of acceptable team behaviors.

Hypothesis 3: Team work satisfaction will be higher among students in groups that developed an explicit statement of acceptable team behaviors than it is among those who are a part of teams in which individuals articulated their own perceptions.

Hypothesis 4: Teams which developed explicit team contracts will score higher on task success than will those who only developed individual reflections.

In addition, team member evaluation has been noted to be important for team satisfaction with group projects (Bolton, 1999). Candy et al. (1994) discuss the importance of students becoming lifelong learners and cite both peer-assisted and self-directed learning as being characteristic of encouraging the process. Boud et al. (1999) points out several other attributes or

skills associated with peer learning which are considered critical both to academic pursuits and work-related experiences; i.e., collaboration, teamwork, critical enquiry and reflection, communication skills, and learning to learn. Searby and Ewers (1997) suggest that the most significant reason for using peer assessment is that it helps students to think critically and to take control of their learning, so that they are less dependent on the lecturer. Gatfield (1999) found a very high level of student satisfaction with a group assessment process in general. Therefore, we propose the following hypothesis:

Hypothesis 5: Teams that developed explicit team contracts and their own internally developed team member evaluation tools will perceive higher Effectiveness of Team Member Assessment Tools.

METHODS

Data were gathered from 145 students working in 34 student teams on semester-long projects with multiple assignments in one of 6 sections of the undergraduate capstone strategic management course at a regional university in the Southeastern United States. Two professors each taught three of these six sections. Teams were created by the students during the first meeting of the course, subject to the constraint of making teams of between 4 – 6 members and having cross functional representation on each team, though one team had only 3 team members because a team member dropped the course.

Research Concerns:

Our primary research questions were:

- Do explicitly developed team contracts result in greater team agreement on important team behavioral dimensions than do aggregations of implicit, unarticulated team member perceptions?

- Do teams with an explicit behavioral contract benefit from better team effectiveness, team environment, and team work satisfaction?
- Do teams with an explicit behavioral contract benefit from higher task success?
- Do teams with an explicit behavioral contract perceive internally developed team member evaluation processes to be more effective than those teams who use an outside developed evaluation tool?

Process

In our attempt to understand the extent to which explicitly developed team contracts created more shared expectations for group interaction, student teams were assigned one of two treatments:

(1) Shared Team Reflection - Students on one half of the teams were asked to meet together as a team to discuss and agree upon what they collectively believed to be the behaviors and commitments that would guide the team's behavior and the penalties for breaking the policies that they collectively set. These teams were each required to draft a team contract, which clearly articulated the outcomes of this discussion, and which each person signed. In addition, each of these groups designed their own team member evaluation form, which was used to assess performance of the team members after the major deliverables were turned in during the course;

(2) Individual Reflection on Team Behavioral Issues - Students on the other half of the teams were asked to write a 2 – 3 page essay in which they articulated the behaviors and commitments that the student believed should be followed by his or her team and what penalties should be matched with violating those behaviors and commitments throughout the course of the semester. These students were expressly told not to interact with

anyone in the completion of this assignment. These students did not design any specific evaluation form, though they were asked to weight how important they believed each of the behaviors they noted were. These teams were assigned an instructor-developed team member evaluation tool to evaluate team member performance after the major deliverables were turned in during the course. They were not provided with this assessment tool prior to its use after the first major deliverable of the course.

Teams assigned to each treatment randomly across each professor and each section, so that there was no obvious bias by time of day, order of team creation, or other effects. Thus, a total of 17 teams were assigned to each treatment.

After the completion of the first major team deliverable during the semester, teams completed in class their respective team member evaluation tool (the teams who went through Treatment 1 completed their internally developed team member evaluation tool and the teams who went through Treatment 2 completed an instructor-developed team member evaluation tool which had been used in previous semesters). In addition, each team member was asked to complete an online survey *after* having completed the in-class team member evaluation. The online survey covered a number of issues, including team effectiveness, team environment, team work satisfaction, and effectiveness of team member assessment, among others.

Team Effectiveness was assessed on a seven-point Likert scale using the nine-item scale developed by Forrester and Taschian (2006). A single factor resulted (eigenvalue = 5.17; variance explained = 64.6%), with very high reliability $\alpha = .919$, which was close to the $\alpha = .90$ reported by Forrester and Taschian (2006).

Team Work Satisfaction was assessed using the three-item scale developed by Forrester and Taschian (2006) and an additional question, “This team experience is one of the best I have

ever had,” was added by the authors to provide some measure of external relevancy to the rating of team work satisfaction. This measure was assessed on a 6-point Likert scale as in Forrester and Taschian (2006). A single factor was identified (eigenvalue = 3.48; variance explained = 87.095%), and reliability was very high at $\alpha = .94$, which was very close to the reliability of $\alpha = .96$ obtained by Forrester and Taschian (2006).

Effectiveness of Team Member Assessment was assessed by two questions, which were each assessed on a 5-point Likert scale: (1) How well does the team member evaluation sheet that you completed in class enable you to accurately evaluate the contributions of your team members to the team’s task accomplishment?; and (2) How well does the team member evaluation sheet that you completed in class enable you to accurately evaluate the contributions of your team members to the team’s work processes? Reliability of these two items was very strong at $\alpha = .911$, and thus the scores reported on each question was summed to create the scale we called Effectiveness of Team Member Assessment.

Task Success was defined as the team grade on the project deliverable. Team grades on this interim deliverable (a 20-page overview and analysis of company and industry) ranged from 55 to 95 (of a total of 100 possible points).

Coding:

To address the first research question of this preliminary study, “Do the individually articulated expectations for team-level behaviors match the explicitly developed team contracts?,” we content analyzed the documents developed through both Treatment 1 and Treatment 2. Content analysis has been recommended as a method for studying text documents in order to identify categories and then to count the occurrence of those categories in the respective documents (Silverman, 1993). Weber (1990) noted that there is a debate about

whether a priori developed (assumed) categories or inferred categories (those evoked from the producers of the textual material) are preferred, and concluded that the use of inferred categories often results in different, incomparable categories as the categories themselves are developed differently across different documents. With this concern in mind, each assignment (from both Treatment 1 and Treatment 2) was content analyzed individually to determine the criteria on which team members thought that they and their peers should be evaluated. For each instrument, whether developed as a team or written as an individual, each evaluation criterion noted was recorded by a main coder. As criteria were expressed in multiple ways across all documents, they were combined subsequently into common categories. For example, *punctuality* might have been expressed by such words or phrases as “timeliness” or “be on time” (See Table 1). Resulting category lists from the team instruments and the individual instruments were then combined to yield a single list of 14 inferred evaluation dimensions. These 14 dimensions included: participation, punctuality, preparation, cooperation, dependability, enthusiasm, focus, respect, help, quality of work, communication, professionalism, honesty and diligence. Frequencies of occurrence for each dimension were determined in order to rank the dimensions (See Table 2). For the purposes of ranking, team responses were recorded separately from individual responses in order to determine if there were differences between teams and individuals in the frequencies with which the various dimensions were named in the evaluation instruments. Further, as this study was exploratory in nature, and as the inferred categories developed in this study were developed across both types of documents, the resulting category structure, noted in Table 2 was deemed appropriate for analysis. In addition, interrater reliability was assessed through the coding of a subsample of the Treatment assignments by a second coder, using the coding categories and examples developed by the original coder. Reliability

uncorrected for chance was .85, but when corrected for chance, using Cohen's kappa, the reliability was .8069. As this was above the recommended .70 level, the interrater reliability was deemed satisfactory.

Using the established dimensions, a second round of content analysis was done on each individual and each group document in order to calculate intrateam agreement on each dimension. A binary coding procedure was used. For each individual document, the dimension was scored 1 if it was mentioned and 0 if it was not. A similar procedure was followed for each group document. The resulting measure of agreement, Explicit Agreement of Importance, was defined as the extent to which team members agreed that the behaviors noted in the aforementioned content analysis were important. We calculated this measure for those who completed Treatment 2 (Individual) as $EAI_{xj} = 1 - ((n_{xj} - X_{ij})/n_{xj})$, where

EAI = Explicit Agreement of Importance;
x = Dimension of Team Behaviors noted in Content Analysis;
j = Team (j= 1, 2, 3, ...j);
i = ith team member of team j (i = 1, 2, ...6);
and where coding is such that x = 1 if mentioned and x = 0 if not

For those who completed Treatment 1, it was assumed that if the team agreed upon the dimension within its team contract, that all had agreed upon it. Thus, Overall Explicit Agreement of Importance was derived as the sum of all of the respective team's score on the individual dimensions, or $OEAI = \Sigma (EAI_x)$, for each of the teams who had completed Treatment 1 or Treatment 2. This enabled a single aggregate measure of the extent to which the respective team agreed upon the categories that were mentioned in the team (or combined individual) documents.

RESULTS

The results of the study provide strong support to the hypotheses posed. The first hypothesis suggested that teams which developed an explicit contract would have higher explicit agreement on important team behaviors than would teams which did not do so. Hypothesis 1 was supported. The t-test between total Total EAI scores for the two groups noted significantly higher Explicit Agreement of Importance on Teams with a Group Developed Contract than on those without a Group Developed Contract. ($t = -3.31$; $p < .01$), with teams that developed explicit contracts noting on average 7.17 of the 14 dimensions, while those teams that did not develop explicit contracts noting on average only 5.73 of the dimensions. These results support the earlier work of Gurtner et al. (2007) and Mathieu et al. (2000).

In addition, Hypothesis 2 was supported. Perceived Team Effectiveness was higher for those students who were in teams who had developed explicit agreement on acceptable team behaviors ($F = 6.649$; $p = .011$), with the average 40.31 for individual versus 44.07 for group.

Hypothesis 3 was supported ($F = 5.324$; $p = .022$). Those from teams which had developed an explicit statement of acceptable team behaviors reported a higher level of work satisfaction than those who developed individual reflections only (22.68 versus 20.27).

Results of a t-test indicated weak support for Hypothesis 4. Teams which developed explicit team contracts scored higher on task success, with average interim deliverable scores of 79.4 for the teams that did not develop such contracts versus an average of 84.8 for those teams that did develop explicit group contracts ($t = -1.47$; $p = .075$).

Results indicate that Hypothesis 5 was supported, with Effectiveness of Team Member Assessment higher for those who had completed Treatment 1, in which they worked together as a team to define explicitly behaviors and penalties appropriate for the team, and discussed and

developed a team member evaluation tool that fit this contract ($F = 9.323$, $p = .003$), with the mean Effectiveness of Team Member Assessment 7.6 for those who had completed the professor-developed tool, versus 8.46 for those who had completed the team-developed tool. While the fact that the teams completing Treatment 2 had not seen the instrument before completing it may have had some effect on the process, it is important to note that the evaluation of that tool on its own still yielded a mean score of 7.6 on a possible 10-point scale.

DISCUSSION

The results of this preliminary study of group versus individual reflectivity support the positive benefit of the shared mental models that seem to emerge with this assignment. Not only are individuals asked to commit more mentally to the project, but as a part of the very assignment of mentally committing and physically signing the behavioral contract, they are engaging in clan-type behaviors (as suggested by Kirsch, 1997).

Of course this project is subject to the limitations of a being conducted in a single university setting; however, controls across different professors indicated no significant differences across their classrooms. We did not receive 100% participation in the survey response, yet there was no indication of a serial bias in nonresponse by any particular demographic in the six classrooms.

The results of this preliminary study provide some interesting suggestions for practice. They reinforce the need for professors to go beyond making the team assignment and allowing or requiring the students to “figure it out” as a way to prepare them for the real world. The results also suggest the primacy of getting students or others involved in short-life projects with complex demands engaged in an active deliberation on and commitment to group developed behavioral controls. For professors, it also points out that in an age of mass customization, it

may be more important to enable students to choose, collectively, how they will be evaluated, and then to hold them accountable to that process. In any case, this study opens a number of interesting doors for future research on shared mental models, the role of reflection and comparative reflectivity, and control processes in group function.

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Table 1
Expressions of Behavioral Dimensions

Participation

- Willingness to work with group
- Attendance (meetings and class)
- Contribution
- Equal contribution
- Input
- Making the most of group meetings
- Equally shared work
- Did all that was asked
- Putting in your time

Dependability

- Ability to assemble
- Make time for group meetings
- Reliability
- Responsibility
- Completion of assigned tasks
- Accessibility
- Availability
- I would work with this person again
- Accountability

Preparation

- Being prepared
- Preparedness
- Prepared for presentations

Punctuality

- Meeting deadlines
- No procrastination
- Time management
- Being on time
- Timeliness
- On time to any group meeting
- Getting work done on time

Cooperation

- Having same expectations as group
- Resolving disagreements
- Flexibility
- Adaptability
- Open mindedness
- Cooperativeness

- Team work
- Your actions affect the group
- Final meetings to wrap up project
- Open to new ideas
- Ability to work with others
- Flexible and cooperative
- Majority rules
- Teamwork skills
- Cohesion with group
- Compatibility
- Willingness to compromise

Work Quality

- Correctness of tasks
- Pride in work
- Accuracy
- Overall performance
- Work done correctly

Respect

- Consideration of others' feelings
- Swallow pride
- No violence or threats
- Ethics
- Polite behavior
- Etiquette
- Politeness
- Fairness
- Sensitivity
- Respectful of others' opinions
- Appropriate meeting behavior
- Friendliness

Communication

- Listening
- Discussing issues as a team
- Effective feedback
- Listening with an open mind
- Responds to email and phone calls
- Listened and followed directions

Enthusiasm

- Positive attitude

Focus

- Staying on task at meetings
- Focus on project
- No cell phones in meetings
- On task and focused
- Avoiding non-school personal issues

Give/Receive Help

- Accept help
- Being helpful
- Providing support to teammates
- Willingness to help
- Understanding of others' need for help

Professionalism

- Intelligent work ethic
- Creative thinking
- Knowledgeable
- Creativity
- Problem-solving new ideas
- Appropriate attire
- No plagiarizing
- Dressed appropriately for presentations
- Always cite sources
- Competitiveness

Honesty

- Trustworthiness

Diligence

- Dedication
- Commitment
- Effort
- Success driven
- initiative
- Goal oriented
- Conscientiousness
- Willingness to work
- Perseverance
- Work until the assignment is complete
- Hardworking
- extra effort

Table 2
Evaluation Dimension Rankings

Evaluation Dimension	Team		Individual	
	Rank	Frequency	Rank	Frequency
Participation	1	26	1	75
Punctuality	2*	15	3	43
Cooperation	2*	15	6	33
Dependability	2*	15	2	62
Quality of Work	3	12	5	37
Respect	4	11	7	32
Preparation	5	10	8	26
Help	6	9	12*	6
Enthusiasm	7	7	10	12
Diligence	8	6	9	20
Focus	9*	5	11	10
Communication	9*	5	4	39
Professionalism	10	3	12*	6
Honesty	11	1	12*	6

Dimension	GROUP		INDIVIDUALLY DEVELOPED	
	Not Mentioned	Explicitly Mentioned	Not Mentioned	Explicitly Mentioned
Participation	0	17	0	17
Punctuality	4	13	0	17
Cooperation	9	8	1	16
Dependability	6	11	0	17
Quality of Work	9	8	1	16
Respect	3	14	1	16
Preparation	8	9	5	12
Help	13	4	8	9
Enthusiasm	12	5	6	11
Diligence	11	6	3	14
Focus	11	6	6	11
Communication	5	12	0	17
Professionalism	9	8	9	8
Honesty	16	1	10	7

MISSION POSSIBLE: WEEKLY READING

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ABSTRACT

“Reading is to the mind what exercise is to the body.” Sir Richard Steele

The authors examine the impact of a program designed to encourage students to read popular business magazines. The results suggest that a reading program can improve student knowledge of current events, but that more work is needed to encourage students to attain timely knowledge of the current environment of business.

INTRODUCTION

Almost without exception, when employers are queried about the qualities that they look for in their applicants, communication skills and the ability to work in groups are ranked in the top five [3]. Effective communication requires one to couch information in relative terms so that it is easily understood by the recipient. Thus, a modicum of broad based knowledge is required. Additionally, a dimension of effective group behavior invariably involves participation in “issues of the day” discussions. Further, students need an awareness of world events given the increasing globalization of business. For educators, the implication is clear. To properly prepare our students, we must incorporate within the curriculum the conveyance of a mechanism whereby students become knowledgeable generally about the world they live in and specifically about the business world. Not doing so might well cause our students to make decisions that are not in the best interests of the firm and thus would sharply diminish the probability of our students’ success. As educators, the authors feel strongly enough about this issue to include it as part of the mission statement of their College of Business Administration (COBA). We are committed to provide knowledgeable graduates who can compete effectively in our community.

Last semester, one of the authors received an email from a recent graduate. A portion of that email is presented below. Interestingly, Thomas Mitchell echoed these exact sentiments by suggesting that employees can be more involved in “water cooler talk” just by catching up on current events [11].

....I never thought I’d say it, but I can’t tell you how glad I am you made us read those current events articles. Everyday when we get to work, we talk about stuff going on and you can’t even talk if you haven’t been reading about business stuff – I admit I hadn’t been keeping up but I sure am now.....

Booth [1] and Clark & Keller [2] lament that Americans know very little about the news, that they fail miserably at quizzes involving current events. One survey found that only 24 % of American respondents could name two Supreme Court justices but 77% could name at least two of Disney’s seven dwarfs. Jeffrey Webb, a college professor, said “everyone who has a conscience in my line of work [higher education] is obsessing over how to change teaching methods so that students are ‘at maximum risk of learning.’”[1]. Clark and Keller [2] point out that even given the publicity of the Iraqi War, sixty percent of Americans between the ages of 16 and 24 cannot locate Iraq on a map of the Middle East. Further,

despite the calamitous nature of Katrina, one-third of those surveyed could not find Louisiana on a map of the US and 48 percent could not locate Mississippi.

The faculty of COBA, at their retreat, agreed to undertake to improve the current business knowledge of their students. Faculty formally adopted a proposal specifying that *Business Week* would be required reading in all classes and that students would be strongly encouraged to purchase the weekly magazine. Faculty believed that such reading would improve students' core knowledge of current events at a minimum. Additionally, faculty were of the opinion that personal access to a magazine related to their major in college could improve scores on the reading portion of a state mandated exam, improve communication confidence and ability, and provide a competitive advantage.

One of the authors of this paper, with the input from a variety of instructors in the College of Business Administration, developed a short current events business quiz (CEBQ) composed of both general business knowledge questions and very current business issue questions [see Appendix 1]. Prior to making the purchase of the subscription mandatory, the authors felt that assessing the value of this requirement should be investigated.

LITERATURE REVIEW

An article on the value of magazines as a classroom resource [10], suggests that not only can reading magazines be pleasurable but that knowledge can be gained, shared and multiplied. Garramone and Atkin [4] found that newspaper and magazine reading has a strong effect on political knowledge and participation which is consistent with the authors' College of Business Administration's mission. Reading also cultivates a sustained attention span (one that has been shown to have diminished due to graphic imagery like television and movies) [6].

Vaz [12] emphasizes the value of reading magazines in developing knowledge. The business literature on strategic human resource management highlights the importance of rewarding desirable behavior [5] [9]. Behavior that is rewarded tends to be repeated and vice-versa. The recent efforts to increase diversity in the workplace have highlighted the necessity to tie executive rewards to meeting diversity goals – just talking about it, is NOT enough [7].

METHODOLOGY

Because many classes in COBA have both a day and an evening section, there is a natural way to evaluate or assess the effect of reading *Business Week*. First, one class was randomly assigned as the class to require reading *Business Week* (by basing some exam questions on the magazine articles) and the other section (taught by the same instructor) served as the control group. The hypothesis we tested is:

Hypothesis: Students enrolled in classes in which part of their evaluation (i.e., grade) is **specifically** related to knowledge gained from reading *Business Week* will earn higher average scores on the CEBQ.

Near the end of the fall semester, 2006, nineteen students in the treatment group (i.e., those whose exams contained questions based on *Business Week* articles/discussion) completed the CEBQ; twenty-one students served as the control group (*Business Week* articles were discussed but no exam questions reflected this discussion). Both classes were upper level Operations Management sections taught by the same instructor.

DATA ANALYSIS AND RESULTS

The average CEBQ scores were compared using a simple t test for those students in the treatment group compared with those in the control group.

There were 10 general business knowledge questions and 5 additional current business knowledge questions. Each test was scored for total number of questions answered correctly, number of general questions answered correctly, and current events questions answered correctly. The students were asked to indicate whether or not they had actually purchased a subscription to *Business Week*, their gender, and their class standing by number of credit hours completed.

Table 1
Sample Characteristics

Males	14
Females	26
Bought subscription	15
Did Not buy subscription	24(1 missing data)
Sophomores	1
Juniors	9
Seniors	30

Overall, the results were abysmal. Looking at the general questions (highest possible score=10), the average score for both classes was 3.7. The average score on the current events questions (highest possible score = 5), was less than 1. When broken down into the treatment versus the control groups, the average score overall on the entire test for the treatment group was significantly higher than the control group ($t = 2.042$, $p < .03$, $\mu = 4.6$ vs. $\mu = 3.3$).

Table 2
Summary Statistics

	Treatment Group (N=19)	Control Group (N=21)
Mean Score Overall	4.579	3.238
t-statistic	2.042	
p-value	0.024	
Mean Score General Questions	4.579	2.905
t-statistic	2.810	
p-value	0.004	
Mean Score Current Events Questions	1.474	0.350
t-statistic	3.452	
p-value	0.001	

With respect to the 10 general questions, the average score for the treatment group was significantly higher than the control group ($t = 2.8$, $p < .01$, $\mu = 4.6$ vs. $\mu = 2.9$). On the 5 current events questions, the average score for the treatment group was significantly higher than the control group ($t = 3.5$, $p < .001$, $\mu = 1.5$ vs. $\mu = .4$). There were no statistically significant differences in scores for those who actually subscribed versus those who did not subscribe.

LIMITATIONS

The subjects were all College of Business Majors at one small university; admittedly, the sample size was small and only one instructor's classes were utilized.

DISCUSSION

The data, although, exploratory, indicate that our business students are woefully uninformed on both general and current business issues. Many of these students are first generation college students from homes with little or no emphasis on reading. In the College of Business, almost all work at least part-time. Over 94 % of the students in our university receive financial aid. Hence, many of them are economically disadvantaged. Requiring students to read is NOT enough; apparently, they are more likely to engage in reading (or, at least, have better recollection) when they are *tested* on these materials. This finding certainly reflects the literature on reinforcement [7], [9]. Moreover, "our" college students are as poorly informed as the general population described by Booth [1] and Clark & Keller [2].

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APPENDIX 1
Current Events Business Quiz

Please fill in the blanks below. If you do NOT know the answer, please do NOT guess.

1. What is the name of the current Chairman of the Federal Reserve Board of Governors?

2. Bill Gates is the chairman of the board of what company? _____
3. What is the name of the chairman of Berkshire Hathaway? _____
4. The stock market tends to rise when interest rates (*increase or decrease – choose one*).

5. Ken Lay was convicted in federal court of malfeasance in regard to his performance as CEO of what firm? _____
6. Which two world economies are the fastest growing this year? _____ and _____
7. What famous management author coined the phrase “knowledge worker?” _____
8. What piece of federal legislation requires CEOs and CFOs to personally attest to the accuracy of a firm’s financial statements? _____
9. What is the area in California that is the “hot place” for technological innovation?

10. In general, what causes housing markets to slow down? _____
11. What company is buying YOU TUBE? _____
12. What US Airline is attempting to buy DELTA? _____
13. Jeff Bezos, the president of _____, was on a recent cover of Business Week.
14. What kind of firm, called Gluttons at the Gate, buys either parts of OR even entire companies as investments for their clients? _____
15. What company hired private investigators to snoop around to find out who on their board of directors was leaking information? _____

Tell us about you:

Do you receive your own personal copy of *Business Week* magazine? YES NO

Gender: male female (circle one)

Class standing: _____ freshman _____ Sophomore _____ Junior _____ Senior
(0 – 29 credit hrs) (30-59 credit hrs) (60-89 credit hrs) (>89 hours)

DEVELOPING RUBRICS FOR ASSESSING LEARNING OUTCOMES FOR QUANTITATIVE ANALYSIS

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The Association to Advance Collegiate Schools of Business (AACSB) standards for accreditation require “learning achievement demonstrated by assessment”. In our BSBA and MBA programs, one of the learning outcomes is that "Students will be able to demonstrate rational decision making using quantitative tools, strategies, and data." To be able to assess this learning outcome, we needed a method that was more detailed than Bloom’s Taxonomy, which gives a general structure for levels of learning. That is, we wanted rubrics that could be used to assess learning outcomes for various mathematical models, such as linear programming and economic order quantity, across multiple sections of courses and would provide enough detail to guide improvement. Developing and using such a rubric clearly defines what students are expected to know about a particular quantitative model. A rubric facilitates consistency in assessment across instructors and sections, regardless of grading schemes used by instructors. In our search for rubrics, we found many rubrics for writing, some for oral presentations, others for solving specific types of mathematical problems (number crunching), and a few for class participation, but none that met our needs for quantitative analysis. This led to research on different types of rubrics and the subsequent development of our own rubrics.

This workshop will benefit attendees because most are at AACSB accredited programs or interested in pursuing the accreditation. The learning outcomes assessment would also be useful for regional institutional accreditation assessment, as well as providing general guidance for program improvement. AACSB standards require coverage of quantitative subjects, including operations management, management science, and business statistics. As indicated above, there are published rubrics for basic problem solving, but none that require students to set up and solve complex problems.

The outline of the workshop is:

- The value of developing and using rubrics for assessing learning outcomes
- Review of Bloom’s Taxonomy
- Review of various rubrics that are available online
- Review of basic types of rubrics, including checklists, holistic rubrics, and analytic rubrics, as well as hybrids of these basic types.
- Examples of rubrics we have developed for assessing learning outcomes related to quantitative analysis
- Using rubrics for course embedded assessment
- Questions and answers

RELATED RESOURCE MATERIALS

Andrade, H. G. (2005, Winter). Teaching with Rubrics: The Good, the Bad, and the Ugly. *College Teaching*, 53(1), 27-30.

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A FURTHER EXAMINATION OF WHY STUDENTS CHEAT TODAY

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ABSTRACT

This paper will examine the problem of cheating in today's colleges. One iteration of this research simply examined the overall data from our study. A second looked for differences in answers based on race, gender, and the student's college orientation (public v private, religious affiliated). This research will explore the collected data in one last way. Correlation analysis will be used to determine the relationships between the variables in the study, along with regression analysis. This study will examine if the student's GPA, religiosity, how they were informed of the university's policies (i.e., handbook, faculty member, or both) on cheating, and whether the school has an honor code or the student perceives there is an honor code affects their eventual answer as to whether it is acceptable to cheat. Last, this paper will present some ideas to ponder for ethical improvements in the classroom environment and provide some other avenues for future research.

INTRODUCTION

Why should we be concerned with cheating at the college level? Anecdotally, cheating seems to have become more newsworthy. Recently, 34 graduate students in Duke's Fuqua School of Business were found guilty of cheating on take-home exams ("Duke's Business School," 2007). From this competitive program which costs \$50,000 in the first year, nine students will be expelled, 15 will receive a one-year expulsion and flunk the course. Of the other 10, nine will fail the class and one will flunk an assignment (Keenan & Sullivan, 2007). The students are allowed to appeal the decision. Sadly, these results mirror those found by Don McCabe of Rutgers University. He found 56% of MBA students in the U.S. and Canada reported cheating in 2005, while only 47% in other fields reported doing so (Allen, 2007; "Duke's Business School," 2007; Prashad, 2006). Thus, there seems to be a problem with business students, in general. This was recently contradicted by an undergraduate study which showed business students did not report cheating more often, but did seem to have more lenient attitudes toward cheating (Klein, Levenburg, McKendall, & Mothersell, 2007).

Meanwhile, it is unlikely that this tendency to cheat started in graduate school. It may have started as early as high school and it may continue into the workplace. Have we forgotten Enron? Shareholders are still trying to retrieve some of their funds lost due to the accounting scandal (Associated Press, 2007a).

As noted by Rhonda Reger of the Robert H. Smith School of Business at the University of Maryland, "Many students who cheat think business school is a game and not real. But if they are willing to cheat at a game, it makes me wonder if they will cheat when it is real" (Beck, 2007). With the all too recent settlements by Morgan Stanley for fraud and Motorola for kickbacks to Adelphia Communications, it is no wonder why some feel that the Duke University incident proves we need a law such as Sarbanes Oxley (Associated Press, 2007b; Associated Press, 2007c; Beck, 2007). Further, most business students believe the U.S. is having a "business crisis" (84%) ("You mean cheating," 2002). The only real difference between dishonesty in the classroom and the workplace is that in the former it called cheating and in the latter it is called competitiveness (Callahan, 2001).

VARIABLES FOR CONSIDERATION

For some, cheating has become the norm. Fortunately though, it has not become the norm for the majority. However, some report “fewer students seem to believe that academic cheating violates their own internalized standards of honesty and good character” (Allen, 2007, para. 8).

Demographics

As Davidson (2005) noted, cheating has become the “short cut to success in our winner-take-all society” (para. 1). This paper will consider some of the basic demographic variables found in the literature, in particular, race and gender. There has been little found with regard to there being a significant difference in cheating based on race. However, the literature has been mixed with regard to gender. Some have reported no differences and others significant differences (Nowell & Laufer, 1997). Survey data usually finds males admit cheating more often than females, although the difference is not always significant (“You mean cheating,” 2002). The same can be said of GPA (Nowell & Laufer, 1997). This research focuses on business majors for the most part because they have been shown to cheat more often (Callahan, 2001; Smyth & Davis, 2004). In particular, Nowell & Laufer (1997) found computer information systems majors cheat more than nonbusiness majors, which were used as the baseline. Therefore, when available, the student’s major will be included in any analysis. One reported study, which included age as a factor, found as age went up, cheating decreased (Dawkins, 2004). Although most college students are still traditional, more colleges are seeing “returning” students at the undergraduate level. Thus, age will also be examined. Also, the importance of being of “good character” will be examined. One study found this was an important issue for students and although they admitted cheating, they often felt they were more ethical than their peers (“Survey finds cheating,” 2004).

Being that one of the colleges is a private, religious institution, the religiosity of the students will be examined and how that may in turn affect their willingness to accept cheating. One study did find that those at private, religious high schools actually reported cheating more often than those in the public school (Private school students cheat more than public school pupils, says survey, 2002). In Nowell & Laufer’s (1997) study, religion was not a significant variable in the decision to cheat or not.

Peer pressure is another area to consider when inquiring about the cheating behaviors of students (Dawkins, 2004). When it is believed cheating behaviors will be tolerated by peers, then individuals seem to be more likely to cheat (Robinson, Amburgey, Swank, & Faulkner, 2004).

Honor Code

A last consideration will be whether the college in question has an honor code and/or whether the student perceives there is an honor code in place. In this sample, only one school actually has an honor code with an official honor code signing. It has been found that students from colleges with honor codes report fewer incidents of cheating (Dawkins, 2004; Kidwell, Wozniak, & Laurel, 2003). West, Ravenscroft, & Shrader (2004) further reported that such behavior carries over into the workplace.

Technology

Technology is becoming a bigger problem in today’s technology age. Students are being caught using cell phones, personal digital assistants, computers, and in particular the Internet and wi-fi (Allen, 2007). Students also continue to download music illegally and copy software and music from each other on a regular basis.

METHODOLOGY

A survey was distributed to students at three southern universities. One is a religious affiliated, women's college and the other two are historically black universities. They range in student population size from approximately 280 students to 6500 students. The students were asked to fill out the survey by the faculty. The survey was given either as an assignment or as extra credit. For this research, there were 231 usable surveys. The students were asked to answer a series of "yes" and "no" questions, categorical questions, and ranking questions. As has been found previously, many students did not rank their reasons for cheating or others' reasons for cheating properly. Therefore, these were converted to whether they, in essence, said "yes" or "no" to that example being a reason why the student would cheat or they thought others would cheat. SPSS was used for the analysis.

RESULTS

The first step in this research was to create and run correlations. Many were found to be significant. This particular study involved 50 variables. Based on Field (2005) a correlation of $\pm .1$ is considered to be "a small effect, explaining 1% of the total variance," while a $\pm .3$ is "a medium effect, accounts for 9% of the total variance," and finding of $\pm .5$ is a "large effect, accounts for 25% of the variance" (p. 32). The correlation findings will be used to generate a logistic regression model with regard to what variables may predict whether the student believed cheating was bad and whether the said student believed being perceived as having integrity is important.

The correlations matrix revealed the following strong effect relationships. Many of the strong relationships came from the data inquiring whether the student thought one of the provided scenarios was cheating/stealing. The following relationships had effect sizes of $\pm .41$ or stronger and are listed strongest to weakest:

- Perception that others cheat because peers see it as acceptable and perception that others cheat due to adult role models (.87)
- Cheating last semester and how often you cheated last semester (.78)
- Number of times one consumed alcohol in a two week period and number of drinks consumed in one sitting (.75)
- Perception that others cheat due to adult role models and perception that others cheat due to time constraints (.66)
- Have you ever cheated in college and cheating last semester (.66)
- Perception that others cheat because peers see it as acceptable and perception that others cheat due to laziness (.65)
- Perception that others cheat due to adult role models and perception that others cheat due to laziness (.62)
- Burning your own CD and burning a friend's CD (.62)
- Perception that others cheat because peers see it as acceptable and perception that others cheat due to time constraints (.61)
- Have you ever cheated in college and cheating on tests (.61)
- Perception that others cheat due to a lack of time and perception that others cheat due to laziness (.57)
- Perception that others cheat due to adult role models and perception that others cheat due to academic pressures (.57)
- Have you ever cheated in college and how often you cheated last semester (.56)
- Cheating on a test and how often you cheated last semester (.56)
- Cheating on a test and cheating last semester (.55)

- Individual perception of why they themselves would cheat – due to time constraints and academic pressures (-.49)
- Perception that others cheat because peers see it as acceptable and perception that others cheat due to academic pressures (.48)
- How often one attended church and perceived strength of one’s religious convictions (.48)
- Downloading music without paying for it (from a non-shareware site) and burning a friend’s CD (.48)
- Burning a friend’s CD and copying software from a friend (.48)
- Buying a coke and another falls and burning your own CD (.48)
- Helping someone cheat on a test and helping someone cheat on a placement test (.48)
- Helping someone cheat on a test and considering cheating to be bad (.41)
- Perception that others cheat due to a lack of time and perception that others cheat due to academic pressures (.41).

For other significant, yet weaker, relationships see the correlation matrix in the Appendix.

The next step was to generate the two logistic regression models. Logistic regression was used because it is more appropriate for categorical data, which includes “Yes” and “No” answers. The logistic regression model calculates the probability of an event occurring. The higher the probability the more likely the event will occur and the lower the probability the less likely the event will occur. The first item to be examined was whether or not the student perceived cheating to be bad. In the first case, a value of one will be assigned if there is a high probability. This would translate to mean the person perceives cheating to be bad. A value of zero will be assigned if the probability is low. This means the person does not believe cheating to be bad. Twenty-two variables were included in the initial model. After using backwards logistic regression, seven variables were determined to have a significant relationship in determining whether a student perceived cheating to be bad. These seven variables were: importance of being perceived as having integrity (X_1), whether the college attended has a religious affiliation or not (X_2), considering buying a water and then getting soda at a restaurant as cheating/stealing (X_3), helping someone cheat on a test (X_4), whether or not they consider plagiarism cheating (X_5), having cheated during their college career (X_6), and the reason why they would cheat being attributed to time constraints (X_7). The following logistical equation was developed:

$$P(Y) = \frac{1}{1 + e^{-(-4.005 + 2.023X_1 + 19.909X_2 + 1.279X_3 + 2.065X_4 + 1.96X_5 - 1.594X_6 + 1.525X_7)}}$$

A high probability in the above equation would mean the person is likely to say cheating is bad. However, a low probability would mean the person would not consider cheating to be bad.

The second item to be examined was whether or not the student thought it was important to be perceived as having integrity. Seven variables were included in the initial model. After using backwards logistic regression, three variables were determined to have a significant relationship in determining whether a student wanted to be perceived as having integrity. These three variables were: the presence of an honor code (X_1), considering sharing notes from a take home test to be cheating (X_2), and grade point average (GPA) (X_3). The following logistic regression equation was developed:

$$P(Y) = \frac{1}{1 + e^{-(7.143 + 2.019X_1 + 18.278X_2 - 1.476X_3)}}$$

A high probability in the above equation would mean the value of one is assigned. This means the student wants to be perceived as having integrity. However, a low probability would mean a value of zero is assigned, meaning the person does not care if they are perceived as having integrity.

DISCUSSION

The correlation analysis found in Table 1 presents some interesting findings. The strongest had to do with perceptions of why others cheat, perceptions of why the student thought they would cheat, whether the student has ever cheated in college or the last semester, how often they have cheated, and some of the scenarios. It should not have been surprising that if the student thought burning their own CD was cheating/stealing that they would think the same of burning a friend's CD. One surprising finding was the perception that why others would cheat – adult role model – was correlated with so many of the other choices. Also, many of the reasons why the student's perceive others would cheat were correlated with each other while the other opposite was true for their own individual perceptions of why they themselves would cheat. It should also not be surprising that cheating in the last semester correlated strongly with how often they reported cheating. What may be surprising was that cheating on a test was correlated with individual cheating in the last semester and how often the student reported cheating, but cheating on a paper was not. The only thought here is that the findings may have been affected by the fact one of the universities involved uses plagiarism checking software. Some of the findings tie into what any individual would consider being common sense. However, there were also some surprising findings.

The logistic regression results show that in the case of determining if cheating was considered bad, a school's religious affiliation, views on helping someone cheat on a test, having every cheated before themselves, views on plagiarism, and time constraints were some of the deciding factors in this research. The most surprising factor that was important to this model was the scenario presented to the students of making a decision at the restaurant. Here, "Buying water at a self-service restaurant and then serving yourself a soft drink was considered cheating/stealing. In the case of determining whether being perceived as having integrity was important, having an honor code, views on sharing notes on a take home test, and GPA were useful determinants when it came to integrity.

ANSWERS TO THE PROBLEM?

One potential answer is to institute an honor code. As early as 2002, Zemike reported the following situations: schools were adding honor codes, schools were rewriting honor codes to be more restrictive and aggressive, and some schools were rewriting them to be less aggressive. The institution of an honor code means there must be trust (Zemike, 2002). For example, Duke University rewrote its code to require students to report cheating so it would take some pressure off faculty members and then allow them to approach students on their own without taking them before a disciplinary council (Zemike, 2002).

One of the keys to an honor code working is the faculty trusting students and the administration. The research has shown if faculty perceive the system as fair they will use it and most faculty at honor code institutions believe their students have more integrity (McCabe, Butterfield, & Trevino, 2003). While honor codes create greater responsibility, they also involve more priveleges such as unproctored exams (Kidwell, Wozniak, & Laurel, 2003). Therefore, students need to be made aware and understand the code. They should not be made to just "sign it" at some ceremony (McCabe, Butterfield, & Trevino,

2003). This brings forth student responsibility for their actions and greater connection between actions and consequences (Mason, 2006).

Are the potential answers lying in the faculty themselves? Should faculty be more vehement about turning in students, as seen with Duke (Kiser, Jones, McCord, Prater, & Philbrick, 2006). Should they make classes more interesting (Park, 2003)? Allen (2007) suggested one reason students cheat is because they are uninspired by “bad teaching” to do their own work. It has also been recommended that universities need to do a better job in orientations and freshman classes of discussing and delineating what cheating is. Also, faculty should be clear at the beginning of each quarter or semester that cheating is not tolerated and what it is (Mason, 2006).

Should tests be eliminated as suggested by some (Robinson, Amburgey, Swank, & Faulkner, 2004). Mr. Timothy Dodd, executive director of the Center for Academic Integrity, suggested faculty “ease up on grading standards” (Allen, 2007, para. 8). Others suggest allowing students to work together and share notes (Robinson, Amburgey, Swank, & Faulkner, 2004). Yet, on the other hand, as Dr. Jim West (2007) noted, “how utterly contemptible in laziness must one be to cheat on an open book, take home exam” (para. 7).

One last consideration involves the college’s attitude toward technology. Should technology be allowed in the classroom, rather than “frowning” upon it (Gameran, 2006)? Options for dealing with technology: completely ban electronic equipment, create multiple versions of a test, control the use of the technology (disable wireless in classrooms for example) (Read, 2004). Most fall on the side of caution and say “ban all technology” (Knight Ridder, 2007).

FUTURE RESEARCH IDEAS

It should be understood that this research does not cover every area possible. It is a starting point. Work is being continued in this area by many authors. Potential areas to include in future research include various personality variables such as self-concept, rank in school or perceived class standing, ACT/SAT scores, involvement in athletics and student organizations such as SGA or Greek groups, and the use of plagiarism finding programs such as Turnitin (Burrus, McGoldrick, & Schuhmann, 2007; Gallup Organization, 2004; Nowell & Laufer, 1997; Robinson, Amburgey, Swank, & Faulkner, 2004). Other issues that should be addressed further in the future is the student’s actual cheating behavior and how is cheating defined, if at all by those conducting the study (Burrus et al, 2007). In many areas of this study, the focus was on a student’s perception of a behavior being cheating, not whether they had actually behaved in such a manner. Last, the global nature of cheating needs to be continually studied. There have been some studies in this area, but not enough (In China, Bribery and Fakery Lower the Value of Degrees, 2002; Lupton & Chapman, 2002; Marsden, Carroll, & Neill, 2005).

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APPENDIX

	School	Cheat_Bad	Integrity Imp	Informed of AI Policy	Have HC	How Often Ref Disc Council	Cheat Download	Cheat Water	Cheat Software	Cheat Credit for Other's Work	Cheat Food	Cheat Coke	Cheat Placement Test	Cheat Own CD	Cheat Friend CD	Cheat Tests Others	Cheat Help Someone
School									.235**								.150*
Cheat_Bad			.190*		.157*	.183**	.153*	.288**		.325**			.313**				.414**
Integrity Imp					.179**			.147**		.140*							
Informed of AI Policy					.155*												.180**
Have HC						.216**											.197**
How Often Ref Disc Council								.158*									.262**
Cheat Download															.480**	.244**	.240**
Cheat Water															.302**	.242*	.248*
Cheat Software															.482**	.222**	.196**
Cheat Credit for Other's Work																	.227**
Cheat Food																	.153*
Cheat Coke													.481**	.341**	.159*		
Cheat Placement Test															.152*	.229**	.481**
Cheat Own CD															.616**	.221**	
Cheat Friend CD																.215**	
Cheat Tests Others																	.209**
Cheat Help Someone																	
Cheat Share Notes																	
Cheat Plagiarism																	
When Cheat Begins																	
Friends Cheat Test																	
Friends Cheat Papers																	
How Often Friends Cheat																	
You Ever Cheated																	
You Cheated Last Semester																	
How Often You Cheated Last Semester																	
You Cheated Tests																	
You Cheated Paper																	
Hrs Spent Studying																	
Others Cheat Academic																	
Others Cheat Lazy																	
Others Cheat Time																	
Other Cheat Adult																	
Others Cheat Peers																	
You Cheat Academic																	
You Cheat Lazy																	
You Cheat Time																	
You Cheat Adult																	
You Cheat Peer																	
Drink in Last 2 Wks																	
Binge Drink in Last 2 Wks																	
GPA																	
Religion Importance																	
Religious Convictions																	
Church Attendance																	
School Religious Affiliation																	
Age																	
Gender																	
Major																	

	Cheat Share Notes	Cheat Plagiarism	When Cheat Begins	Friends Cheat Test	Friends Cheat Papers	How Often Friends Cheat	You Ever Cheated	You Cheated Last Semester	How Often You Cheated Last Semester	You Cheated Tests	You Cheated Paper	Hrs Spent Studying	Others Cheat Academic	Others Cheat Lazy	Others Cheat Time	Others Cheat Adult	Others Cheat Peers
School	.229*																
Cheat_Bad	.205**	.175**				-.141*	-.159*	-.152*	-.197**	-.157*		.151*					-.164*
Integrity Imp Informed of AI Policy	.133*																
Have HC									-.148*			.192**					
How Often Ref Disc Council		.141*										.160*		.145*			
Cheat Download	.322**				.141*							.168*					
Cheat Water																	
Cheat Software																	
Cheat Credit for Other's Work												.184**					
Cheat Food									.183**								
Cheat Coke	.263*																
Cheat Placement Test	.238**	.229**		.197*								.140*					
Cheat Own CD	.322**							-.154*									
Cheat Friend CD	.318**																
Cheat Tests Others	.250**				.138*												
Cheat Help Someone	.183**	.148*							-.177*			.179**					
Cheat Share Notes										-.186**							
Cheat Plagiarism												.142*					
When Cheat Begins									-.180*								
Friends Cheat Test					.277**	.285**	.252**	.270**	.189**	.261**							
Friends Cheat Papers						.323**	.154*		.152*		.193**						
How Often Friends Cheat							.272**	.294**	.364**	.264**							
You Ever Cheated								.661*	.560*	.608*	.262**					.185*	
You Cheated Last Semester									.776**	.549**						.198**	.198**
How Often You Cheated Last Semester										.557**	.209**					.142*	
You Cheated Tests																	
You Cheated Paper																	
Hrs Spent Studying																	
Others Cheat Academic													.303**	.411**	.565**	.482**	
Others Cheat Lazy															.565**	.616**	.647**
Others Cheat Time																.663**	.614**
Other Cheat Adult																	.867**
Others Cheat Peers																	
You Cheat Academic																	
You Cheat Lazy																	
You Cheat Time																	
You Cheat Adult																	
You Cheat Peer																	
Drink in Last 2 Wks																	
Binge Drink in Last 2 Wks																	
GPA																	
Religion Importance																	
Religious Convictions																	
Church Attendance																	
School Religious Affiliation																	
Age																	
Gender																	
Major																	

		You Cheat Academic	You Cheat Lazy	You Cheat Time	You Cheat Adult	You Cheat Peer	Drink in Last 2 Wks	Binge Drink in Last 2 Wks	GPA	Religion Importance	Religious Convictions	Church Attendance	School Religious Affiliation	Age	Gender	Major	Race
School													.204**	.184**		.139*	-.193**
Cheat_Bad				.154*					-.142*			.171*	.246**			.177**	-.167*
Integrity Imp Informed of AI Policy						-.187**			-.162*								
Have HC													.411**			.278*	-.297*
How Often Ref Disc Council			.146*								.154*		.205**				
Cheat Download								-.135*									
Cheat Water							-.231**	-.257**									-.189**
Cheat Software								-.146*									
Cheat Credit for Other's Work							-.219**	-.324**		-.167*			.198*			.134*	-.165*
Cheat Food													-.198*				.178**
Cheat Coke			.158*														
Cheat Placement Test							-.265**	-.260**	-.153*				.194**				
Cheat Own CD		-.141*															
Cheat Friend CD												.145*					
Cheat Tests Others		-.196**											.159*				
Cheat Help Someone							-.208**		-.138*				.178**				.148*
Cheat Share Notes													.228**				.209**
Cheat Plagiarism																	
When Cheat Begins																	
Friends Cheat Test																	
Friends Cheat Papers						-.137*	.203**									-.162*	
How Often Friends Cheat				-.153*		-.152*	.151*						-.139*				
You Ever Cheated			.171*			-.182*							.262**	-.261**		.180*	-.152*
You Cheated Last Semester			.204**										.327**	-.262**		.213**	
How Often You Cheated Last Semester			.262**										-.156*	-.154*		-.139*	.152*
You Cheated Tests													-.184**	-.138*		-.181**	.175*
You Cheated Paper																	
Hrs Spent Studying									-.247**			.225**	.245**			.185**	-.233**
Others Cheat Academic		.213**	-.243**	-.182**			-.177**	-.134*									
Others Cheat Lazy													.135*	-.220*			
Others Cheat Time											.248**		.161*	-.313**			
Other Cheat Adult									-.186**							-.272**	
Others Cheat Peers									-.196**		.160*					-.233**	
You Cheat Academic			-.283**	-.489**				-.136*									
You Cheat Lazy														-.138*			
You Cheat Time								.138*		.157*							
You Cheat Adult																	
You Cheat Peer																	
Drink in Last 2 Wks								.752**					-.210**		-.209**	-.178**	.159*
Binge Drink in Last 2 Wks									.159*				-.211**		-.235**	-.168*	.191**
GPA													-.288**			-.273**	.273**
Religion Importance										-.147*							
Religious Convictions												.480**					
Church Attendance															.248**		
School Religious Affiliation														-.233**		.697**	-.687**
Age																-.168*	
Gender																	
Major																	-.586**

FACULTY EXPERIENCES WITH STUDENT CHEATING: A PRELIMINARY ASSESSMENT

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ABSTRACT

The overall goal of this study was to determine college professors' perceptions towards academic dishonesty and how they have dealt with these issues throughout their careers. Data were gathered from an online survey sent to 21,912 professors across the United States. The results revealed that 94.8% of the 2,667 professors who responded to the survey said that they had encountered an instance of cheating in their teaching career. Of those professors that stated they had encountered cheating 77.8% encountered it on writing assignments, 69.5% encountered it on exams, 51.1% on homework, and 23.8% encountered cheating on group assignments.

During exams, the most common method of prevention was visual observation with 33.9% of professors using observation. Following this was the use of different versions of the exam with 28.3%. For homework, the most frequent form of prevention was grading and comparison of assignments or learning a student's writing style. Other topics covered in the survey include the use of honor codes and the practice of overlooking academic dishonesty by professors.

INTRODUCTION

The purpose of this study is to discover current professors' attitudes towards student cheating and how they manage it in their classrooms. We wanted to learn how many professors had experienced academic dishonesty, how they disciplined students when it was discovered, and what measures professors implemented to prevent academic dishonesty. We also wanted to assess the impact an honor code has on academic dishonesty.

This paper begins with a brief review of faculty perceptions towards student cheating followed by a set of research objectives. The study design is presented next followed by the results in table-narrative format. We conclude with an analysis and study limitations.

BACKGROUND

Student cheating has been an ongoing problem in higher education for decades. Research on the topic has been ongoing for the past seventy years (Etter, Cramer, & Finn, 2006). However, the first major comprehensive study on the subject was conducted by Bill Bowers in 1964. In his work, over 5000 students at 99 U.S. institutions of higher learning were surveyed. The results found that three fourths of

the students had taken part in some form of academic dishonesty (Bowers, 1964). Thirty years later, McCabe and Trevino (1997) conducted a similar study and found a modest increase in cheating over the Bowers study. They also noted an increase in cheating among female students. In addition to conducting this study and many others, McCabe also founded the Center for Academic Integrity (CAI) in 1993 (Gallant & Drinan, 2006).

The latest inventions in this digital age have made it easier for students to cheat (Sterngold, 2004). However, this technology has also given professors better ways to discover if cheating has occurred in their courses. For example, websites such as Turnitin.com allow professors to compare student papers with a large database of previously written papers. The website highlights potential plagiarized parts (including information from the original source) of the paper for further investigation.

Professors state some students do not think that they are cheating even when they are. Some of this confusion arises on the protocols for citing references. They say that students do not think copying and pasting a few sentences from a website constitutes cheating (Selingo, 2004). Professors also feel that students learn this behavior in high school and that nothing is done to correct the problem, so they carry it over into college. Professors are also employing tactics such as randomly assigned seating, numbered exams, handing out different tests during a testing period, and using class lists and ID's to identify students. A growing body of research indicates that the adoption of an honor code will aid in the prevention of cheating (McCabe, Trevino, & Butterfield, 2002).

The reasons professors gave for not reporting cheating is that there is not enough evidence to prove that the student was cheating and they are afraid of what will happen to them if they turn the student in (Keith-Spiegel, Tabachnick, Whitley, & Washburn, 1998). There have been several cases when a professor turned a student in for cheating and was pressured by the administration to let the matter drop (Lambert, 2005). Other reasons professors give for not turning students in is because the process is perceived to be bureaucratic (McCabe, Trevio Butterfield, 2001). Dr. John Barrie, the founder of Turnitin.com, feels that professors do not report cheating because they want to protect the school's image and name.

Donald McCabe conducted a study on student cheating and asked 800 professors at 16 institutions if they had ever reported cheating: 40% said "never," 54% checked "seldom," and 6% picked "often" (McCabe & Trevino, 1996). This study found that professors handle cheaters quietly and quickly with a stern warning. In instances when a student copies homework, the professor made them redo the assignment. When the student plagiarized a paper, the student received a failing grade.

RESEARCH OBJECTIVES

The following research objectives were identified for this study.

- To determine how wide spread student cheating currently is based on the experiences of college-level educators that have witnessed acts of academic dishonesty during their teaching careers.
- To discover in which activities students tend to be dishonest. Also, out of those activities, which assignments yield the most dishonesty.
- To find out how professors discipline academic dishonesty. Also, is there a preferred disciplinary action in similar situations?
- To discover the preventative measures professors' use during different academic assignments to prevent cheating.
- To find the effect an honor code has on the number of students involved in dishonest activity.

- To learn if any professors ignore the issue of academic dishonesty. We also wanted to know the reasons why some professors overlook the issue

RESEARCH METHODOLOGY

We used descriptive research to discover professors' attitudes about cheating. We chose this method because we felt that the professors' experiences with cheating would cover a wide range of topics. We felt most professors would agree that cheating is not acceptable, but we wanted to know how each individual professor handles cheating and their thoughts on improving the situation.

DATA COLLECTION FORMAT

Our data collection format consisted of an online survey with thirty-two questions. We used email to contact our respondents, giving them a link to the survey. The professors' emails were obtained from a website that listed all of the colleges in the United States. After obtaining the websites for each college we went to the site to locate the professors' email. The addresses were compiled and the email requests were sent. We sent out the first set of email requests from May 15th through May 29th, 2006. To those that did not respond, a second requests were sent out between June 1st through June 25th, 2006.

We used a structured-undisguised survey. All respondents received surveys with the same wording and questions in the same order. We used fixed-alternative questions and open-ended questions. We used these two options because we felt that it was important to give the respondents fixed choices but also allow them to voice their opinions freely.

POPULATION

The population for this project was any college professor/instructor in the United States. Obviously, the total number of college professors across the entire United States is quite large. Therefore, the sampling unit became college professors who had their email address readily available on the Internet, usually through their college's website. Some schools did not disclose the email addresses, but most were obtainable either through a college-wide directory or by searching through each department. As a result, the sampling unit was a convenience sample. Our final email list contained 21,912 email addresses.

DATA ANALYSIS AND FINDINGS

The results of selected questions appear next. For each question, a table is provided and additional comments are offered.

Have you ever had an instance of student cheating during your teaching career?

Response	Number (%)
Yes	2,529 (94.8%)
No	138 (5.2%)
Total	2667 (100.0%)

In which of the following activities have you had instances of cheating?

Activity	Number (%)
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Writing assignments	1,967 (77.8%)
Exams	1,757 (69.5%)
Homework	1,293 (51.1%)
Group assignments	603 (23.8%)

The respondents were able to select multiple options from this question. Therefore, the percentages total more than 100%. Of the respondents who have had instances of cheating, 77.8% have witnessed cheating on writing assignments, 69.5% on exams, 51.1% on homework, and 23.8% on group assignments.

During the following activities, what forms of cheating have you encountered? Choose all that apply. (2,529 responses)

	Cheat Sheet/Hidden Notes	Whispering in class	Plagiarism	Copying from another student
Exams	924 (36.5%)	430 (17.0%)	213 (8.4%)	1,417 (56.0%)
Homework	15 (.6%)	18 (.7%)	768 (30.4%)	1,055 (41.7%)
Group Assignments	9 (.4%)	18 (.7%)	348 (13.8%)	468 (18.5%)
Writing Assignments	18 (.7%)	22 (.9%)	1,910 (75.5%)	864 (34.2%)

For this question, the respondents were given a chart and they marked which forms of cheating they have encountered on various assignments. They could mark all that applied, although some of the options would not be applicable. An example of this would be “Whispering in class” on Homework. As the chart shows, 75.5% of respondents have come across plagiarism on writing assignments, so plagiarism is definitely an issue. The next highest percentage, 56.0%, stated that respondents have seen students copying from other students during an exam.

On average, how did you handle each of the following situations on an exam? Choose all that apply. (1,757 responses)

	Verbally warned the student	Lowered grade	Failed the student	Referred incident to honor court/administration	Overlooked the incident
Cheat Sheet/Hidden Notes	478 (27.2%)	422 (24.0%)	431 (24.5%)	323 (18.4%)	70 (4.0%)
Whispering in class	536 (30.5%)	89 (5.1%)	27 (1.5%)	35 (2.0%)	57 (3.2%)
Plagiarism	531 (30.2%)	737 (41.9%)	671 (38.2%)	568 (32.3%)	36 (2.0%)
Copying from another student	803 (45.7%)	826 (47.0%)	571 (32.5%)	471 (26.8%)	97 (5.5%)

This chart allowed the respondent to select how he/she disciplined common forms of cheating on exams. Since only 1,757 respondents have seen cheating on exams, the percentages are based on the number in the box divided by 1,757. The most common form of discipline for cheat sheets/hidden notes was a verbal warning with 27.2%. For whispering in class, the highest was a verbal warning again with 30.5%. For plagiarism, the most common form of discipline was lowering the grade with 41.9%. Finally, copying from another student was most commonly punished by lowering the grade with 47.0% or respondents choosing this option. 5.5% of respondents overlooked copying from another student on exams.

On average, how did you handle each of the following situations regarding homework? Choose all that apply. (1,293 responses)

	Verbally warned the student	Lowered grade	Failed the student	Referred incident to honor court/administration	Overlooked the incident
Cheat Sheet/Hidden Notes	116 (9.0%)	144 (11.1%)	58 (4.5%)	43 (3.3%)	21 (1.6%)
Whispering in class	135 (10.4%)	44 (3.4%)	11 (.9%)	13 (1.0%)	19 (1.5%)
Plagiarism	542 (41.9%)	682 (52.7%)	417 (32.2%)	313 (24.2%)	42 (3.2%)
Copying from another student	681 (52.7%)	821 (63.5%)	336 (26.0%)	247 (19.1%)	85 (6.6%)

The respondents could select as many options as necessary because more than one form of punishment is used on cheating. 63.5% of respondents lowered the grade on the homework if one student copied from another. 52.7% gave a verbal warning if copying was an issue. For plagiarism, 52.7% lowered the grade and 41.9% gave a verbal warning. 6.6% overlooked copying from another student.

On average, how did you handle each of the following situations regarding group assignments? Choose all that apply. (603 responses)

	Verbally warned the student	Lowered grade	Failed the student	Referred incident to honor court/administration	Overlooked the incident
Cheat Sheet/Hidden Notes	58 (9.6%)	56 (9.3%)	22 (3.6%)	13 (2.2%)	15 (2.5%)
Whispering in class	68 (11.3%)	34 (5.6%)	10 (1.7%)	5 (.8%)	18 (3.0%)
Plagiarism	289 (47.9%)	376 (62.3%)	181 (30.0%)	140 (23.2%)	29 (4.8%)

Copying from another student	346 (57.4%)	441 (73.1%)	155 (25.7%)	115 (19.1%)	42 (7.0%)
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This chart showed how the 603 respondents who have seen cheating on group assignments handled certain incidents. Slightly over 73% punished copying from another student by lowering the grade and 57.4% gave a verbal warning. For plagiarism on group assignments, 62.3% lowered the grade and 47.9% gave verbal warning. 7.0% of respondents overlooked copying from another student on group assignments.

On average, how did you handle each of the following situations regarding writing assignments? Choose all that apply. (1,967 responses)

	Verbally warned the student	Lowered grade	Failed the student	Referred incident to honor court/administration	Overlooked the incident
Cheat Sheet/Hidden Notes	64 (3.3%)	86 (4.4%)	60 (3.1%)	34 (1.7%)	9 (.5%)
Whispering in class	76 (3.9%)	42 (2.1%)	19 (1.0%)	10 (.5%)	9 (.5%)
Plagiarism	847 (43.1%)	1,152 (58.6%)	993 (50.5%)	819 (41.6%)	51 (2.6%)
Copying from another student	551 (28.0%)	764 (38.8%)	546 (27.8%)	401 (20.4%)	41 (2.1%)

This chart shows how respondents handled certain cheating techniques on writing assignments. The percentages are based on the 1,967 respondents who indicated they have seen cheating on writing assignments. With writing assignments, plagiarism seemed to be the biggest issue. 58.6% lowered the grade when plagiarism occurred and 50.5% of respondents failed the student. Only 2.6% did nothing about plagiarism.

Approximately how many instances of cheating have you observed in your classes? Question was open-ended. (2,667 responses)

Category of Instances	Number (%)
Light (1-3 per year)	1,884 (70.6%)
Medium (3.01-7 per year)	212 (7.9%)
Other	183 (6.9%)
None	138 (5.2%)
Heavy (7.01+ per year)	136 (5.1%)
Too many to count	55 (2.1%)
Not many	32 (1.2%)
Did not answer	27 (1.0%)

Some professors listed how many instances they have seen across their whole careers while others gave a number per year or per semester. Since we neglected to put a time frame on this question and we did not know exactly how many years each professor had taught we had to analyze this question differently. Therefore, we developed a system broken down by instances per year as seen in the above table. A later question asks how many years the professor has been teaching on a ten year basis. So, if the professor gave a number for this question (such as 12) and said they have been teaching 1-10 years; we divided 12 by the median number between 1 and 10, which is 5.5. As a result, $12/5.5=2.18$ instances of cheating per year and that would be added to the “Light” category.

What methods do you use to prevent cheating on Exams?

Question was open-ended. (2,667 responses)

Method	Number (%)
Observation or proctoring	905 (33.9%)
Different versions of exam	756 (28.3%)
Seating arrangements	707 (26.5%)
No outside materials	310 (11.6%)
Did not answer	257 (9.6%)
Open ended questions	256 (9.6%)
Other	225 (8.4%)
Warnings	205 (7.7%)
Change tests often	188 (7.0%)
Honor Code or signed honest pledge	102 (3.8%)
Open book or allow cheat sheet	85 (3.2%)
None/NA/Do not give	64 (2.4%)
Keep old exams	61 (2.3%)
Comparison or Grading	37 (1.4%)
Answer was irrelevant	32 (1.2%)
Different or no make-up test	26 (1.0%)
Students must use cover sheets	27 (1.0%)
Take home tests	26 (1.0%)
Students cannot leave the room	24 (.9%)
Timed tests	19 (.7%)
Study guides or give questions ahead of time	19 (.7%)
No talking allowed	14 (.5%)

This question was open-ended and the respondent could list as many ways as they wanted to show how they prevent cheating on exams, which is why the percentages total more than 100%. As the above chart shows, various ways of preventing cheating on exams are used by the respondents. Observation/Proctoring had the highest percentage with 33.9%. 28.3% of respondents use different versions of the exam and 26.5% use some form of seating arrangements. Other answers with a relatively high response rate included “No Outside Materials” with 11.6% and Open-Ended Questions with 9.6%. Also, 9.6% of the respondents did not answer this question.

What methods do you use to prevent cheating on Homework?

Question was open-ended. (2,667 responses)

Method	Number (%)
Did not answer	975 (36.6%)
None/NA/Does not count for much	393 (14.7%)
Warning	293 (11.0%)
Grading/comparison/learn writing styles	278 (10.4%)
Individualized assignments	181 (6.8%)
Other	141 (5.3%)
Specialized or unique topics	113 (4.2%)
Allow group collaboration	96 (3.6%)
Honor code or pledge work	65 (2.4%)
Turnitin.com or other software	59 (2.2%)
Answer was irrelevant	58 (2.2%)
Change assignments often	57 (2.1%)
Internet or search engines	45 (1.7%)
Check or require works cited	45 (1.7%)
Teach about plagiarism or citing	36 (1.3%)
Follow up in class	34 (1.3%)
Keep old assignments	22 (.8%)
Require drafts or make students show all work	14 (.5%)

This question was similar to the previous one except it asked for cheating prevention methods used for homework. Again, many unique responses were given. A large number of respondents, 36.6%, chose not to answer this question and 14.7% said “None,” “Not applicable,” or “Homework does not count for much.” 10.4% responded that they use grading or comparison of homework assignments to prevent cheating on homework. The next highest total was 6.8%, which was for individualized assignments.

What methods do you use to prevent cheating on Group Assignments?

Question was open-ended. (2,667 responses)

Method	Number (%)
Did not answer	1,204 (45.1%)
None/NA/Do not give	451 (16.9%)
Peer evaluations	214 (8.0%)
Warning	185 (6.9%)
Individual accountability/classroom presentation	128 (4.8%)
Other	119 (4.5%)
Comparison/grading	92 (3.4%)
Specific or unique assignments	82 (3.1%)

In class or monitoring	70 (2.6%)
Honor code or signed pledge	52 (1.9%)
Answer was irrelevant	50 (1.9%)
Groups self-police themselves	44 (1.6%)
Teaching about plagiarism or citing	41 (1.5%)
Each group has different assignment	40 (1.5%)
Turnitin.com or other software	36 (1.3%)
Require works cited	30 (1.1%)
Internet or search engine	29 (1.1%)
Change assignments often	22 (.8%)
Keep old work	9 (.3%)

Similar to the previous two questions, this question was open-ended and asked for methods of preventing cheating. This question involved group assignments. A high percentage, 45.1% did not answer this question and 16.9% said None/Not Applicable/Do not give. Eight percent of the respondents said they use peer evaluations to deter cheating on group assignments and 6.9% give a warning.

What methods do you use to prevent cheating on the following Writing Assignments? Question was open-ended. (2,667 responses)

Method	Number (%)
Did not answer	474 (17.8%)
Warning	443 (16.6%)
Comparison/Grading/Learn writing styles	374 (14.0%)
Specialized or unique topics	370 (13.9%)
Turnitin.com or other software	325 (12.2%)
Internet or search engine	319 (12.0%)
Require works cited	311 (11.7%)
Teach about plagiarism or citing	256 (9.6%)
Drafts or show all work	170 (6.4 %)
Na/None/Don't give	118 (4.4%)
Personal reflection or opinion questions	102 (3.8%)
Honor code or signed pledge	87 (3.3%)
Change assignments often	81 (3.0%)
Other	81 (3.0%)
Answer was irrelevant	79 (3.0%)
Students have different topics	69 (2.6%)
Keep old copies	53 (2.0%)
In class or observation	50 (1.9%)

This question dealt with the prevention of cheating on writing assignments and was open-ended. Almost eighteen percent (17.8%) of the respondents did not answer this question. Over sixteen percent (16.6%)

of the respondents discourage cheating on writing assignments by giving a warning. Fourteen percent said they use comparison/grading/learn writing styles to prevent cheating. Almost fourteen percent used specialized or unique topics. Turnitin.com was used by 12.2% or other plagiarism software and 12.0% use the Internet or search engines to prevent cheating. Finally, 11.7% require a works cited page.

In your opinion, what would be the appropriate punishment/discipline for a student caught with a cheat sheet during a test? Assume that this is a first time offense.

Question was open-ended. (2,667 responses.)

Method	Number (%)
Fail the exam or give the students a zero on the exam	1,604 (60.1%)
Refer incident to dean or administration	464 (17.4%)
Fail the course	381 (14.3%)
Warning	305 (11.4%)
Letter grade reduction	215 (8.1%)
Give the student another test	146 (5.5%)
Discuss with the student	127 (4.8%)
Expulsion or suspension	115 (4.3%)
Depends on the student or situation	92 (3.4%)
Answer was irrelevant	78 (2.9%)
Other	78 (2.9%)
Take test away from the student	67 (2.5%)
Failure	50 (1.9%)
Do not know/No opinion/NA	47 (1.8%)
Did not answer	34 (1.3%)
Give additional assignment	17 (.6%)
Public humiliation	6 (.2%)

This question was open-ended and allowed the respondent to say what they would do if they caught a student cheating on a test for the first time. They could list as many disciplinary techniques as they wanted. Some respondents put multiple answers, so the percentages total more than 100%. 60.1% said they would give the student a failing grade or a zero on the exam. 17.4% would refer the incident to the dean or administration. 14.3% of respondents would fail the student for the entire course and 11.4% stated that they would give a warning.

Why do you think some professors overlook some occurrences of cheating? (Choose all that apply).

(2,667 responses)

Reason	Number (%)
Not enough time to pursue matter	1,502 (56.3%)
Lack of support from administration	965 (36.2%)
Other (see next table below)	876 (32.8%)
Cheating wasn't serious	548 (20.5%)
Difficult to prove	429 (16.1%)

Punishment is too severe

368 (13.8%)

This question was an opinion question in chart form regarding the issue of why some professors overlook cheating. The respondents could choose any of the selections that they thought were relevant. 56.3% said there is not enough time to pursue the matter. Next, 36.2 % said lack of support from administration, 32.8% said other, 20.5% said cheating was not serious, 16.1% said cheating is difficult to prove, and 13.8% said the punishment is too severe.

Other – This response category from the previous question was open ended and is presented below. (876 responses)

Reason	Number (%)
Do not want to confront or afraid of lawsuit	199 (22.7%)
Too lazy or the process is too time consuming	176 (22.5%)
Want to get a good evaluation or be liked	82 (9.4%)
Procedure or policy does not work	76 (8.7%)
Other	76 (8.7%)
Do not care	66 (7.5%)
Want to give another chance or feel bad for the student	60 (6.8%)
Lack integrity themselves or are bad professors	53 (6.1%)
Cheating will not help the student anyway or the cheating will hurt them in the long run	43 (4.9%)
Do not look for cheating or lack knowledge to deal with cheating	42 (4.8%)
Feel student does not know what cheating is	23 (2.6%)
Not enough proof	18 (2.1%)
Do not know	15 (1.7%)
Do not overlook	7 (.8%)

This table is from the 876 respondents who said “Other” to the previous question. If they selected “Other,” then they could type what they wanted to justify the selection of the “Other” option. Of the 876 respondents, 22.7% said professors do not want to confront or are fearful of a lawsuit. Other answers included other professors are too lazy (22.5%) or the process simply takes up too much of their time. Almost ten percent (9.4%) said professors want to be liked or get a good evaluation.

When do you discuss your cheating policies with students on the following topics? Choose all that apply. (2,667 responses)

	Do not discuss	In a syllabus	Per assignment	Other	Not relevant for my courses
Plagiarism	66 (2.5%)	2,205 (82.7%)	1,185 (44.3%)	547 (20.5%)	101 (3.8%)
Group assignments	160 (6.0%)	1,177 (44.1%)	839 (31.5%)	265 (9.9%)	607 (22.8%)
Proper citation	57 (2.1%)	1,605 (60.2%)	1,468 (55.0%)	511 (19.2%)	196 (7.3%)
Exams	205 (7.7%)	1,885 (70.7%)	1,003 (37.6%)	430 (16.1%)	114 (4.3%)

This question was in chart form and allowed the respondent to select as many options as they desired on when they discuss issues pertaining to cheating. For plagiarism, group assignments, proper citation, and exams, the syllabus was the option with the highest percentage. In fact, 82.7% said they discuss plagiarism in the syllabus. That was the highest percentage on the chart. 7.7% of the respondents do not discuss a cheating policy for exams.

Based on your experience, which gender has had a greater tendency to cheat?

Answer	Number (%)
No difference	1,327 (49.8%)
I have not had enough experience to give a conclusive answer	620 (23.2%)
Male	596 (22.3%)
Female	117 (4.4%)
Did not answer	7 (.3%)

This question was in chart form. Nearly half, 49.8%, of the respondents said there is no difference in regards to which gender has the greatest tendency to cheat. Interestingly, 23.2% of respondents said they have not had enough experience to give a conclusive answer. On a gender level, 22.3% said males have a greater tendency to cheat, while only 4.4% of respondents said females do. A very small percentage (.3%) chose not to answer this question.

Do you think cheating is a problem on your campus?

Answer	Number (%)
Yes	1,758 (65.9%)
Not sure	609 (22.8%)
No	296 (11.1%)
Did not answer	4 (.1%)

This question was a chart that allowed the respondent to select Yes, No, or Not Sure. A sizeable number of respondents (65.9%) said that cheating is a problem on their campus. Over twenty percent (22.8%) of respondents were not sure and only 11.1% said cheating was not a problem.

How would you evaluate the cheating policy on your campus in regards to its effectiveness in minimizing cheating?

Answer	Number (%)
Very strong	187 (7.0%)
Strong	1,032 (38.7%)
Indifferent	799 (30.0%)
Weak	467 (17.5%)
Very weak	116 (4.3%)
Did not answer	66 (2.4%)

Seven percent of respondents believed their school has a very strong cheating policy and 38.7 % said their school’s cheating policy was strong. Thirty percent of the respondents were indifferent, 17.5% reported a weak cheating policy, 4.3% said very weak, and 2.4% chose not to answer this question.

Does your school have an honor code?

Answer	Number (%)
Yes	1,423 (53.4%)
No	807 (30.3%)
Not sure	428 (16.0%)
Did not answer	9 (.3%)

Over half of the respondents (53.4 %) said their school has an honor code while 30.3% said their school does not. Surprisingly, 16.0% of the respondents did not know if the school they are teaching at has honor code or not. Some respondents did not answer this question.

Do you think the existence of an honor code aids in minimizing cheating?

Answer	Number (%)
Yes	886 (33.2%)
No	726 (27.2%)
Not sure	1,047 (39.3%)
Did not answer	8 (.3%)

Slightly over one-third (39.3%) said they were not sure if an honor code aids in minimizing cheating. One third (33.2%) said it does help minimize cheating, while 27.2% of respondents stated that it does not. Only .3% chose not to answer this question.

Please indicate your gender.

Answer	Number (%)
Male	1,429 (53.6%)
Female	1,216 (45.6%)

Did not answer	22 (.8%)
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How many years have you been teaching at the undergraduate level?

Answer	Number (%)
0-10 years	1,029 (38.6%)
11-20 years	784 (29.4%)
21-30 years	477 (17.9%)
31+ years	260 (9.7%)
Did not answer	117 (4.4%)

This chart shows 38.6% of the professors who took this survey have taught for 10 years or less at the undergraduate level. Almost thirty percent (29.4%) of respondents have taught between 11-20 years, 17.9% have taught between 21-30 years, 9.7% have been teaching at the undergraduate level for 31 years or more and 4.4% did not answer this question.

ANALYSIS

According to our research, it was clear that an overwhelming amount of instructors have witnessed cheating at the college level. In fact 94.8% have seen an act of academic dishonesty, leaving only 5.2% who have not. The results of our first objective were what we expected. It seems logical that an educator would come across at least one dishonest person during the course of their career.

Second, we wanted to discover during which activities were students most likely to be dishonest. We found that writing assignments had the highest level of dishonesty with 77.8%, followed by exams with 69.5%, homework with 51.1%, and group assignments with 23.8%. The reason we believe writing assignments were the most cheated on activity is partly because they are usually out of the classroom projects. This means there is no direct supervision during the writing of the paper, leaving more room for temptation. Writing assignments typically involve the use of the Internet or other outside sources to gain knowledge of a subject. While researching online, students can find a completed paper on a wide range of topics online and reframe it as their own work.

We believe exams were second in frequency because cheating in this instance is sometimes done on impulse. The panic of being unprepared for an exam overwhelms students and they then begin to cheat in hopes of passing the exam. Homework also had a high percentage for mostly the same reasons as writing assignments. It too, is rarely done in the classroom and some instructors use homework as more of a teaching tool rather than counting it for a sizeable grade. This may lead students to think that the lack of a grade for the assignment also relaxes the rules on academic dishonesty. Group assignments probably had the lowest percentage because many professors do not give group assignments. Also, group assignments tend to limit the amount of cheating for two reasons. The first reason is multiple people are working on a project and that makes the workload lighter, which lowers the urge to be dishonest. Secondly, the presence of others helps keep an individual who would ordinarily cheat honest in order to avoid criticism from the group.

During exams, 56.0% of professors of who have had an occurrence of cheating have witnessed students copying from another’s paper. This could be the top reason because it is the easiest way to cheat if the cheating was unplanned. If the students found themselves unprepared, it would be an easy opportunity to try to improve their exam score. The method of using cheat sheets came in second with 36.5% of

respondents saying that they have seen this. This finding suggests that the dishonest act was planned, so that means a significant number of students make an active decision to cheat on exams. The third most common method was whispering in class with 17% of professors having witnessed this. The final form was plagiarism which came in at a low 8.4% because it would mostly likely be used on take-home exams which are given less frequently than traditional exams.

During homework activities, the most used means of cheating was copying from another student's paper with 41.7% of professors reporting this infraction. This was expected because homework is an out of class activity and students have more of an opportunity to be dishonest about their work.

Group assignments had lower numbers overall, but the most used form of cheating during this activity is copying from another student with 18.5% of the professors reporting this activity. This could be viewed as group members cheating from each other or one group cheating from another group. The second most used measure was plagiarism with 13.8% reported from the respondents. This was also not surprising because most group projects include a written report and that would allow for plagiarism to sneak into the project. Whispering in class was mentioned with .7% and cheat sheets were also included with .4% of professors having witnessed this form of cheating. These numbers are low because this type of assignment does not lend itself to this form of cheating.

Writing assignments easily lend themselves to plagiarism, so it was not a surprise when 75.5% of the professors who have had an instance of cheating reported plagiarism on writing assignments. Again, this is a large percentage because this form of assignment can easily be found on the Internet. The second most common form of cheating was copying from another's paper, with 34.2% of professors citing this reason. Whispering in class and cheat sheets had a small percentage at 9% and .7% respectively.

We also wanted to know how educators tried to prevent cheating from occurring. During exams, the most common form of prevention was observation with 33.9% of professors using this form. Following this was using different versions of the exam with 28.3% of professors using this intervention. The third most used method was using seating arrangements with 26.5% and prohibiting outside materials also had 11.6%. The top responses to this question are the things that are easiest for the professor to control. Therefore it is logical that those would be the most popular forms of prevention.

During the activity of homework, the most used prevention system was simply warning the students not to cheat with a usage rate of 11%. The second prevention technique was grading and comparing the assignments at 10.4%. This is not actually a preventative measure, but a sizeable number of the professors gave that response.

Cheating was most often prevented on group assignments by peer evaluations with 8% of professors using that. Warning the students had 6.9% of professors preferring that method. The peer evaluation method is a great way to prevent cheating as well as insuring that group members do their share of the project.

Preventing academic dishonesty during writing assignments was most commonly done with comparison during grading or learning writing styles with 14.0% of professors choosing this method. Even though this could be considered looking for cheating instead of prevention, 14.0% still mentioned it. This prevention method was followed by specialized and unique topics at 13.9%. Next, 12.2% of professors report they use Turnitin.com or some other anti-plagiarism software. Also, 12.0% said they use the Internet or search engines. We consider that more of a way to discover cheating instead of preventing it. The answers to all of the prevention techniques were quite varied because there are many ways to prevent cheating.

Another objective was to discover if professors believe honor codes have an impact on the number of students that cheat. Of the educators we surveyed, 39.3% said they were not sure, 33.2% said that they believe an honor code minimizes cheating, and 27.2% of professors said that honor codes did not minimize cheating. Professors state that 53.4% of them have an honor code at their institution while 30.3% do not have one. Also, 16% of professors were unsure if their school had an honor code, which was a surprisingly high number.

We also wanted to know if some professors overlook the issue of academic dishonesty and if so, why would they do this. The above results show that a very small percentage of educators actually overlooking the issue, but some do. The professors were asked why they believe some instances of cheating are overlooked. The most common response was that the professor does not have enough time to pursue the matter with 56.3% of professors choosing this as a reason. The other top reason educators may overlook cheating is a lack of support from the administration with 36.2% claiming that this is why some overlook cheating. According to our survey, very few professors overlook cheating. However, there are still some professors that will overlook cheating and this is a problem that needs to be addressed.

The survey was also designed to gather other statistical information. One question we asked was the gender of our respondents. According to our results, 53.6% were males and 45.6% were females. Some respondents chose not to divulge their gender for various reasons. We also asked which department the educator teaches in. The departments that had a sizeable response rate were Social Sciences, Business, English, Science, Fine Arts, Math and Computer Science, Education, Physical Education, and Nursing. Finally, we wanted to know how many years they had been teaching. Our respondents who had teaching experience between 0-10 years were 38.6%. The range of 11-20 years had 29.4%, the 21-30 year range was at 17.9%, and 31+ years had 9.7%.

CONCLUSION

The results of our survey show professors recognize student cheating and are constantly dealing with it. This survey was designed to allow professors across the United States to give their opinions on student cheating. The 2,667 respondents to this survey helped give insight about types of cheating, methods of prevention, and disciplinary action that occurs if a student is caught. This survey proves that cheating is a very important issue that needs to be dealt with seriously. The data also lends itself to multivariate analysis, which will be addressed in a later study.

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STUDENT BUSINESS ORGANIZATIONS: INVOLVEMENT STRATEGIES AND EXPECTATIONS

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ABSTRACT

Student business organizations within business schools play a vital role in preparing students to enter the professional business world. These organizations provide students with opportunities to apply leadership skills, as well as other management related skills. Additionally, these organizations may provide students with a linkage to the business community. The success of student business clubs depends heavily on student involvement. The degree of involvement may depend on the expectations of each student. The purpose of this paper is to offer involvement strategies based on the student expectations. A total of 450 surveys were collected from business students at a small four-year state supported university located in the Southeastern United States. The survey consisted of questions related to areas such as communications, interests, rewards, time of meeting, and expectations. Based on the results of the survey, strategies will be suggested to assist faculty advisors in maintaining strong professional clubs in schools of business.

INTRODUCTION AND LITERATURE

Clubs can be defined as “an association of people with shared interests meeting in a specified place” (Dearlove, 2003). A key component of student expectations regarding business clubs pertains to the purpose for which the student is joining the club. According to John M. Butler in his article *Public Relations In Action: A View of the Benefits of Student Membership in Pre-Professional Organizations*, 1994, “Preprofessional organizations greatly aid the student in learning and utilizing the information taught in the classroom in a practical and professional atmosphere.” This statement leads one to believe that membership by students would be for the knowledge obtained; however, Bettina A. Lankard in her article *Youth Organizations, Myths and Realities*, 1996, cites that “Students are very articulate about the benefits they have realized through participation. Research studies show participation in activities benefits

career development.” This statement would indicate that the reasons students join organizations is to gain experience for their resumes. In addition, Lankard goes on to cite that students involved in youth organizations had higher leadership skills, and that the “primary goal of membership for these students is to develop competencies necessary for employment in a high performance economy” (Lankard, 1996). Clearly, the students are thinking of the future when joining business clubs at the college level. Their focus is on how membership in this organization will benefit them when interviewing and later working in the job profession that they have chosen.

However, it has been noted by those writing this article that student membership in business clubs and organizations is declining. Often, it is only a small percentage of the business students who join these organizations, provided their GPA makes them eligible. Then, if they do join, there are a declining number of returning students to the regularly scheduled meetings. The survey which was distributed to the business students at this small university asks several questions which could give insight as to why it is so difficult to maintain continued interest in the business club, and thereby have a substantial number attend regular meetings. Some of these questions include an analysis of the various forms of communication to not only the club members but also the student body as a whole. Based on the results of the survey, strategies will be suggested to assist the faculty advisors in maintaining strong professional clubs in schools of business.

METHODOLOGY

To obtain student’s opinions about student business organizations, a questionnaire involving questions ranging from best means of communication, to interest and expectations was developed. Additional aspects such as meeting times, rewards and punishments as a means to improve participation and attendance were also considered but are not part of the present study. From a convenience sample of all the business classes (a captive population) 459 responses were collected, nine questionnaires were rejected for lack of completion or major errors, providing an effective return rate of 90.5%. Students were made aware of the purpose of the study and the voluntary nature of their participation. Proper research procedures were applied to assure the students’ anonymity, the privacy of the information, and to avoid duplications in participation. Some classificatory questions were used to be able to evaluate potential differences between the participants.

PRESENTATION OF DATA

Table I describes the characteristics of the students sampled. Approximately 51% of the students were female and 49% of those students were male. Seventy five percent of the students were Caucasian, and 23% of the students were African American. About one-third of the students were juniors and 28% of the students were seniors. A good representation of lower classmen (39%) also was collected. The vast majority of those surveyed were full-time students. Forty-three percent of the students were in the

Marketing/Management emphasis, while the Accounting and Health Care Management emphasis accounted for 15% each. The Economics/Finance emphasis included 10% of the students and approximately 17% of those surveyed were not business majors. Most of the students were between the age of 20 and 22. Approximately two-thirds of the students worked either part-time or full-time. Of the students who are employed, 48% worked at least 20 hours per week.

Table I								
Sample Characteristics								
Description	Gender	Class	Emphasis	Race	Student	Age	Work	H/Week
Male	49%							
Female	51%							
Freshman		18%						
Sophomore		21%						
Junior		33%						
Senior		28%						
Accounting			15%					
Econ./Finance			10%					
HC Mgmt			15%					
Mgmt./Mktg.			43%					
Other			17%					
Caucasian				75%				
African American				23%				
Other				2%				
Full Time					97%			
Part time					3%			
17 – 19 years						25%		
20 – 22 years						61%		
23 or more years						14%		
Yes							67%	
No							33%	
At least 10								14%
At least 20								48%
At least 30								23%
More than 30								15%

Table II shows the different ways to communicate club activities to club members. “E-mail” received the highest percentage response in the “Excellent” ranking and received a total of 84% for both “Excellent” and “Good” combined. Other communication choices which received high marks from students were word of mouth, flyers, The Forum (the university newspaper), and personal letters. InfoBox and Telephone Contacts both received below a 50% response on the combined categories of “Excellent” and “Good” and were the least popular choices for students.

Table II
Communication to Club Members

Communication	Excellent	Good	Neutral	Bad	Worst
The Forum	23%	43%	28%	5%	1%
Flyers	26%	51%	20%	2%	1%
InfoBox	12%	23%	46%	16%	3%
Telephone Contacts	17%	30%	31%	17%	5%
Personal Letters	22%	41%	26%	8%	3%
Bulletin Boards	19%	44%	30%	5%	2%
Word of Mouth	28%	41%	21%	8%	2%
E-Mail	47%	37%	12%	3%	1%

Table III shows that activities that would interest students the most when involved in an organization. Forty-eight percent of the students were “very interested” in fieldtrips and another 41% were “interested” in fieldtrips. This was the top choice of the students’ interests when combining the top two “interest” categories. Students also showed a strong interest in Social gatherings, which received an 86% combined total in these two categories. Luncheons/Dinners received a 79% total combined response and Guest Speakers received a 72% combined total in the first two interested categories. The bottom four activities and their percentage total for the top two “Interested” categories were Resume Analysis (61%), Environmental Projects (57%), Networking (55%) and Conferences/Seminars (45%).

Table III
Student Interests

Activities	Very Interested	Interested	Somewhat Interested	No Interest at All
Fieldtrips	46%	41%	11%	2%
Guest Speakers	22%	50%	24%	4%
Environmental Projects	14%	43%	32%	11%
Conferences/Seminars	12%	33%	36%	19%
Networking	21%	34%	35%	10%
Luncheons/Dinners	32%	47%	18%	3%
Resume Analysis	19%	42%	32%	7%
Social Gatherings	38%	48%	13%	1%

Table IV shows the student’s expectation in joining a professional club. Gaining knowledge in a particular discipline was the top reason for the students. Students also like the idea of putting their club experience on their resume. Many companies which are looking for young leaders may put an emphasis on student leadership within a professional organization. Additionally, there is a social interaction aspect that most students are looking for in joining a club. The possibility of receiving some type of scholarship also is an expectation that many students have. Networking received the lowest response from students (65%); however, many students may associate networking

with developing contacts with other students. Networking with professional business people would certainly be a great advantage for students, and professional clubs should emphasize the importance of this opportunity. There is actually an organization called the Public Relations Student Society of America (PRSSA) that was established in 1968 for the sole purpose of establishing relationships between students and professional public relations practitioners. It also has a purpose of teaching public relations and professional attitudes (Pohl, 1994).

Table IV
Club Membership Expectations

Expectations	% of Students
Knowledge	90%
Experience for your Resume	86%
Social Interaction	75%
Recognition/Status	69%
Scholarships	67%
Networking	65%
Others	1%

CONCLUSION AND RECOMMENDATIONS

Using the proper means of communicating is essential to having a healthy professional business club. Based on the responses from the students; e-mail, word of mouth, the college newspaper, and flyers were considered to be the more effective ways to communicate activities to club members. Telephone contact and infoboxes were the least favored means of contact with club members. Club advisors and officers must continue to use and improve the most effective venues for communicating with members.

Business clubs must focus on Student interests if they are going to recruit and retain members. Club advisors and leaders should consider offering more fieldtrips, social gatherings, luncheons/dinners, and guest speakers. Obviously, students prefer more informal, social functions rather than the formal atmosphere of conferences and seminars. However, student interest also appears to be strong in resume analysis even though only 19% of the students were very interested in resume analysis. One area in which the authors thought would have a stronger response by the students was networking. Networking is often viewed as one of the strongest reasons to join a business club, especially if the networking is with business professionals. The lower than expected response by the students may be explained by the students interpreting the question as networking with other students instead of business professionals. It has been cited in other articles that one of the “attractions” of joining clubs is that “they allow members to rub shoulders with the great and the good...and they allow them to do so in an informal way” (Dearlove, 2003). Therefore, the current authors are certain that this response could be remedied in future analysis by clarification of the question.

We are a society that is obsessed with the idea of developing networks that will benefit future leaders and clients. Clubs have become about building and maintaining these relationships in communities and organizations (Dearlove, 2003). In order to do this, it is essential that business clubs maintain the interest of their members. This is done by proper communication, as well as programs and activities that attract the attention of current and potential members. Listening to the opinions of its members is essential because “Clubs offer one possible solution of getting to a very targeted audience in a positive environment” (Dearlove, 2003).

It will be interesting to explore, in a further study, those issues pertaining to improving attendance and participation. These two aspects provide an opportunity for business organizations to enhance their efficiency in managing the organization’s activities and student involvement towards well defined goals. The authors are in the process of examining the previously mentioned aspects.

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QUALIFIED FACULTY: WHAT DOES THAT MEAN?

Panel Discussion

Moderator: Lilly Lancaster, University of South Carolina - Upstate

Panelists:

Robert T. Barrett, South Carolina State University

Ron Green, The Citadel

M. Barry O'Brien, Francis Marion University

Participants on this panel discussed their experiences in developing definitions of academically qualified (AQ) and professionally qualified (PQ) faculty. The session began with a brief overview of AACSB Standard 10. It should be noted that this session was in no way endorsed by AACSB; only opinions of the participants were expressed. The panelists are Deans from AACSB accredited schools. The moderator is a former Dean from an AACSB accredited school. Participants on this panel represent small state supported schools. Specific definitions were presented and critiqued by the panel and the audience. Tables 10-1 and 10-2 were discussed. The audience shared experiences and definitions of AQ/PQ. Also presented were methods of recording and presenting faculty qualifications.

Standard 10 of the AACSB International Eligibility Procedures and Accreditation Standards for Business Accreditation provides the basis for this discussion.

Concerning AQ faculty, the standards document indicates the basis for judgment and guidance for documentation and lists examples to augment the definition. The document states: Academic qualification requires a combination of original academic preparation (degree completion) augmented by subsequent activities that maintain or establish preparation for current teaching responsibilities.

Concerning PQ faculty, the document states: Professionally qualified faculty can be an important component of the total faculty resources deployed by the business school. Professionally qualified faculty members can be key to ensuring that students have learning experiences that reflect current business practice and understand the link to research and theory. The deployment of professionally qualified faculty within the context of these standards should be viewed as an appropriate strategic decision that is consistent with supporting high quality academic programs and the mission of the business school. Both relevant academic preparation and relevant professional experience will be required to establish a faculty member as professionally qualified. Normally, the academic preparation should consist of a master's degree in a field related to the area of teaching assignment. Normally, the professional experience should be relevant to the faculty member's teaching assignment, significant in duration and level of responsibility, and current at the time of hiring. The burden of justification regarding professionally qualified faculty rests with the school under review.

UNIFORMITY IN TEACHING THE PRINCIPLES OF FINANCE CLASS – IS IT POSSIBLE OR DESIRABLE?

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ABSTRACT

We typically offer four or five sections of the Principles of Finance class (FINC 311) at Winthrop University each semester. These sections are usually taught by three of the four finance professors (i.e. one professor may teach two sections in a given semester). A common syllabus is not utilized. Further, there are significant differences in teaching styles, course content and exam design.

This paper will explore the differences in methods and teaching style employed by the finance faculty in teaching the Principles course. The implications for student achievement and credit hour production will be addressed. Alternative strategies for ensuring more consistency in delivery of desired course content will be presented.

INTRODUCTION

FINC 311 is a required class for all students in the College of Business. It is regarded by students as the most challenging course in the core curriculum. It is the only finance course that the majority of students in the College of Business are required to take. Accordingly, a number of students adopt the attitude that earning a C for the course is sufficient and this thinking is subsequently reflected in their level of effort.

The goal of “getting by” with a C also manifests itself when students register for the course. Some sections fill up much faster than others. While the time a section is offered plays a major role in selection, we know that students discuss among themselves which professors are preferred and which, if any, should be avoided. Student recommendations may be based on the quality of a professor’s teaching. It may also be based on the ease with which students are able to achieve a satisfactory grade.

It should be noted that a subset of these students decide to major in Finance and go on to take the Intermediate Corporate Finance class (FINC 312). This is the first finance class for finance majors only. The objective of this class is to reinforce concepts learned in the Principles of Finance class and to extend the students’ depth of understanding by exploring more challenging concepts and problems. It is our expectation that students across each section of the Principles class will gain a common set of competencies. It has been my experience that students come to the Intermediate class with varying levels of understanding of basic financial concepts. This becomes immediately evident when an assessment test is given at the beginning of the semester. A significant amount of time is often required to get everyone on a level playing field.

We have developed a common Course Description for the Principles of Finance course. This should be used as the starting point by each faculty member in preparing a Syllabus. To my knowledge, there has been no sharing or comparing of syllabi in previous semesters. We all use the same textbook [1]. However, there is individual license regarding chapter coverage, relative emphasis placed on individual topics and the number and content of exams.

An assessment test was administered in the Principles course for the first time at the end of the Spring 2007 semester. This was a ten question multiple-choice exam intended to provide a means of documenting what our students learned in the course. The exam was written by one of the Professors. It was circulated among the three other faculty members who teach the course and feedback was requested. Unfortunately, no feedback was offered and the test was administered as written. In reviewing the exam, I noted that there were a few questions on topics I either didn't cover or only briefly mentioned and that there were few, if any, questions on material I covered in significant detail. As we prepare for a re-accreditation visit, assessment has taken on new meaning. It is clear that we need to refine our process and our assessment tool.

FINDINGS

In order to assess the consistency in teaching the Principles of Finance class across the sections, I obtained the most recent syllabus for each professor who teaches the course. The following tables illustrate differences identified.

Table 1 – Stated Goals Included in the Course Syllabus [2] [3] [4] [5]

	Dr. Wood	Dr. Letourneau	Dr. Bhardwaj	Mr. Evans
Explain the basic criteria for every financial decision	Yes		Yes	
Assess the financial health of the firm	Yes	Yes	Yes	Yes
Develop proforma financial statements	Yes	Yes	Yes	Yes
Describe financial markets	Yes			
Explain stock and bond valuation	Yes	Yes	Yes	Yes
Explain how a company raises capital	Yes			
Calculate interest rates	Yes			
Understand time value of money	Yes	Yes	Yes	Yes
Compute a company's cost of capital	Yes	Yes	Yes	
Explain international issues	Yes			

Review capital budgeting		Yes	Yes	Yes
Review currency conversion			Yes	

Stated goals vary by professor. This is expected given that chapter coverage, as illustrated in Table 2, varies as well. This may also reflect each professor's personal interests and/or view of each topic's relative importance. For example, I have always maintained a position in industry in addition to teaching. It has been my experience that students need a solid understanding of:

- Financial Statements
- Financial Statement Analysis (Ratio Analysis)
- Time Value of Money
- Capital Budgeting

Hence, I tend to spend considerably more class time on these topics than my colleagues. I also cover the fewest number of chapters.

I also saw a difference in the philosophy of constructing a syllabus. Some of my colleagues prepare a very detailed syllabus, while others prepare a more condensed version.

Table 2 – Chapters Covered

Chapters	Dr. Wood	Dr. Letourneau	Dr. Bhardwaj	Mr. Evans
1	Yes	Yes	Yes	Yes
2	Yes	Yes		
3	Yes		Yes	Yes
4	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes
6	Yes		Yes	Yes
7	Yes	Yes	Yes	Yes
8	Yes	Yes	Yes	Yes
9	Yes		Yes	Yes
10	Yes	Yes		
11	Yes	Yes	Yes	
14	Yes	Yes	Yes	Yes
17	Yes	Yes	Yes	

One must recognize that there are limitations in evaluating a course based solely on the Syllabus. While Dr. Wood has the most chapters to be covered in his syllabus, he informed me that he typically doesn't get to each. Anecdotally, Chapter 17 (International Finance) is often skipped by Drs. Wood, Letourneau and Bhardwaj because of lack of time. When it is covered, it is typically discussed in one class period. Accordingly, while the chapters to be covered per the syllabi vary from nine to thirteen, the actual difference may not be that great.

Table 3 – Grading

	Dr. Wood	Dr. Letourneau	Dr. Bhardwaj	Mr. Evans
1 st exam	22%	25%	25%	25%
2 nd exam	22%	25%	25%	25%
3 rd exam	22%			25%
Quizzes		25%		
Project			15%	
Participation			10%	
Final exam	34%	25%	25%	25%*

*Final exam score will also replace one earlier exam score if higher. All professors give a cumulative final.

Each Professor designs his own exams. Two of my colleagues give two exams and a final. Two of us give three exams and a final. Further, Dr. Letourneau gives quizzes and Dr. Bhardwaj assigns a project and awards points for class participation. I have not seen exams administered by any of my colleagues. Further, I did not have access to grade distribution data. I do know that a variety of formats is used. All multiple-choice exams are administered by two of my colleagues. Two of us give exams that include problems in addition to multiple-choice questions.

I have had a fair amount of debate with one of my colleagues regarding giving exams with all multiple-choice questions. He believes such exams are effective in assessing student learning. He points to academic research that shows that they are an effective tool. Further, many professional exams are now given in multiple choice format. Recently, I discussed this issue with my new Department Chair. She suggests that, at a minimum, there should be problems in the multiple-choice format. Students should be required to show their work. The professor should review all answered incorrectly and award partial credit.

As can be expected, there are also differences in teaching style. Two professors conduct lectures using PowerPoint. One also uses WebCT to conduct quizzes and to have online office hours. Two of us conduct lectures using chalk and blackboard.

The level of understanding of the basic tools and techniques of finance demonstrated by students who take the next finance class (i.e. FINC 312) is uneven. The results of the assessment test administered in FINC 312 at the beginning of the semester are often skewed toward the students who complete a particular section(s) of FINC 311.

CONCLUSION

Clearly, there is an opportunity for us to become more consistent in what we do in each of the sections. While I would like to see each professor continue to have some flexibility in course design, greater collaboration would be positive for students and for each of us. A common syllabus is used across all sections of Principles of Accounting. A common exam is also administered. I'm not sure that degree of uniformity is where we want to go. However, there is substantial middle ground. Effective communication among the finance faculty is required if we are to achieve greater consistency in delivering a quality product to our students. This has begun. I have discussed my observations with the other two finance professors teaching FINC 311 this semester. One of the professors obtained and

reviewed my syllabus prior to completing his own. Hopefully, sharing information will make us all more effective instructors.

As a result of my reviewing each syllabus, I have decided to add two chapters that I have not covered in recent years. In order to accomplish this, I will have to cover one or two topics in less depth than I have previously. Given that ratio analysis and time value of money are covered again in FINC 312, I will likely spend less time on these topics in the Principles course.

It is my intent to facilitate further discussion with my colleagues regarding the chapters we should cover and to what depth. Specifically, we need to agree on specific learning outcomes that can be measured by an assessment test administered to all sections at the end of each semester.

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Student Evaluations of Teaching: Multiple Class Sections Compared

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ABSTRACT

Student evaluations of their professors and courses, originally designed to help instructors improve the quality of their instruction, are increasingly used in tenure and promotion decisions. The goal of this research is to identify external factors that influence these student evaluations. The three measures of teaching, progress on relevant course objectives, excellence of instructor, and excellence of course, do not follow a consistent pattern. Greater progress is associated with non-introductory classes and instructors teaching no more than two sections of a class. Excellence of instructor is not significantly associated with any of the external variables we analyzed. Excellence of course is associated with larger classes, shorter classes, and lower student response rates. These external factors are beyond the control of instructors, yet they live with the results.

INTRODUCTION

The goal of teaching is to educate and not surprisingly, assessing that education has become a major focus in academia. Accreditation guidelines have placed pressure on colleges and universities to place greater emphasis on teaching (Garcia and Floyd 2002; Read et al. 2001). Consequently, faculty are increasingly held responsible for the learning of their students (Garcia and Floyd 2002). The assessment method has been to have students evaluate their professors. Student evaluation of teaching (SET) has a long history, dating back to the 1920s at the University of Washington (Seldin 1993). Since the 1960's, SETs have been used in the United States, Australia, Canada, Europe and Great Britain. At that time, such evaluations were "almost entirely voluntary" (Algozzine et al. 2004:134). Such ratings have become more and more common. Seldin (1993) noted that the use of student ratings among a group of 600 liberal arts colleges increased from 29% to 68% to 86% in 1973, 1983, and 1993 respectively. Haskell (1997) found that 95% of business school deans at 220 accredited undergraduate schools use SETs as a source of information. Today, student evaluation of faculty is a mandatory part of post-secondary teaching in America (Algozzine et al. 2004). SETs are the fastest growing method of evaluation (Pratt, 1997).

SETs were originally designed to help instructors improve the quality of their instruction and courses, a formative function (Birnbaum 1999; Germain 2005; Haskell 1997; Rifkin 1995). SETs continue to provide formative feedback for instructors (Aultman 2006), but increasingly they are used by administrators for faculty reappointment, tenure, promotion, and pay increase recommendations, a summative function (Cashin and Downey 1992; Jackson et al. 1999; Pike 1998; Seldin 1999). Student evaluation forms may be designed by individual instructors, by departments, by colleges, or by outside agencies. Regardless of the instrument used, research, in the past, has supported the assumption that students make valid and reliable estimates of their learning (Hoyt and Perera 2000; Seldin 1993). SETs should be highly influenced by variables demonstrated to be strongly associated with effective teaching. However, research shows that a number of external factors, beyond the control of any instructor, may influence those evaluations (Johnson 2002). Following the work of Marsh and Roche (1997), construct- validity has come under increasing scrutiny.

Some detractors simply question the ability of college students, especially first-year students, to assess the quality of teaching based on limited experience, maintaining that students' perceptions are not necessarily based on fact, nor are they necessarily valid (Crumbley 1995; Sproule 2000; Wilson 1998). Others have focused on a plethora of variables that have no documented association with effective teaching. Davidovitch and Dan Soen (2006) found that instructors of mandatory courses received lower evaluations compared to instructors of electives. They also noted that instructors of natural sciences classes received lower evaluations than did instructors of humanities and social sciences classes or than instructors in the healthcare sciences. Kwan (1999) and Nerger et al. (2007) found academic discipline, in general, to be associated with differences in SETs. Burns and Ludlow (2005) as well as Davidovitch and Dan Soen (2006) found that class attendance altered SETs. Munz and Fallert (1998) showed that student mood was correlated with instructor and course ratings, as were characteristics of an instructor's personality (Clayson 1999; Nerger et al. 2007), particularly attractiveness ("hotness" based on ratemyprofessor) (Birnbaum 1998; Riniolo et al. 2006). Millea and Grimes (2002) and Davidovitch and Dan Soen (2006) found that females tended to evaluate teaching more positively. This applied to African-Americans, and students 35 and over as well (Davidovitch and Dan Soen 2006). Birnbaum (1998) and Marsh and Roche (1997) reported that students gave higher ratings to classes with less coursework, but Millea and Grimes (2002) did not find that to be the case. There is a general positive correlation between grades, either expected or actual, and student evaluations of teaching (Cohen 1981; Greenwald and Gillmore 1997; Johnson 2002; Millea and Grimes 2002; Nerger et al. 2007), but Marsh and Roche (2000) caution that good grades can come from higher motivation and greater interest in the subject matter and need not constitute bias. In fact, "workload, expected grades, and their relations with SETs were stable over 12 years" (Marsh and Roche 2000).

The effects of class size have been the focus for a number of researchers (Fernandez and Mateo 1998; Kwan 1999; Maurer et al. 2006; Shurden et al. 2005), examined recurrently since the 1920s, but have shown mixed results (UCSB 2004). Typically, small, medium, and large classes have been compared, but the criteria for establishing size categories have not been uniform. Evaluations for small classes seem to be higher in general (Shurden et al. 2005), although part of the variance may depend on the type of class (seminar, lab, lecture, or level) rather than simply the size (Nerger et al. 2007). Fernandez and Mateo (1998:599) found "a statistically significant but very small negative linear relationship between class size and mean ratings of quality of teaching". When they divided the same data into five categories, rather than three they saw a clear, U-shaped relationship between the variables (Fernandez and Mateo 1998). Results that change based on ordinal-level cut points are problematic for any research and would explain the mixed results reported in the literature.

Shurden, Smith, and Tolbert (2005) explored the effect of length of class, which corresponds to frequency of class meetings. Monday/Wednesday afternoon classes met for 75 minutes as did Tuesday/Thursday classes. Monday/Wednesday/Friday classes until 1:50 PM met for 50 minutes. While instructors' desires may be considered, class schedules are arranged to meet the requirements of university administrators. Introductory classes are spread across sections to allow the greatest number of students to enroll. Required classes must not conflict. Popular electives are scheduled in sections to attract new students to department courses. Any systematic association of SETs and length or frequency of class could dramatically affect instructors' ratings, but be totally beyond their control. Those of us who teach summer school, when classes meet four days per week have noticed that grades are typically higher. Students and instructors alike believe that this results from greater frequency of contact with the material. If so, it would be logical for classes that meet more frequently during regular terms to have higher SETs. Shurden et al. (2005) found this to be the case with significantly higher SETs for the more frequent classes.

Last year, we compared student perceptions of distance education classes taught at separate sites. As expected, we found that students from different sites held different perceptions. We thought that we understood the reasons for those disparities. Students in the room with the instructor perceived more progress on relevant objectives and rated both the instructor and the class more positively as did students who experienced fewer technical difficulties. However, we have also noticed differences in the student perceptions from different sections of classes taught by one instructor in a traditional classroom, in some cases with variation as great as we saw for the distance education sections. The difference in evaluations among an instructor's multiple sections ranges from zero to 25%. We maintain no illusion that we understand these differences. They may exist for only a few classes, or a few instructors, or for certain departments or because of external factors. In any case, these inconsistent student perceptions continue to raise concerns about the validity and reliability of SETs in general.

METHODOLOGY

The focus of this paper is to examine student perceptions in multiple sections of a class taught by a single instructor. Based on the literature, we will explore differences based on those external variables to which we have access. In 2004, Lander University adopted the Individual Development and Educational Assessment (IDEA) instrument to collect student perceptions of their classes. The growing use of and reliance on student evaluations of teaching for summative decisions and increasing questions about their construct validity, led to the development of the IDEA instrument at Kansas State University during the 1968-1969 school year (Hoyt and Cashin 1977). Now, 60,000 classes are assessed annually, providing nationally comparative data (<http://www.idea.ksu.edu/StudentRatings/index.html>). What distinguishes the IDEA instrument from other SETs is that student ratings are adjusted on the basis of a student's motivation to take the course, work habits and effort, as well as perceived course difficulty and class size (Hoyt and Lee 2003). Regardless of these admirable attempts to control for external influences, limitations to the interpretation of the results from this instrument remain. The IDEA system is not recommended for classes with less than 10 students due to decreased validity and reliability (Hoyt and Cashin 1977). Nearly four percent of Lander classes have fewer than 10 students enrolled. Ratings are not considered to be representative unless at least 75% of students respond (IDEA Center 2004). Only about 65% of Lander classes get a response rate of 75% and above.

The IDEA instrument provides three summary measures for each class. The first measures effective teaching in terms of progress made on particular course objectives. Instructors pick from a list of 12 possible course objectives, designating each as essential, important, or not important to the particular course. Those objectives deemed essential are double weighted in the IDEA assessment calculations. Objectives are organized into six categories: *Basic Cognitive Background*; *Application of Learning*; *Expressiveness*; *Intellectual Development*; *Lifelong Learning*; and *Team Skills* (www.idea.ksu.edu). Most categories include multiple possible objectives, rated by students on a five-point scale from *no apparent progress* (1) to *exceptional progress* (5):

Basic Cognitive Background

1. Gaining factual knowledge (terminology, classifications, methods, trends)
2. Learning fundamental principles, generalizations, or theories

Application of Learning

3. Learning to *apply* course material (to improve thinking, problem solving, and decisions)
4. Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course

Expressiveness

6. Developing creative capacities (writing, inventing, designing, performing in art, music, drama, etc.)

8. Developing skill in expressing oneself orally or in writing
- Intellectual Development*
7. Gaining a broader understanding and appreciation of intellectual/cultural activity (music, science, literature, etc.)
 10. Developing a clearer understanding of, and commitment to, personal values
 11. Learning to *analyze* and *critically evaluate* ideas, arguments, and points of view
- Lifelong Learning*
9. Learning how to find and use resources for answering questions or solving problems
 12. Acquiring an interest in learning more by asking questions and seeking answers
- Team Skills*
5. Acquiring skills in working with others as a member of a team.

The IDEA guidelines recommend, “that the meaning of the objectives [should be] discussed with your class early in the semester so a common understanding is reached”. It is questionable, however, how well specific objectives are remembered when evaluations are performed later in the semester. The second measure is based on the single statement, “Overall, I rate this instructor an excellent teacher.” Response options range from *definitely false* (1) to *definitely true* (5). The third measure is based on the single statement, “Overall, I rate this course as excellent.” The responses are the same as those used for the second measure. For each measure, the IDEA center calculates raw and adjusted average scores, recommending that the adjusted scores be used for comparisons. Scores are adjusted on the basis of students’ professed desire to take the course, expressed effort put forth, and perceived amount of work required.

We have data from 58 instructors, who taught 86 pairs of classes, 20 who taught 21 sets of three classes, two who taught four sections, three who taught five sections, and one who taught six sections for a total of 254 classes. We will compute the difference between the maximum rating and minimum rating for pairs and sets of classes taught by each specific instructor. If the IDEA instrument relies on factors correlated highly with teaching, we would expect little difference between ratings from difference sections of a class taught by a single instructor. In addition we will explore the ratings and variance in ratings between semesters, and between pairs of classes and larger sets. Further, we will explore evaluations and response rate based on length of class, class time, and class level. Our analyses will use paired t-tests, analysis of variance, and correlation (Fox 2003; Patterson and Basham 2006). Based on previous research, we have only one hypothesis, that classes that meet more frequently will have higher evaluations for all three summary measures.

ANALYSES

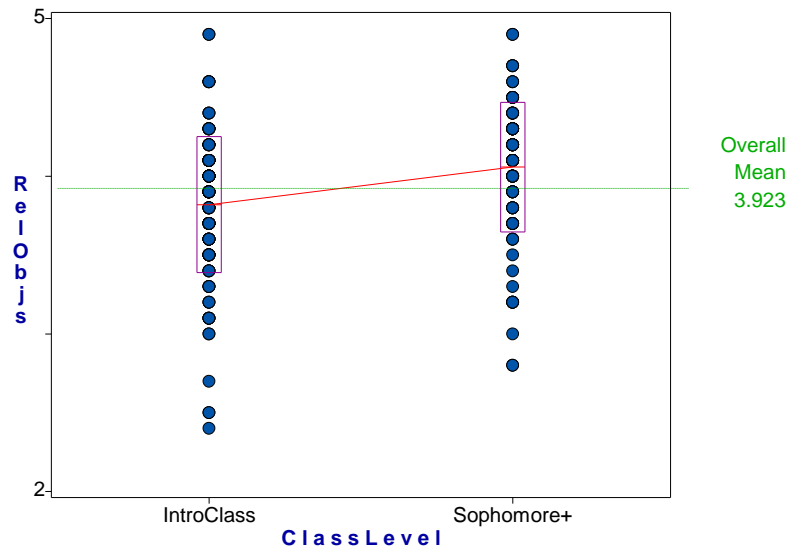
As with any interesting research, our exploration has generated a series of new questions for the future. All of the factors we have explored are, for the most part, beyond an instructor’s control and unrelated to the process of teaching, itself. Due to the lack of literature or conflicting literature, we approached our exploration with a series of questions. Since the IDEA instrument provides three summary measures for each class, we have explored each question for each summary measure. As we found in our previous research, different measures show different results. For only some of these differences are there any suggested or even inferred explanations in the literature.

Question 1: Do SETs differ depending on whether a class is introductory level or a higher level? Introductory classes, while not limited to first-year students, certainly have a higher percentage of such students enrolled. Table 1 shows no significant difference in SETs for either excellence of instructor or excellence of course based on class level. However, figure 1 shows a highly significant ($P=0.000$) positive relationship between SETs for the measure, progress on relevant objectives. These results may

support the suggestion of Crumbley (1995), Sproule (2000), and Wilson (1998), who question the ability, particularly of first-year students, to assess the quality of teaching based on limited experience. It appears, however, that it is not the quality of teaching they are inexperienced in assessing. Rather, they may lack experience in assessing the progress made on the relevant objectives for the class. Students would have developed impressions of teaching and course quality in high school, but never have experienced assessing progress on course objectives. Moreover, the difference in SETs disappeared for the spring semester, further suggesting that inexperience among first-year students explained the fall disparity.

TABLE 1. Student evaluation of teaching based on class level.				
<i>Excellence of Instructor</i>	N	Mean Evaluation	Std. Dev.	Prob.
Introductory Classes	146	4.163	0.500	0.322
Sophomore level & above	111	4.226	0.513	
<i>Excellence of Course</i>				
Introductory Classes	146	3.902	0.446	0.442
Sophomore level & above	111	3.951	0.583	
<i>Progress on Relevant Objectives</i>				
Introductory Classes	146	3.821	0.431	0.000
Sophomore level & above	111	4.059	0.410	
<i>Progress on Relevant Objectives - Fall 2005</i>				
Introductory Classes	110	3.777	0.441	0.000
Sophomore level & above	54	4.131	0.381	
<i>Progress on Relevant Objectives – Spring 2006</i>				
Introductory Classes	36	3.953	0.378	0.675
Sophomore level & above	57	3.989	0.428	

FIGURE 1: Student evaluation of progress on relevant objectives based on class level.

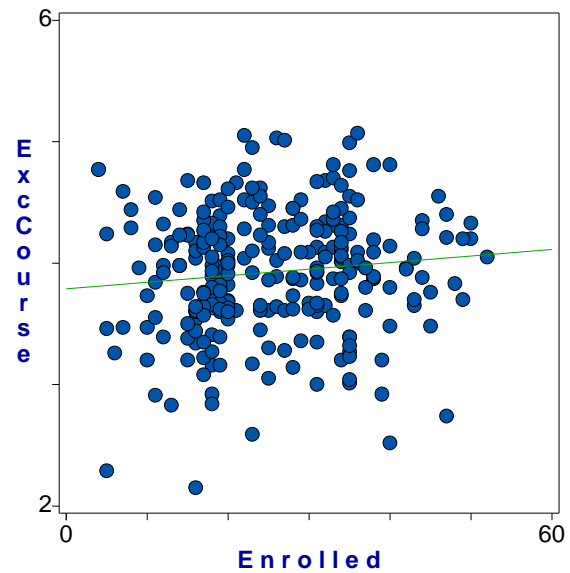


Question 2: Do SETs differ based on class size? The literature reports conflict for this question. Small, medium, and large classes were compared, but results have varied depending on the ordinal level cut-points used for classification (Fernandez and Mateo 1998). Instead, we correlated the number of enrolled students with the student evaluations. Table 2 shows the results of these comparisons. Class enrollment is unrelated to perceived progress on relevant objectives and excellence of instructor. In contrast, figure 2 shows that the number of students enrolled in a course is positively and significantly ($P = 0.038$) related to the evaluation of the excellence of the course. These results conflict with those of Shurden et al. (2005) as well as Fernandez and Mateo (1998) and are contrary to common sense, which suggests that

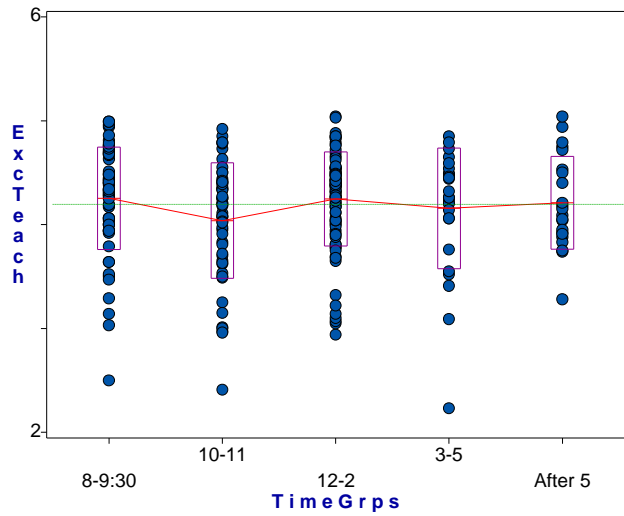
students can get more attention and help in a smaller class. Nerger et al. (2007) suggested that the variance in SETs may depend on the type of class (seminar, lab, lecture) rather than simply class size. It may be that class size would be more appropriately used as a relative measure, rather than an absolute, as with enrollment. At Lander, 60 students make a huge class, while at many schools, an enrollment of 60 would be considered a smaller medium size class. Given perceptual differences, however, the actual boundaries between class size categories might be university specific as well as class-type specific. If class size is influencing SETs, it would seem that the size-category boundaries should be student driven. Nothing in the literature indicates that student perceptions have been included while setting class-size boundaries, however. Trying to separate the class size and class type effects remains for the future.

TABLE 2. Student evaluation of teaching based on class enrollment.				
Summary Measure	N	Line Equation	r	Prob.
<i>Progress on Relevant Objectives</i>	264	$Y = 3.937 + -0.000X$	-0.011	0.430
<i>Excellence of Instructor</i>	264	$Y = 4.163 + 0.001X$	0.027	0.332
<i>Excellence of Course</i>	264	$Y = 3.790 + 0.005X$	0.110	0.038

FIGURE 2: Student evaluation of excellence of course based on class enrollment.

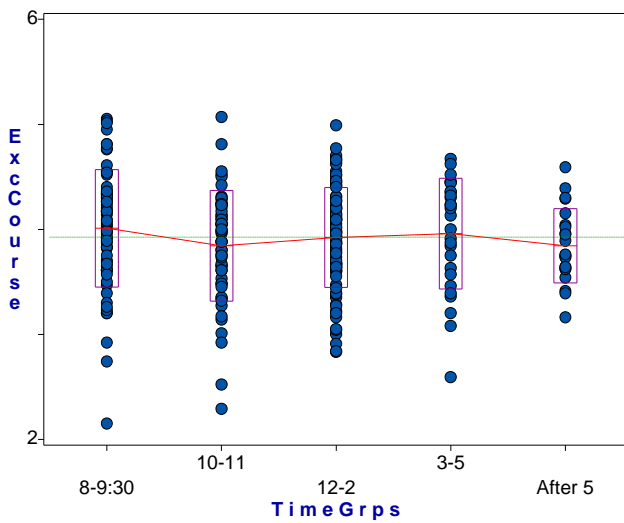


Question 3: Do SETs differ based on the time of the class? We all know that some class times are more popular than others if students have a choice. We also know that individuals experience their peak performance at different times. Might these time preferences and peak times be related to student ratings because students want to be somewhere else or engaged in some other activity? The same items influence faculty members as well and might affect an instructor’s delivery of a course, which would systematically influence SETs. For analysis, we divided class times into five categories based on student popularity. Whether these time preferences correlate with peak performance times is unexplored and unexplorable given the available data. As seen in figures 3a, b, and c, none of the relationships between SETs and class times is significant. However, student evaluations are consistently highest for the earliest time slots, typically the last populated classes when students have a choice of class times. Instructors openly talk about students sleeping in 8:00 classes or having to allow students to bring coffee to class in order to stay awake. Evaluations are consistently lowest for 10:00 and 11:00 classes, class sections that are among the first to fill. Why there would be any specific pattern between progress on relevant class objectives and class time is a mystery. Finding a pattern between the summary measures that focus on excellence of the instructor and of the course and class time seems more logical. Yet, the pattern for evaluations and excellence of the instructor ($P = 0.118$) nears significance along with progress on objectives ($P = 0.192$). In contrast, the pattern for evaluations and excellence of course is far from significant ($P = 0.417$).



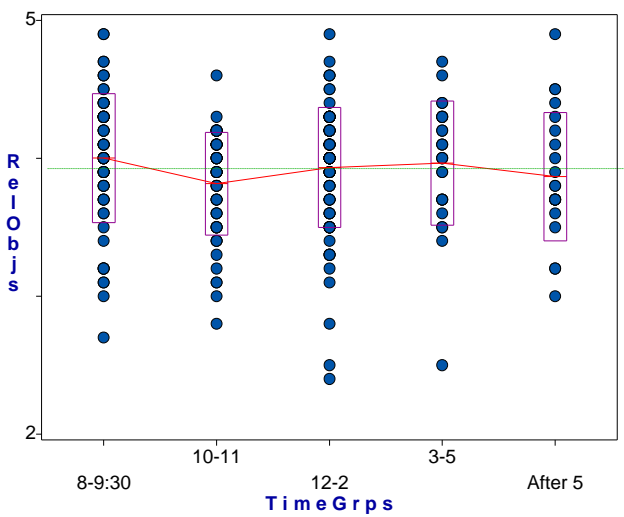
Overall
Mean
4.195

FIGURE 3a. Student evaluation of progress on relevant objectives based on class time ($P = 0.192$).



Overall
Mean
3.926

FIGURE 3b. Student evaluation of excellence of instructor based on class time ($P = 0.118$).



Overall
Mean
3.925

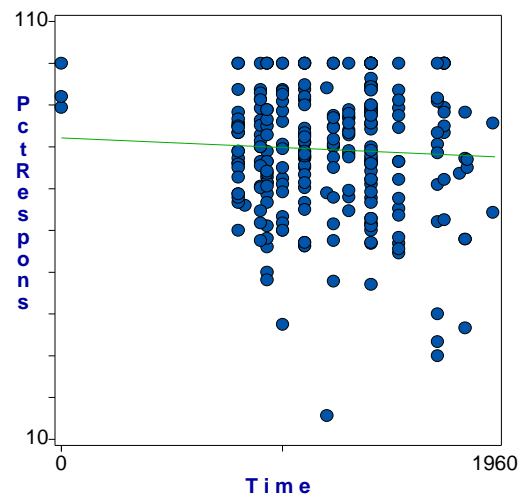
FIGURE 3c. Student evaluation of excellence of course based on class time ($P = 0.417$).

Question 4: Do SETs vary based on how frequently a class is taught? The frequency of class meetings is synonymous with the length of each class session. Shurden et al. (2005) found significantly higher SETs for the more frequent classes, but their research was limited to Lander's College of Business. We have expanded their research to include classes from across campus. Our hypothesis is that SETs will be higher for all three summary measures for classes that are taught more frequently. Table 3 includes the results, none of which shows significant differences in evaluations by frequency of class meeting. Nonetheless, results for both excellence of course and progress on objectives do support our hypothesis. Evaluations are highest for courses that meet three days a week. Only the evaluations for excellence of course, however, are near significance.

TABLE 3. Student evaluation of teaching based on frequency of class meetings (length of class).				
Summary Measure	N	Mean Rating	Std. Dev.	Prob.
<i>Progress on Relevant Objectives</i>				
One Day Class	49	3.878	0.398	0.290
Two Day Class	142	3.906	0.466	
Three Day Class	71	3.992	0.398	
<i>Excellence of Instructor</i>				
One Day Class	49	4.257	0.426	0.240
Two Day Class	142	4.148	0.535	
Three Day Class	71	4.251	0.481	
<i>Excellence of Course</i>				
One Day Class	49	3.793	0.385	0.097
Two Day Class	142	3.946	0.520	
Three Day Class	71	3.990	0.545	

Question 5: How do class times, frequency and enrollment influence the response rate of SETs? The IDEA Center (2004) cautions that ratings are not considered to be representative unless at least 75% of students respond. Only about 65% of Lander classes get a response rate of 75% and above. That leaves slightly more than one third of classes that have received too few evaluations. This presents problems for instructors who rely on these evaluations for a formative function. This may also disadvantage an instructor when administrators use the evaluations for a summative function. Student evaluations of teaching are conducted during the latter part of a semester. In the College of Business and Public Affairs, evaluations for all classes are scheduled over a two-day period. So, students taking business, political science, and sociology classes could readily become aware of the pattern and avoid the evaluations, but no such regular predictable evaluation pattern exists for other departments. Figure 4 shows the slightly negative relationship between evaluation response rate and class time (measured on a 24 hour clock). While not significantly different ($P = 0.214$), evening classes do receive lower response rates, but the relationship is very weak ($r = -0.049$).

FIGURE 4. Student response rate based on class start time.



The frequency of class meetings is significantly related to the evaluation response rate ($P = 0.001$) with less frequent classes receiving higher response rates. These results are shown in figure 5. Lander's evening classes are taught on either one night or two nights, and while those meeting one night per week have higher response rates, evening classes as a whole, shown in figure 4 have lower response rates. Figure 6 shows the results for evaluation response rate and class enrollment. The relationship is negative, moderately weak ($r = -0.237$), but significant ($P = 0.000$). The top row of data points represents the classes that received 100% response rates, a rarity. Sophomore level classes and above receive a slightly higher response rate. The results are near, but not significant ($P = 0.122$).

FIGURE 5. Student response rate based on class frequency.

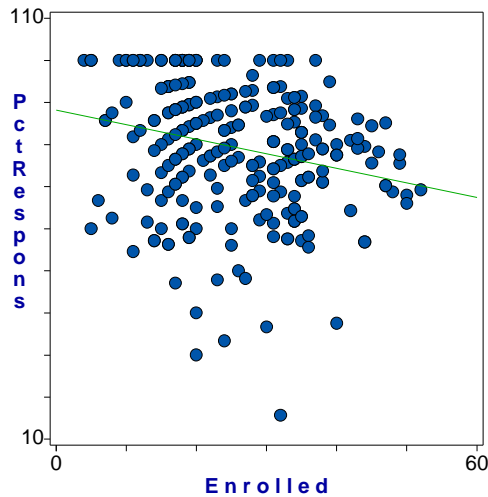
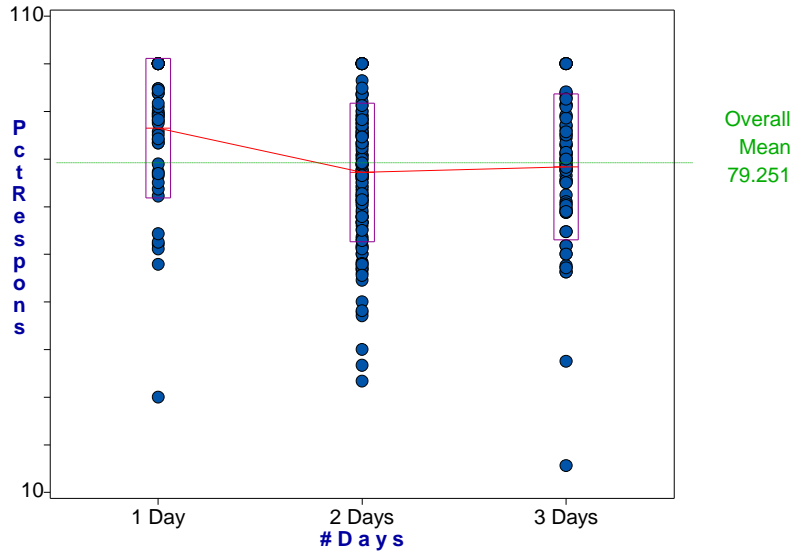


FIGURE 6. Student response rate based on class enrollment.

Question 6: The next logical question is whether evaluation response rates influence SETs? If they do, what is their influence? Table 4 shows that evaluation response rates have little effect on student evaluations of progress on relevant objectives or excellence of instructor. However, the negative effect of response rate on excellence of course is near significance. What a conundrum, a not representative set of responses may provide a higher evaluation.

TABLE 4. Student evaluation of teaching based on response rate.				
Summary Measure	N	Line Equation	r	Prob.
<i>Progress on Relevant Objectives</i>	264	$Y = 3.875 + 0.001X$	0.022	0.362
<i>Excellence of Instructor</i>	264	$Y = 4.200 + -0.000X$	-0.001	0.492
<i>Excellence of Course</i>	264	$Y = 4.137 + -0.003X$	-0.079	0.102

Descriptive Statistics for Paired and Group Data: Table 5 lists the means, standard deviations, and Z-scores for the three IDEA summary measures. For each measure, there are three sets of statistics, one for the two semesters combined, one for the fall semester, and one for spring. All data distributions are positively skewed as demonstrated by the minimum and maximum Z-scores. Two patterns emerge. First, the evaluations for progress on relevant objectives express less variation than the other two measures. Second, for each measure, evaluations for the spring semester are higher than for the fall; spring evaluations also express consistently greater variance.

Summary Measure	N	Mean Evaluation	Std. Dev.	Min Z-score	Max Z-score
<i>Progress on Objectives</i>	109	0.345	0.244	-1.412	3.499
Fall 2005	70	0.333	0.236	-1.412	2.402
Spring 2006	39	0.367	0.261	-1.405	3.194
<i>Excellence of Instructor</i>	109	0.367	0.311	-1.180	4.612
Fall 2005	70	0.334	0.273	-1.222	3.430
Spring 2006	39	0.426	0.366	-1.110	3.760
<i>Excellence of Course</i>	109	0.429	0.369	-1.163	4.283
Fall 2005	70	0.420	0.324	-1.297	3.056
Spring 2006	39	0.445	0.443	-0.983	3.532

Differences among multiple sections: We have data for 86 pairs of classes and for 27 sets of three or more sections of the same class by the same instructor. Are the evaluations for these two categories of data equivalent? Is the variation in evaluation scores for the paired classes comparable to the variation for groups of classes? Table 6 lists the mean evaluations, standard deviations, Z-scores, and significance comparing evaluations for classes by pairs and groups. The within group variation is consistently higher for groups of classes than for pairs of classes. Data for progress on relevant objectives for pairs of classes is almost normally distributed. The remaining groups of data are negatively distributed, particularly the data for excellence of instructor, the evaluations for which are virtually indistinguishable. The difference in evaluations for excellence of course is near significant ($P = 0.171$), with instructors teaching only two sections of a class faring slightly better. The only difference that is significant is for the comparison of progress on relevant objectives ($P = 0.006$). Students thought that they made more progress when an instructor taught just two sections of a class.

Summary Measure	N	Mean Evaluation	Std. Dev.	P	Min Z-score	Max Z-score
<i>Progress on Objectives</i>						
Paired data	172	3.978	0.408	0.006	-2.885	2.256
Grouped data	92	3.825	0.468		-3.046	2.298
<i>Excellence of Instructor</i>						
Paired data	172	4.196	0.481	0.980	-3.711	1.754
Grouped data	92	4.198	0.538		-3.657	1.380
<i>Excellence of Course</i>						
Paired data	172	3.960	0.496	0.171	-3.368	2.199
Grouped data	92	3.870	0.523		-3.288	2.294

Table 7 shows that the differences between the minimum and maximum evaluations based on instructors are always significantly higher when they teach three or more sections of a class rather than just two sections.

Summary Measure	N	Mean Difference	Std. Dev.	Prob.
<i>Progress on Relevant Objectives</i>				
Paired data	82	0.313	0.239	0.018
Grouped data	27	0.441	0.239	
<i>Excellence of Instructor</i>				
Paired data	82	0.331	0.317	0.034
Grouped data	27	0.476	0.267	
<i>Excellence of Course</i>				
Paired data	82	0.376	0.369	0.008
Grouped data	27	0.591	0.326	

Question 7: Our last question is whether SETs are significantly different for two sections of a class taught by the same instructor. These analyses are limited to data for pairs of classes. Table 8 shows the mean evaluations, variance, correlation, *t* statistic and probability. We analyzed data for the combined semesters, then fall 2005, and spring 2006 separately. In fall 2005, differences between an instructor's two class sections were significant for both progress on relevant objectives ($P = 0.05$) and excellence of instructor ($P = 0.02$). The differences for excellence of course were significant for the year, but not for either semester alone. For some pairs of classes, the variance among evaluations is as little as 0.01; for some it more than doubles from one class to the other (0.16 compared to 0.36).

Summary Measure	N	Mean Evaluations		Variance		r	2 tail <i>t</i> -Stat	Prob.
		Class1	Class2	Class1	Class2			
<i>Progress on Objectives</i>								
Fall 2005	86	3.96	3.97	0.16	0.18	0.55	-0.86	0.39
Spring 2006	35	4.05	3.99	0.10	0.19	0.48	0.92	0.36
<i>Excellence of Instructor</i>								
Fall 2005	86	4.17	4.22	0.22	0.24	0.56	-0.98	0.33
Spring 2006	35	4.26	4.19	0.17	0.28	0.36	0.68	0.50
<i>Excellence of Course</i>								
Fall 2005	86	3.83	4.02	0.24	0.22	0.62	-3.27	0.00
Spring 2006	35	4.05	3.98	0.16	0.36	0.35	0.66	0.52
Spring 2006	35	3.92	4.00	0.22	0.27	0.47	-1.56	0.12

DISCUSSION

Our analyses have revealed some significant differences among the SETs, but overall, confusing and conflicting results. Absolutely clear is that the three measures of teaching do not follow a consistent pattern. Table 9 summarizes our findings, showing the influence of each external variable on each measure of teaching. Larger classes, classes that meet more frequently, and classes with lower student response rates show significant or near significant relationships with excellence of course ($P = 0.038$, 0.097, and 0.102 respectively), the measure most influenced by external factors. Evaluation response

rate, itself, is associated with other external factors. They are higher for classes that meet less frequently ($P = 0.001$) and for smaller classes ($P = 0.000$) suggesting that external factors influence evaluations both directly and indirectly, creating a very complicated relationship. Evening classes in general receive lower evaluations, but those sections meeting one night per week have higher response rates and receive higher evaluations for excellence of course.

Students in classes designed to be taken by sophomores or higher level students think they have made more progress on relevant objectives for the year ($P = 0.000$), particularly in fall 2005 ($P = 0.000$), compared to students in introductory classes. This finding supports suggestions that the lack of evaluation experience among beginning college students affects SETs. Class type, whether pairs or groups, is significantly related only to progress on relevant objectives for the year ($P = 0.006$), as opposed to single semesters, with instructors teaching two sections receiving higher evaluations.

TABLE 9. Summary of the influence of external variables on the IDEA measures of teaching.

<i>External Influence</i>	<i>Progress on Objectives</i>			<i>Excellence of Instructor</i>			<i>Excellence of Course</i>		
	Year	Fall	Spring	Year	Fall	Spring	Year	Fall	Spring
Class level (intro/soph+)	0.000	0.000	n.s.	n.s.	--	--	n.s.	--	--
Class enrollment	n.s.	--	--	n.s.	--	--	0.038	--	--
Class time	n.s.	--	--	n.s.	--	--	n.s.	--	--
Class meeting frequency	n.s.	--	--	n.s.	--	--	0.097	--	--
Response rate	n.s.	--	--	n.s.	--	--	0.102	--	--
Pairs vs groups	0.006	--	--	n.s.	--	--	n.s.	--	--
Class 1 vs class 2	n.s.	0.05	n.s.	n.s.	0.02	n.s.	0.00	n.s.	n.s.

Excellence of instructor does not demonstrate a significant relationship with any of the external variables that we analyzed. This allows the possibility that this variable does specifically measure quality of teaching. Evaluations may in fact, be less questionable in terms of validity if this single measure were the output. Progress on relevant objectives is significantly related to whether or not a class is introductory or higher level and whether an instructor teaches two or more than two sections, with those teaching two sections or higher level classes receiving slightly higher evaluations.

If instructors wanted to maximize their evaluations, they would teach only two sections of a class in one semester. They would teach classes that meet one night per week or early on Monday, Wednesday, and Friday mornings. They would never teach at 10:00 AM or 11:00 AM, or classes that meet twice per week in the evening. They would teach upper level classes that are relatively large and they would hope for a relatively low response rate. SETs were originally designed to help instructors improve their teaching and their classes, but when a number of external factors influence those evaluations, how do instructors decide what changes to make? Should they average their evaluation scores over a school year or over several semesters of teaching a specific class? What if a class is small one semester, but large another or if one section is small, but another section large? What if the class meets at 8:00 AM one semester, but at 10:00 AM another semester? How are instructors to make sense of these evaluations? It is scary to realize that administrators are increasingly relying on these SETs to make decisions about an instructor's value, tenure, promotion, and pay raises.

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MAPPING IT SKILLS TO ABET PROGRAM OUTCOMES

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Many computing programs are interested in accreditation by the Computing Accreditation Commission of ABET, Inc (ABET CAC). The ABET accreditation guidelines require programs to formulate a set of program level outcomes that graduating seniors are supposed to have achieved, based on the needs of their constituencies, and to assess the extent to which graduating students have achieved these. The criteria provide some guidelines on the program level outcomes as they include a set of minimal outcomes on which program can build but from which they cannot subtract. This raises two questions, namely how does a program (i) assess the degree to which a student has achieved these outcomes and (2) determine the specific skills that an important constituency for any program, namely employers, seek in new hires that are relevant to these outcomes.

This paper describes a process used to develop a skills/knowledge survey instrument that IT programs can use to administer to companies that hire their graduates to assess the degree to which graduates have achieved the outcomes formulated by the program. In addition, this survey instrument can be administered to IT managers world-wide to determine which skills are important for new graduates to have. The process used to develop the set of skills/knowledge areas involves having faculty map a comprehensive list of skills/knowledge areas from previous research to the program outcomes set forth by ABET CAC. The final result will be a set of skills/knowledge areas that can be directly mapped to specific ABET CAC program outcomes. These skills/knowledge areas can be used in surveys for assessment purposed in departments seeking ABET CAC accreditation.

ACCESSIBILITY FOR ONLINE STUDENTS WITH DISABILITIES: RECOMMENDATIONS FOR EDUCATORS

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ABSTRACT

The increasing demand for distance education, paired with the increasing numbers of students being identified as having exceptionalities, requires that faculty be keenly aware of accessibility issues for students with disabilities. This paper examines some of the most critical accessibility issues in an online environment, such as Attention Deficit/Hyperactivity Disorder, Visual Impairment, and Mobility Impairment. The responsibilities of the various parties involved in the learning process are discussed, and some recommendations are offered on accommodations that better promote accessibility for all distance education students.

INTRODUCTION

A primary purpose of distance education is to allow students access to educational materials, no matter what their physical proximity to a college or university may be. If these courses are designed with accessibility in mind, the playing field can truly be leveled for college students with disabilities, whether these disabilities are cognitive, learning, or physical in nature. Some examples of the issues facing our students include visual and hearing impairments, mobility impairments, mental health/psychiatric impairments, and learning disabilities. Designed correctly, distance learning courses can create learning opportunities for these students. If the design of these courses ignores the needs of those with disabilities, the courses themselves become additional barriers to accessing an education. Our goal must be to make learning accessible to anyone and everyone.

With the ever-increasing numbers of individuals with disabilities, there will undoubtedly be increases in the number of college students with disabilities. According to the U.S. Census Bureau, nearly 1 in 5 persons in the United States has some type of disability; 14.3 million Americans age 15 and older have a mental disability, 3.5 million of which have learning disabilities. Accessible design can help everyone, not just those with disabilities.

Students with disabilities often face difficult challenges navigating a large university campus, so online courses seem an attractive alternative to the traditional classroom. As Peter Drucker stated in 1997, "Distance learning is coming on fast." This point is well taken when one considers the rapid growth of online learning in education and industry during the last decade. Several factors have caused a rise in virtual instruction, including greater access to and affordability of personal computers, and more demand for flexible courses to accommodate the hectic lifestyles of adult students (Ricketts, Wolfe, Norvelle, and Carpenter, 2000).

There are many advantages associated with distance education. Some of these positives include increased convenience, access to courses which may not be available locally, and flexibility for those who wish to combine an education with full-time employment and family responsibilities (Jenkins and Downs, 2003). Virtual education also provides a platform that assists professors in presenting material in alternative ways that better meet the diverse learning styles of their students. In addition to these advantages, studies have shown that distance education students are often self-disciplined and motivated, and achieve comparable, and often better, educational results than their peers in a traditional classroom.

Distance education will continue to play a critical role in the growth of student enrollment at universities throughout the United States. Research has shown that online education is often the most expedient way for students to earn a degree (Jenkins and Downs, 2003). As distance education increasingly becomes a standard part of our business curriculum, it is imperative that we learn more about the students in these courses and develop creative ways to deliver course content.

COMMON STUDENT DISABILITIES

Federal and state laws require that public universities provide reasonable accommodations for students with disabilities. Accommodations, however, do not require professors to drastically change their course content or expectations. Rather, accommodations are generally associated with the manner in which the course content is delivered.

Accommodation provides a method whereby a disabled student can demonstrate his or her knowledge and abilities when traditional methods are inadequate. Accommodation in no way implies giving someone an unfair advantage over other students. Students with disabilities are required to meet the same academic standards as other students. Each student has a specified plan designed to illustrate accommodations that can be provided for their particular disability.

Students with disabilities are affected in how they take in information, how they process it, and how they retain and/or express their understanding of the information. Challenges include accessing information contained in spoken words, printed words, videotaped/televised or webcast information, audiotaped information and computer-based information. The most common difficulties encountered with such students include reading comprehension, spelling, writing, math computation and/or problem solving. These students may also have difficulties with organization, time management and social skills. Some online students with disabilities may not be able to see graphics or hear audio, and many may have difficulty navigating unorganized sites. Students with disabilities encounter many challenges in gaining knowledge and demonstrating that knowledge.

Many students with visual impairments are not completely blind. The degree of visual impairment will determine the types of accommodations needed for each individual. Some individuals will be able to read with enlarged print, while others who are completely blind will need their textbooks and exams converted to Braille or read to them by a screen reader. This will require ALT tags and descriptions of images. An ALT tag is a sequence of key strokes used in HTML coding to indicate to a screen reader that a non-text item is present in the document, such as a line, border, graph, picture, etc. If an ALT tag is not used with a non-text object, a screen reader will see it as an "unidentified object" and the student will not know what the screen reader has encountered and whether it is important or not.

Color blindness is the inability to perceive differences between some or all colors that other people can distinguish. It is most often of a genetic nature but may also occur because of eye, nerve, or brain damage. Many different types of color blindness exist, such as "green-red" (cannot distinguish between

green and red), “yellow-blue” (cannot distinguish between yellow and blue), and monochromic blindness (cannot distinguish any colors at all from gray).

Not all students who are deaf or hearing impaired require the same types of services. Most will require captions for audio and/or video and possibly extended exam time.

Attention Deficit/Hyperactivity Disorder (AD/HD) is generally characterized by an inability to pay close attention to detail, difficulty sustaining attention, forgetfulness in daily activities and other related symptoms. Students who are diagnosed with AD/HD may require some accommodation to accomplish academic requirements. AD/HD is often the most commonly encountered disability at many universities. There are many different strategies that an instructor may use within the learning environment to address Attention Deficit Disorder such as visual aids, structured assignments, and clear outlines of requirements and timeframes or schedules so students can plan ahead and pace themselves.

The orthopedic and mobility impairment group is composed of a multitude of disability types. Spinal cord injuries, cerebral palsy, multiple sclerosis, arthritis, AIDS, and amputated limb are examples of these types of impairments. Because of the wide range of function within this group, accommodation is different for each individual.

There are no specific teaching techniques for working with this disability group, but special consideration should be given with regard to each individual's needs. Communication with students is essential for providing accommodation for each individual. In addition to extended exam taking time, the professor should ensure that the Blackboard site can be navigated by keyboard alone.

FEDERAL DISABILITY LAWS

Three major laws deal specifically with the issues of accessibility. These laws include the Americans with Disabilities Act (ADA) of 1990; Section 508 of the Rehabilitation Act of 1973, and Section 255 of the Telecommunications Act of 1998.

The ADA states that all public colleges and universities must make reasonable accommodations for students with disabilities, and provide full access to all programs. This means that all students must have access to the same information and communication involved in the course. University of Washington's DO-IT (Disabilities, Opportunities, Internetworking and Technology) program states that an accommodation for an individual is NOT “reasonable” if providing it would: 1) pose a direct threat to the health or safety of others; 2) result in a substantial change in an essential element of the curriculum; 3) require a substantial alteration in education opportunities or service provision; and/or 4) impose an undue financial or administrative action.

Congress amended the Rehabilitation Act in 1998 to require federal agencies to make their electronic and information technology accessible to people with disabilities. Inaccessible technology interferes with an individual's ability to obtain and use information quickly and easily. Section 508 was enacted to eliminate barriers in information technology and to make available new opportunities for people with disabilities. Under Section 508 (29 U.S.C. '794d), agencies must give disabled employees and members of the public access to information that is comparable to the access available to others.

Section 255 of the Telecommunications Act requires that the manufacturers of hardware and software ensure the products are usable by persons with disabilities. This may involve accessibility aids commonly used by persons with disabilities. This applies to any hardware or software that transfers information over the internet, networks or phone lines. Our publishing representatives have assured us

that their companies comply with this law and that all course content materials, including Blackboard cartridges, are fully accessible.

EXPLANATION OF RESPONSIBILITIES

The following lists include the responsibilities of the various parties involved in the delivery of accessible online education. Some responsibilities are shared between the various parties, while others are the responsibility of certain individuals. The simplest way to ensure that the process is effective is for everyone to work together to provide the necessary accommodations.

Student Responsibilities:

- 1) Register with Disability Support Services (DSS) at his/her respective institution.
- 2) Notify the instructor of disability and accommodations required.
- 3) Obtain and use needed assistive technology and necessary equipment.
- 4) Request proctor for exam.
- 5) Notify DSS of test accommodations for proctor (read aloud, screen reader, etc.).
- 6) Pay any costs associated with the use of a proctor or assistive technology or tutoring.
- 7) Save and/or print all information for the course in a format compatible with the assistive technology used (print in black ink only, save documents as text only, etc.).
- 8) Notify instructor immediately of any problems they encounter accessing course information whether it is from documents, links, etc.

Office of Online Programs Responsibilities (or comparable unit at your campus):

- 1) Obtain and coordinate proctors for students with disabilities.
- 2) Create a presentation for faculty teaching distance education courses informing them of requirements and alternative teaching strategies to ensure accessibility of online courses.
- 3) Record faculty attendance of presentation and report to the Dean's office.
- 4) Train graduate assistants to assist faculty in performing accessibility functions such as checking documents, creating ALT tags, getting videos and multimedia captioned, etc.

Office of Disability Support Services Responsibilities (or comparable unit at your campus):

- 1) Verify that student has a disability and the nature of said disability.
- 2) Determine accommodations needed by student and provide student with documentation to present to instructor, including those accommodations specific to online material.
- 3) Assist with captioning of video, ALT tags and other conversion of course materials, including textbooks, into accessible formats.
- 4) Identify and recommend appropriate hardware and software to meet students' needs.

Faculty Responsibilities:

- 1) Ensure course content is accessible to students with disabilities.
- 2) Include an ADA statement on all syllabi.
- 3) Implement all accommodations required by student.
- 4) Offer text equivalents and alternative deliveries of content.
- 5) Provide alternative ways for students to earn chat credit if this is a graded item.
- 6) Utilize accessibility software or website to ensure online materials are accessible.

- 7) Provide a disclaimer for any video material that may flicker or be viewed over a slow internet connection (flickering is associated with epileptic seizures).
- 8) Respond promptly to any accessibility problems encountered by any student.

SUGGESTED ACCOMMODATION POLICIES

Many accommodations for online students often require practicality and flexibility. The following recommendations will be stated in “Required” and “Recommended” terms. The “Required” items will include those things which every online course must have or do to be in compliance with the federal disability laws and/or college policies. Non-compliance with the college requirements would result in loss of online teaching privileges at the discretion of the administration. These required items pertain to all components used in an online course. The “Recommended” items will include those things that will allow a student with a disability to most effectively complete the course. These items will be listed by individual components or programs.

General Requirements:

The components of the latest version of Bb (6.3) are ADA compliant, except the Chat function. Blackboard is currently in the process of addressing this issue. If Chat is a grade component, there must be an alternative equivalent, such as recording and archiving the chat and allowing the disabled student to write a response or discussion. Professors should record Chats even if a grade is not involved, so that all students have access to what was discussed in the Chat. Individual websites are allowed, but the professor is responsible for ensuring that the web pages are accessible. Faculty web pages, as well as college web pages, should be assessed for accessibility.

The primary requirement for each faculty member involved in online teaching is to provide an equivalent alternative delivery method for information presented in the course. The information may need to be provided in text, video, and audio formats. If other methods are not available, a text equivalent is required. Multimedia files (audio, video, streaming, etc.) must at a minimum have a text equivalent document. The key is to provide the student with a disability the same opportunity as the student without a disability, so they are able to understand, learn, and apply the information.

It is suggested that some type of “universal design” be used so that faculty do not have to “reinvent the wheel” whenever a student with a disability is encountered. This simply means that professors should be proactive in the manner in which they design their course so that the most common accommodations have already been met. In accordance, all documents must include the following characteristics: clean, undecorated font types that are easy to read; high contrast between text and background; column and row headings for tables or charts; ALT tags for images; ease of navigation through the document using the keyboard only; page or screen organized into manageable “chunks” of information; diagrams labeled so they are not dependent on color; and elimination of flickering, flashing, or unnecessary motion.

In addition to course delivery, professors need to be aware of the required accommodations for exams and quizzes. As with the face-to-face classes, instructors must provide extended time for all timed exams and quizzes. Generally, extended time consists of time and a half allotted for the completion of the graded assignment.

Accessibility Requirements:

No matter what tool is used to deliver the information to the online student, the following items are required to ensure accessibility and compliance with federal and state laws.

1. Provide an equivalent delivery alternative for all course materials (such as text alternative or captioning for video).
2. Use common fonts (Arial, Times New Roman, Helvetica, etc.) and avoid extremely decorative fonts.
3. Utilize high contrast between text and background.
4. Organize text into manageable chunks with headings to separate the information.
5. Use column and row headings for tables and charts.
6. Use ALT tags, captions, or description with images.
7. If animation is used, text equivalent must be provided.
8. Ensure that documents with color are understandable for people who cannot perceive color (color blindness). If color is used to convey important information, an alternative indicator such as an asterisk (*) must be used.
9. Use the clearest and simplest language appropriate for the document's content and refrain from using slang or regional language.
10. Make each hyperlink descriptive of the content to which it links. For example, when referring a student to a web page, give a brief explanation of the content of the web page or the actual web page address. Do not use "Click here" since a screen reader would not understand "here."
11. If creating PDF documents with Adobe Acrobat, use version 5.0 or higher since earlier versions are not ADA compliant. The later versions have features that are critical for the accessibility of PDF documents. They also have an accessibility checker which was not present in previous versions of the product.
12. All documents must include page numbers to facilitate navigation.

Program-specific Recommendations:

In addition to the general requirements above, faculty are responsible for ensuring that all tools used in distance education meet the necessary accessibility requirements. We are providing recommendations for some of the most commonly used programs and features in an online environment. These recommendations deal with the delivery of the online course, not the content. By designing online courses with accessibility in mind, fewer changes will be necessary in the future if a student with a disability enrolls in the course. Full access must be provided to students with disabilities to the extent that accommodations are "reasonable" and "doable."

Microsoft Word

1. Make text equivalents short and to the point.
2. Use automatic bullets and numbering to format lists and outlines (for screen readers).
3. Create a table of contents.
4. Specify the meaning of each acronym or abbreviation when first used.

Microsoft Excel

1. Label each worksheet with a meaningful name.
2. Provide descriptive notes for each chart or graphic displayed.
3. Repeat column and row headings for end of column or end of row totals.
4. Avoid abbreviations and acronyms when possible in headings.
5. Expand column widths to accommodate full length of text. Screen readers cannot distinguish wrap-around text.

Microsoft PowerPoint

1. Presentations in HTML format must use ALT tags.
2. Make sure all links are clearly visible and are not hidden behind other objects.
3. Provide text equivalent for any audio (applause, speech, sounds).
4. Avoid unnecessary animation.
5. Avoid using backgrounds that are overly busy or cluttered.
6. Create a consistent style in the presentation.
7. Specify the meaning of each acronym or abbreviation when first used.
8. Ensure black and white view of presentation conveys all information properly.

Adobe Acrobat

1. Tag all documents, lists, and data tables using Acrobat's Tag Palette.
2. All important or relevant parts of the document should be part of the document structure (if importing files, make sure all headers, page numbers, etc. are tagged).
3. Group similar illustrations together into one illustration using the Group command (allows for one entry of alternative text).
4. If the PDF is sufficiently long, create an index for easier navigation.

Audio/Video (Camtasia, streaming video, webcasts, etc.)

1. Allow students to pause audio or video if possible.
2. Make sure audio is clear and easy to understand.
3. Provide text equivalent for audio if reasonable.
4. Provide text equivalent or captioning/subtitles for video.
5. Make sure video is of sufficient brightness.
6. Make videos available in common formats (WMV, MPG).

E-mail

1. Provide high contrast between text and background.
2. Use proper grammar and punctuation so that a reader for visually impaired students can read the message properly.
3. Include a signature line on all e-mail messages (to assist screen readers).
4. Include a text equivalent for all images in an e-mail.
5. Ensure that all e-mail attachments are accessible.

Blackboard Chat

1. Chats should be recorded.
2. Attempt to keep a moderate pace in the chat.
3. If importing visual or sound items, provide a text equivalent.
4. If participation in chat is part of the student's grade, alternative options must be available.

In addition to these requirements and recommendations, faculty should always attempt to proactively accommodate students' diverse needs.

FUTURE OUTLOOK

If online instruction continues to grow as projected, a college or university can expect the number of students with disabilities to grow as well. Government regulation (ADA, FCC) in the area of online education will continue to be redefined and expanded upon. To ensure compliance with the federal and state laws, it is imperative that all colleges and universities be proactive in staying abreast of changes in the requirements for online accessibility for students with disabilities. Eventually it may be determined that a compliance officer at the university or college level is necessary to evaluate all online instruction. In order to effectively meet the needs of our students with disabilities, colleges and universities must continue to develop and strengthen relationships with all constituents involved in the instructional process.

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**DIGGING DEEPER: ARE MINORITY BUSINESS CASES BEING
DISSEMINATED?**

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Submitted to:
SE INFORMS
43rd Annual Meeting
October 4-5, 2007

Track: Innovative Education

ABSTRACT

Less than 1% of published business cases deal with minority owned or operated businesses. Yet, minority groups will account for a higher percentage of the population than the non-Hispanic white population by 2060 and the number of minority business companies is increasing at a faster rate than non-minority owned companies. We surveyed minority business owners and managers in an effort to explain why so few minority business cases are written and published, and what may need to be accomplished to encourage their development. We learned that 8.5% of respondents reported that they had participated in business case development. If this percentage were extrapolated to the southeast portion of our minority business database, this would indicate that over 900 cases had been developed. Why this discrepancy? We conducted a second survey of those respondents indicating case participation to learn if the cases were completed, used in the classroom, and/or published.

Subject Areas: Minority Business Cases, Survey

1. INTRODUCTION

As the U.S. population is growing, from 281 million in 2000 to 432 million in 2060 [27], its demographics are changing. Racial and ethnic minority groups will contribute more to the population growth than the non-Hispanic White population [27]. The U.S. Census Bureau projects that by 2010 minorities will comprise 34% of the U.S. population [28] and by 2060 minorities will comprise 53.2 percent of the population making them the dominant population [27].

As the various minority groups have grown in numbers, their impact on the U.S. economy has significantly increased. The number of minority-owned firms grew between 24% and 45% versus 10% for all U.S. firms between 1997 and 2002 [17]. Black-owned businesses totaled 1.2 million in 2002, Hispanic-owned businesses grew to 1.6 million, and Asian businesses reached 1.1 million in number [17]. In addition, Black-owned businesses reported \$92.7 billion in revenues in 2002, while Hispanic companies brought in \$226.5 billion, and Asian-owned businesses had the highest reported receipts at \$343.3 billion [17]. According to the *2002 U.S. Study of Entrepreneurial Dynamics*, sponsored by Kansas City's Kauffman Foundation, "minorities, especially African-Americans, are 50% more likely than Whites to engage in start-up business activities" [25]. Finally, according to a 2002 Babson College study African-Americans with advanced degrees, such as an MBA, are 2.6 times as likely as Whites to start a business [1].

Bates [5] has clearly shown the link between educational attainment and entrepreneurial success in the African American community. Emerging Black enterprises differ from traditional Black companies; they are typically started by better-educated owners (i.e., four or more years of college) whose initial investments and skill levels are higher than those traditionally seen. As a result these emerging firms tend to be more profitable and larger than their traditional counterparts [5]. In fact, logistic regression results by Bates indicate that a college education is strongly positively associated with firm survival among small Black owners of emerging businesses [5].

The increasing number of minorities pursuing college degrees (both undergraduate and advanced) at American colleges and universities will likely continue and play a significant role in successful minority entrepreneurship. For the 2003-2004 academic year minorities earned 25.59% of all bachelor degrees conferred [20]. Choy [10] reports that by 1999-2000 minorities already represented approximately 30% of undergraduate students. Finally, in the 2003-2004 academic year minorities represented 23.07% of all recipients of master's degrees in business.

Minorities represented 9.16% of all doctoral degrees in business conferred in 2005. The Ph.D. Project [Ph.D. Project; www.phdproject.org] has aided in increasing the number of minority business school faculty by taking steps to attract minority students to business doctoral programs. Since the inception of the Ph.D. Project in 1994 the number of minority business school faculty increased from fewer than 300 to over 600. The impact of the program is expected to continue, given the significant number of minority students in the graduate school pipeline with high interests in academic careers. According to Pullman [23], the growth rate of minority college and university instructors over the ten year period from 1993 to 2003 was 14% for African-Americans, 45% for native Americans, 61% for Hispanics, and 63% for Asians. Thus, the number of minorities enrolled in doctoral business programs and employed in academic positions also continues to increase in significance.

Racial and ethnic minorities represent an increasing proportion of the population, new business starts, college students and graduates, college professors, business executives, employees, the U.S. GNP, and other economic indicators. This increase in the economic, social, educational, and, undoubtedly, political importance of minorities poses many timely and critical questions to college and university educators.

2. DIVERSITY ON CAMPUS, IN THE CLASSROOM, AND IN THE CURRICULUM

With the growing number of minority college students, college classrooms are becoming increasingly racially diverse. The need for and benefits of classroom diversity are well researched and documented. The American Council on Education [ACE] and the American Association of University Professors [AAUP] commissioned a study [1], which surveyed over 1200 faculty using the Faculty Classroom Diversity Questionnaire, the first comprehensive survey ever conducted of the attitudes toward and experiences with racial and ethnic diversity of faculty members at America's leading research universities. Their study reports several specific benefits of classroom diversity:

- Diversity provides interactions important for developing critical thinking and leadership skills.
- A broader range of ideas and perspectives is generated and examined.
- Racial stereotypes are challenged.
- Students learn that there are similarities across different racial or ethnic groups and differences within groups.

Other studies (e.g., [15], [9], [4], [29], and [16]) support the need and benefits of classroom diversity. Taken together, these works reveal that racial and ethnic diversity in the classroom lay a foundation for comprehending diversity issues in various environments and on a broader level. The reader is directed to [19] for a detailed review of these studies.

3. CLASSROOM PEDAGOGIES THAT ENHANCE THE DIVERSITY CLIMATE AND MULTICULTURAL LEARNING

Sheridan [24] and Buttner [8] point to the importance of establishing a diversity climate within the classroom and selecting pedagogies that enhance multicultural learning. Some classroom pedagogies that could be used to integrate discussions of diversity with business management concepts include: (1) discussing an article that focuses on issues confronting minority owned/operated businesses, (2) having student teams interview the owners and/or managers of minority enterprises to learn which problems may be unique to them, (3) assigning student teams to interview the management of minority firms and write mini-cases concerning important and perhaps unique problems they encountered and how they solved them, and (4) inviting the owners or managers of minority firms (individually or as members of a panel) to the classroom to speak to students and perhaps faculty about the unique business problems they face [13]. Finally, the use of business cases, long heralded as a significant research and teaching methodology (e.g., [18], [12], [6], [14], [13], [26], [30]) at the undergraduate or graduate level could provide a comprehensive pedagogical approach for studying and discussing minority business issues, diverse cultures, and their interrelationships.

3.1 The Case Method – An Accepted Research and Pedagogical Approach

Business case studies represent both an accepted research approach and a prominent, widely, used, instructional pedagogy that provides many recognized and desirable academic advantages [30]. These include: active participation in the learning process; a multifunctional perspective of business; enhanced communication skills; augmented analytical reasoning; simultaneous examination of economic, behavioral, cultural, political, and ethical/legal issues; criteria selection; the generation and analysis of alternatives; and the formulation of an implementation plan [6].

Several facts to support, not only the acceptance, but also the abundant and widespread use of the case method of teaching and learning include the following:

- Harvard Business School Publishing alone sold over 6,000,000 cases in 2001; this does not include the 500,000 cases that were downloaded gratis to business instructors [11].
- There are over 30 organizations worldwide that are considered case associations or case clearing houses [14].
- There are worldwide at least 10 journals that are purebred business case journals or accept business cases for publication [14].

Prior published research has shown that less than 1% of business cases published in the most prominent university journals and online sources deal with minority business issues [13]. This in spite of the many significant issues minority businesses can face [13]. Totten [26] reviewed 214 cases that appeared from 1995 to 2002 in three refereed case publications, *Annual Advances in Business Cases*, *Business Case Journal*, and *Case Research Journal*. Of these 214 cases, only three (1.4%) “clearly involved minority-owned businesses” [26, pp. 160-61].

This dilemma of a growing importance of racial and ethnic minorities in population, business starts and revenue, college graduates and professors, etc., and yet a paucity of minority business cases provokes a series of questions:

- Why is there currently not a greater inventory of racial minority business cases?
- Have there been any efforts outside the traditional case sources to publish such cases?
- Are minority business owners and managers interested in participating in the development of business cases?
- Have a number of minority businesses already participated in case development, but perhaps the cases were simply never completed, used, or published?
- What inhibits such case development?
- What could promote the development of such cases?

One possible answer to the first question may simply be that there has not been a great pool of successful minority-owned businesses from which to draw. Another is that minority-owned businesses may not want cases to be written concerning the issues they faced. A third is that the number of racial minority professors with an interest in case writing may be small. Fourth, non-minority faculty may not have sufficient interest to develop cases concerning minority businesses. Fifth, many case writers may legitimately feel that their case(s) can be insightful to students of any racial or ethnic background. Additionally, case writers may take an interest in the new, *hot* issues and, therefore, global markets, internet-based business, and the market penetration of Eastern Europe and China may be of greater motivation. Buttner [8] offers another perspective; she writes that while minority student enrollments have been increasing, the U.S. higher education system has been slow to adapt. Finally, Pope and Thomas [22] add that U.S. colleges and universities are dominated by Eurocentric values, beliefs, norms and traditions and, thus, exhibit the values, norms, etc. of a White culture. Whatever the reasons for the scarcity of minority business cases, this remains an area of open and significant inquiry.

To address the second question – yes, there have been efforts to produce racial minority business cases. One effort is the book, *African American Enterprises* [2], which consists of eight cases and articles focused on African American businesses. The motivation for the text stemmed from an interest of several faculty at Historically Black Colleges and Universities to enhance the business school curriculum by increasing emphasis on the case method. Over 10,000 copies of the text were distributed primarily to faculty at Historically Black Colleges and Universities (HBCUs) and to institutions with a strong focus on case development and teaching, such as Harvard University and Babson College. The editor and supporters of the aforementioned casebook are attempting to raise funds in order to produce another book of African-American minority business cases. Another effort stems from Babson College, which received a grant from the Ford Motor Company to develop minority business cases, which can be integrated into the collegiate curricula throughout the U.S. [1]. These efforts, while credible and commendable, are not far reaching or are in their early stages and do not provide answers to the important, aforementioned questions.

4. FIRST SURVEY RESEARCH METHODOLOGY AND INITIAL RESULTS

Efforts to answer the questions concerning the paucity of minority business cases are primarily anecdotal [13]. In an exploratory attempt to scientifically assess: (1) the interest and willingness of minority business owners and managers to participate in case development, (2) their concerns, (3) if they had ever been approached to participate in developing cases, and (4) what would make them more willing case participants, we surveyed minority business owners and managers in the southeast United States. The 2002 National Directory of Minority-Owned Business Firms (NDMOBF) database of minority businesses was used as the source of minority businesses [7]. We elected to concentrate on minority businesses located in the Southeast U.S. This portion of the entire database contained 10,882 minority businesses in the states of Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and Washington, D.C.

We developed a stratified sample of southeastern minority businesses based on company size, which was measured by the number of employees. In the southeast portion of the NDMOBF directory 7,296 firms reported their numbers of employees. We categorized companies by size into nine categories ranging from no full time employees (only part time employees) to over 1,000. Since the “501 to 1,000” and “Over 1,000” employee categories contain fewer than 20 listings, we chose to include all of them in the survey. To assure that the survey would reflect each company size category, an equal number of companies were randomly drawn from each of the remaining “number of employee” categories. In total 2,386 businesses were drawn from this database and mailed a copy of the survey questionnaire. This represents approximately 22% of the minority-owned businesses listed in the southeast portion of the NDMOBF directory and approximately 33% of those companies who provide employee data.

The survey questionnaire is divided into three sections: (1) the demographics of the respondent (the business owner, partner, manager, etc.), (2) the characteristics of the business (business form, main activities, size, sales, etc.), and (3) the experience and attitude of the respondent regarding the development of a case concerning his/her business.

Some of the specific questions we sought to address in the survey include the following:

1. What percent of minority business owners and managers have *participated* in developing cases concerning their businesses?
2. What percent of minority business owners and managers have been *asked* to participate in developing cases concerning their businesses?

3. What concerns do minority business professionals have in participating in case development?
4. What significance does the confidentiality of business details, names, and/or financial results play in their decisions to participate in case development?
5. What demographic traits and/or business characteristics tend to indicate an interest in participating in minority business case development?
6. What can be done to encourage participation in case development?
7. Are there any differences in the responses to the aforementioned questions due to: (1) the respondents' gender, race or ethnic group, age, business experience, management position (e.g. owner vs. manager), level of education, and college major(s) and/or (2) the business structure (proprietorship, partnership, corporation, LLC, etc.), industry category (e.g., manufacturing versus service), service type (if a service business), and business size (i.e., number of employees, annual sales).

Statistical procedures such as ANOVA analysis, cross tabulations, and logistic regression analysis, were employed to examine the survey results.

A total of 267 usable survey questionnaires were returned. This constitutes 11.2% of questionnaires mailed. However, the life of small business is fleeting and volatile and 600 survey mailings were returned as "undeliverable, addressee deceased, addressee relocated, etc." Thus, the usable returns were actually 14.9% of *delivered* survey mailings. Demographic data is presented in Table 1. The entire results of the first survey are available in [19] and will not be repeated here. A follow-up to the initial survey was conducted and we explain its design and results now.

5. SECOND SURVEY RESEARCH DESIGN

From the initial survey, it was revealed that 8.5% of respondents reported that they have participated in case development. If all the cases in which respondents participated were completed and published in academic journals, this alone would produce 21 cases. If this case productivity was extrapolated to only the southeast portion of the NDMOBF database, this would suggest over 900 cases were developed. Yet, Totten's research spanning seven, recent years (1995-2002) of widely-known and respected case research journals reveals only 3 cases dealing with minority business issues. Why this large disparity? We offer several possible explanations:

- A disproportionately large percentage of the respondents who had participated in case development completed the survey and, thus, the reported case productivity is not representative of the minority business population as a whole.
- The respondents are interpreting "developing business cases" more broadly than intended and are not answering the question accurately.
- The case efforts were begun, but never completed.
- The cases were completed and used at only a single or very few academic institutions.
- The cases were not submitted for presentation at academic or professional conferences or publication in business case research publications (books, journals, case data bases, etc.)

Table 1: Demographics, Business Data and Respondent Attitudes

Variable	Category	Frequency	Percentage
Gender	Female	85	32.8
	Male	<u>174</u>	<u>67.2</u>
		259	100.0
Age	Less than 30	2	0.8
	30 to 39	31	11.8
	40 to 49	93	35.5
	50 to 59	85	32.4
	60 to 69	43	16.4
	70 to 79	7	2.7
	80 and over	<u>1</u>	<u>0.4</u>
		262	100.0
Race/Ethnicity	African American	145	54.5
	American Indian	25	9.4
	Asian/Pacific Islander	26	9.8
	Hispanic	42	15.8
	Other	25	9.4
	More than one checked	<u>3</u>	<u>1.1</u>
		266	100.0
Years of Work Experience Prior to Current Business	None	25	9.4
	Less than 2 years	13	4.9
	2 to 5 years	49	18.5
	6 to 9 years	39	14.7
	10 or more years	<u>139</u>	<u>52.5</u>
		265	100.0
Company Position	Owner	236	89.4
	Owner/Manager	8	3.0
	Manager	11	4.2
	Employee	1	0.4
	Other	<u>8</u>	<u>3.0</u>
		264	100.0
Highest Level of Education	Some High School	4	1.5
	High School Diploma	15	5.7
	Some College	57	21.6
	Undergraduate Degree	40	15.2
	Some Graduate School	31	11.7
	Graduate Degree	108	40.9
	Other	<u>9</u>	<u>3.4</u>
		264	100.0
Undergraduate Major	Business/Accounting/Economics	71	31.3
	Math./Science/Computer Science/Engineering	72	31.7
	Liberal Arts	31	13.7
	Education	9	4.0
	Nursing	2	0.9
	Other	22	9.7
	More than one checked	<u>20</u>	<u>8.8</u>
		227	100.0

Table 1: Continued

Variable	Category	Frequency	Percentage
Graduate Major	Business/Accounting/Economics	57	37.7
	Math./Science/Computer Science/Engineering	39	25.8
	Liberal Arts	6	4.0
	Education	10	6.6
	Nursing	2	1.3
	Other	25	16.6
	More than one checked	<u>12</u>	<u>7.9</u>
		151	100.0
Type of Business	Corporation	210	82.0
	Franchise	2	0.8
	Partnership	7	2.7
	Sole Proprietorship	29	11.3
	LLC	3	1.2
	More than one checked	<u>5</u>	<u>2.0</u>
		256	100.0
Industry	Manufacturing	15	5.7
	Construction	38	14.6
	Transportation/Communication/Utilities	8	3.1
	Finance/Investments/Real Estate	8	3.1
	Services	116	44.4
	Other	54	20.7
	More than one checked	<u>22</u>	<u>8.4</u>
		261	100.0
Service Type	Business Services	14	7.4
	Personal Services	4	2.1
	Professional Services	66	35.1
	Repair Services	6	3.2
	High Tech. Services	42	22.3
	Other	40	21.3
	More than one checked	<u>16</u>	<u>8.5</u>
		188	100.0
Number of Full Time Employees	Zero (all part time)	24	9.2
	1 to 25	184	70.8
	26 to 50	27	10.4
	51 to 75	6	2.3
	76 to 100	9	3.5
	101 to 250	7	2.7
	251 to 500	0	0.0
	501 to 1000	3	1.2
	Over 1000	<u>0</u>	<u>0.0</u>
			260

Table 1: Continued

Variable	Category	Frequency	Percentage
Annual Sales	Less than \$25,000	7	2.7
	\$25,000 to \$50,000	13	5.1
	\$50,000 to \$100,000	22	8.6
	\$100,000 to \$200,000	25	9.7
	\$200,000 to \$300,000	17	6.6
	\$300,000 to \$500,000	24	9.3
	Over \$500,000	147	57.2
	More than one checked	<u>2</u>	<u>0.8</u>
	257	100.0	
Sell Business	Yes	49	23.7
	No	156	75.4
	Maybe	<u>2</u>	<u>1.0</u>
	207	100.0	
Expand Business	Yes	200	84.7
	No	<u>36</u>	<u>15.3</u>
	236	100.0	
Plan to Retire	Yes	53	26.0
	No	<u>151</u>	<u>74.0</u>
	204	100.0	
Interested in Case Development?	Yes	145	58.0
	No	94	37.6
	Maybe	<u>11</u>	<u>4.4</u>
	250	100.0	
More Willing If Case Information Disguised?	Yes	118	55.1
	No	90	42.1
	Maybe	<u>6</u>	<u>2.8</u>
	214	100.0	
State	Alabama	15	5.8
	Arkansas	7	2.7
	Florida	53	20.5
	Georgia	35	13.5
	Kentucky	6	2.3
	Louisiana	17	6.6
	Mississippi	4	1.5
	North Carolina	24	9.3
	South Carolina	7	2.7
	Tennessee	11	4.2
	Virginia	57	22.0
	Washington, D.C.	17	6.6
	New York	1	0.4
	West Virginia	1	0.4
	More than one checked	<u>4</u>	<u>1.5</u>
	259	100.0	

- The cases were submitted for conference presentations and/or publication in case research publications, but were not accepted for presentation at the conferences or for journal publication.

The latter three explanations suggest that, while additional cases exist, their existence is relatively unknown.

To address the aforementioned questions we designed a second survey for the 21 respondents who indicated participation in business case development. The survey included five questions:

1. Was the case completed?
2. To the best of your knowledge was the case ever used in a classroom setting?
3. To the best of your knowledge was the case ever presented at an academic or professional conference, meeting, or seminar?
4. To the best of your knowledge was the case ever published in a conference proceedings, book, or journal?
5. Would you be interested in further development of minority business cases?

Since we had the email addresses of 20 of the 21 respondents, emails thanking the respondents for their previous survey participation and posing the five questions to them were sent. A letter was mailed to the respondent without an email address. If no email response was forthcoming in two weeks another round of emails were sent to those not responding. Additionally, letters were sent to those respondents whose emails “bounced-back”. If this last set of emails produced no response in an additional two weeks, letters were mailed to those not responding to our emails. Finally, after an additional two-week period telephone calls were placed to those unresponsive to the previous set of survey inquiries.

6. RESULTS

Twelve of the 21 respondents (57% response rate) provided answers (two by email, three by letter, and seven via telephone calls) to the five research questions. Five of the initial 21 respondents could not be located for several reasons: (1) the companies no longer exist or have relocated or (2) the respondent to the initial survey has since left the company and no one presently with the company is familiar with the case. The remaining four respondents did not respond to emails, letters, or a series of telephone calls. The results are analyzed to learn the proportion of cases: (1) completed, (2) completed, but not used, (3) completed and perhaps used for instruction, but never disseminated (presented or published), and (4) completed and published. Also of interest is the reasons offered for the answers provided and what remaining interest the respondents have in future minority business case development. Table 2 illustrates the results obtained.

These data and information provide us with the following:

- Overall, cases are being completed. At least six (and perhaps seven) of the cases efforts resulted in completed cases.
- At least 50% of the reported case development efforts resulted in completed cases.
- Two-thirds of the completed cases appear to have been used in academic settings. Thus, while most completed cases reach the classroom, a completed case is no guarantee of its academic application.

- Fewer than one-third (27%) of the completed cases were presented at academic or business conferences or meetings.
- There were *no* reports of any case publications in textbooks, journals, or conference proceedings.
- Most respondents (at least 67%) indicate that they would participate in future minority business case developments. Thus, the desire to enhance the understanding of minority businesses and develop material useful to both business students and professionals remains.
- There is some confusion of what constitutes a business case. Some respondents interpret a litigation or judicial appeal process as a case.

Thus, while minority business cases are being completed, only a portion is being used in the classroom or presented at academic conferences or business meetings, and, as evidenced from this survey, *none* are being disseminated beyond a single academic institution.

7. CONCLUSIONS

We had no preconceived notion of how many minority business cases have been written, used, and disseminated. Apparently they do exist, and about two-thirds of completed cases are, in fact, being used. According to our results about one-half are being presented at academic or business conference/meetings. However, we have no evidence that any cases are disseminated beyond the reach of a single institution or published for general use. Thus, it appears, the scarcity of minority business cases is not due to the lack of their completions, (although more would help), but the lack of efforts to disseminate them. We reiterate one suggestion we made to minority business case participants at the completion of the first survey – make certain the case effort reaches the maximum student audience possible by insisting that the case be presented at a business or academic conference and, better yet, published in a textbook or reputable business journal.

Thus, these findings, although based on limited data and information, do provide some insights into the paucity of *published and available* minority business cases. More minority business cases exist than we initially realized, but they are apparently (and perhaps deliberately) not being disseminated to the general academic audience.¹ To explore the reasons behind these decisions not to popularize these minority business cases may require a future survey of *case writers*. Finally, these results further support initiatives such as that undertaken by Babson College and the Ford Motor Company to financially support the development and dissemination of minority business cases.

¹ It may be understandable that an academic institution would delay the publication of a case for one or several years, so that it may use that case for its own educational purposes. However, it would be beneficial to present and/or publish the case for general use, once the case is no longer used at the initial institution.

Table 2

Results from the Respondents Indicating Participation in Minority Business Case Development

<u>Respondent</u>	<u>Case Completed</u>	<u>Case Used in Instruction</u>	<u>Case Presented At Conference or Meeting</u>	<u>Case Published</u>	<u>Willing to Participate in Minority Business Cases</u>
1	Yes	No	No	No	Yes
2	Yes	Yes	Yes ¹	No	Yes
3	Not certain	Yes ²	No	No	Yes
4	Yes	Unknown	No	No	Yes
5	Yes ³	Yes	Yes ⁴	No	Yes
6	⁵	--	--	--	Yes
7	Yes ⁶	No	No	No	Yes ⁷
8	⁸	--	--	--	--
9	No ⁹	No	No	No	Yes
10	⁸	--	--	--	--
11	Yes	Yes	Yes	No	--
12	No	Unknown	Unknown	Unknown	No

¹ Presented at an executive development seminar at Dartmouth College.

² Believed used at the University of Michigan.

³ Used only internally within the company.

⁴ At a business meeting.

⁵ Did not really comprehend what a minority business case was. Interpreted a case as a litigation or appeals process.

⁶ Case was really a report completed by a graduate student group as part of a class assignment for extension service of a business school. The report pointed out areas the business could improve.

⁷ Provided the case writers were committed to the project and performed effectively.

⁸ Could not recall the case.

⁹ Too time consuming

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TESTING FOR RACE AND GENDER ISSUES IN COLLEGE GRADES

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ABSTRACT

This paper focuses on the issue of race and gender effects as related to course grades received by 533 students in 19 different classes at a small regional university. The results indicate that both gender and race are related to grade received. Further analysis shows that those effects may be primarily related to differences in academic ability based on using previous GPA as an indicator for academic ability.

INTRODUCTION

The issue of grades can be a very sensitive topic for college instructors. Most college professors assert that the demographic characteristics of the student have no impact on the grade received. Some may admit that academic preparation and support may affect different populations differently but few are willing to test to see if demographic characteristics like race and gender significantly impact the grades received by students.

There has been a good deal of research into issues of bias based on political bias but few studies have been completed that provide a relatively easy process to see if grades are independent of race or gender at the college level. The focus of this paper is to propose a simple analysis that can be done to keep check by individual faculty to determine if there is a race or gender factor in grades earned in their classes. There is no effort to ascertain what might be causing any effect if it exists. Rather the goal is to provide a fairly simple system for checking for independence of grades and race and gender.

REVIEW OF RELEVANT LITERATURE

A considerable amount of previous research has explored the relationship of student characteristics such as gender and race to academic achievement in higher education. However, the vast majority of such studies have used measures other than course grades—such as enrollment figures, degree attainment figures, and grade point averages—as the measures of academic achievement. Overall, the research suggests there is a “gender gap” in higher education in that the overall performance of women in higher education tends to supersede that of men in several respects. Namely, women are more likely than men to both be enrolled in college and receive Bachelor’s degrees (National Center for Education Statistics 2004). Women also tend to have higher grade point averages than do men [7][9][14][17][19][31]. There is no general consensus in the literature on the explanations for such observations. However, some of the commonly proposed explanations pertain to the differences between men and women’s college

work ethic [7][18][21], differences in men and women's notions of the payoffs of a college education [6][8][24] and women's levels of preparedness for college [8].

As is the case with regard to gender, much of the research pertaining to the relationship between race and collegiate academic achievement uses factors other than course grades to measure academic achievement. Overall, the academic achievement of African Americans tends to be lower than that of Caucasians in several respects. A lower percentage of African Americans than Caucasians are enrolled in college and a higher percentage of African American students than Caucasian students drop out of college (National Center for Education Statistics 2004). Additionally, African Americans tend to have lower grade point averages than do Caucasians [6][12][27]. There is no consensus in the literature with regard to the explanations for such findings. However, some of the commonly proposed explanations pertain to relatively lower levels of academic preparedness for college among African American college students [10], perceptions of lack of support and feelings of alienation by African American students at predominantly white institutions [13][15][29] and greater demands and stress pertaining to family related issues [6].

As stated earlier, a much more limited body of research has investigated the existence of gender effects on academic performance by examining grades received by students in college courses. Several of these studies examining the existence of gender effects fail to find any significant differences in the grades earned from courses by women and men. For instance, Borde's [3] study of several sections of an introductory marketing course, found that there were no significant differences in the course grade received by men and women. Likewise, in their analysis of grades received by freshmen in 290 different courses, Keller, Crouse, and Trusheim [16] found that there were no significant differences in the grades according to gender.

However, results from other studies suggest that there are gender effects with regard to grades received in courses—usually that women tend to receive higher course grades than men. Several studies examining grades received in college mathematics courses found that women received grades that were higher than those received by men [4][23]. Further, other research studies have yielded results indicating that women received higher grades in accounting [20] and a variety of other courses [16]. These findings are consistent with the previously referred to finding that female college students have higher overall grade point averages than male college students.

Alternatively, some studies find that men tend to perform better in a few courses [16]. In particular, the results of some studies have shown that men tend to perform better in introductory economics classes than women [1][25]. One study found that men received better grades in an introductory economics course than did women, but that those differences disappeared when the prior attitudes of the students toward economics were taken into account [2]. However, other studies have failed to find significant differences in the grades received by men and women in upper level economics classes [30].

Even less attention has been given to the relationship between race and grades received from college courses. As pointed out earlier, the vast majority of the research investigating the relationship between race and academic performance uses factors other than course grades as indicators of academic achievement. One study [28] examining the academic performances of African American and Caucasian students in developmental mathematics courses at a four-year university found revealed there was a relationship between race and the grades received in the courses. The African American students received lower grades in the two courses than Caucasian students.

METHODOLOGY

This study is a review of grades for three different professors covering a total of 19 classes with 533 students. Two professors are male and one is female. The courses include lower level and upper level and also include three different disciplines. The results are not sufficiently large to generalize across all faculty members but rather are useful to suggest a systematic way to check for race and/or gender effects. The impetus for this study was intermittent allegations of race and/or gender bias by students at a small regional university. While none of the professors in the current study have been alleged to have discriminated, all were willing to subject their courses after the fact to the pilot study. As a result, the knowledge that their grades would be included in the study could not affect the results. None of the faculty members had any idea as to whether their course results would show an independence of effect when they chose to participate in the study. While all classes are anonymous, the faculty members realize that it might be possible to trace a particular class result to them.

This study is limited to gender and two race classifications. Other demographic characteristics could be used but these categories seem to be the most at issue. At the institution that provided the data, the vast majority of the students are either Caucasian or African-American. Other minorities make up less than five percentage of the total student body with no one group having a significant portion.

The study uses a simple Chi-Square test for Independence to check for effect of race and gender. This requires two contingency tables, one with the rows indicating the race and the columns representing grades. The second table lists gender in the rows and the columns representing the grades. In each case, the contingency table is 2 x 5 and the resulting Chi-Square test indicates whether the independence of the factors can be accepted or rejected.

The simple contingency table allows only a test for the independence of grades and either gender or race. This simple test is not sufficient because there is not a check for “ability” differences. As a result, the overall GPA of the students was added to further refine the analysis. As a result, the contingency tables became 6 x 5 with students clumped into three categories of GPA by race and gender.

Preliminary analysis indicates that there are instances where grades are not independent of gender and race when the simple 2 x 5 table is the basis of analysis. However, use of the more detailed second table indicates much more independence of the grades and gender and race. While that is helpful to the feelings of the involved professors, it may not be appropriate to use this particular categorization.

The focus of the paper is not to try to find cases of grade bias nor to clear professors of charges of bias in grading. Rather the focus is on suggesting a fairly simple procedure whereby faculty members and administrators can check to see if certain groups are being affected differently by the grades awarded. For example, a faculty member may be truly unbiased and the grades from a particular class may reject the hypothesis of independence between grades and gender or race. The focus then would be to try to discover whether alternative methods might be used that would assist the group having more difficulty with the class.

RESULTS

The chi-square statistic tests whether two variables are independent. The null hypothesis is rejected if a relatively large chi-square value and a small corresponding p-value is observed. There are 533 observations in the sample. In Table 1, the null hypothesis is stated as:

Ho: There is no relationship between gender and grade earned, with an alternative hypothesis stated as:

H₁: There is a relationship between gender and grade earned.

The contingency table and Chi-square test results are shown in Table 1. As shown the null hypothesis is rejected at the .10 level of significance. Thus we conclude there is a relationship between gender and the grade earned in the classes observed in this study.

TABLE 1: CONTINGENCY TABLE FOR GRADES AND GENDER

	A	B	C	D	F	Total
Female	61	110	77	23	20	291
Male	39	77	76	20	30	242
Total	100	187	153	43	50	533
Chi-Square	8.446					
Df	4					
p-value	0.0765*					

*Significant at .10 level

To test the relationship of race to grades earned, the null hypothesis is stated as:

Ho: There is no relationship between race and grade earned, with an alternative hypothesis stated as:

H₁: There is a relationship between race and grade earned.

The contingency table and Chi-square test results are shown in Table 2. As shown the null hypothesis is rejected at the .01 level of significance. Thus we conclude there is a relationship between race and the grade earned in the classes observed in this study

TABLE 2: CONTINGENCY TABLE FOR GRADES AND RACE

	A	B	C	D	F	Total
Black	13	36	53	15	16	133
White	87	151	100	28	34	400
Total	100	187	153	43	50	533
Chi-Square	22.134					
Df	4					
p-value	1.885e-4**					

** Significant at .01 level

The results shown above in Tables 1 and 2 indicate that there is a relationship between gender and race for the students in the 19 sections. However, there is an important variable not accounted for in these tests. There is no measure of “academic performance” or preparation outside the courses involved. Therefore, another measure was included to further analyze the data. The students were further categorized by GPA to serve as a proxy for academic ability.

In Table 3 below, a 6x5 contingency table is constructed to show three levels of academic performance of the students. Those levels are subdivided by gender and GPA level such that the variables listed are

- Female B = Female student with GPA 3.0+
- Female C = Female student with GPA 2.0 – 3.0
- Female D = Female student with GPA < 2.0
- Male B = Male student with GPA 3.0+
- Male C = Male student with GPA 2.0 - 3.0
- Male D = Male student with GPA < 2.0

The null hypothesis now is stated as:

Ho: There is no relationship between gender GPA levels and grade earned,

with an alternative hypothesis stated as:

H₁: There is a relationship between gender GPA levels and grade earned.

As shown in Table 3, the null hypothesis is rejected and we conclude that there is a relationship between gender GPA level and grade earned in the course. This tends to indicate that it is previous academic performance (which we have used as a proxy for academic ability) that is the important relationship not the gender of the student.

TABLE 3. CONTINGENCY TABLE COMPARING GRADES AND GENDER ADJUSTED FOR GPA

	A	B	C	D	F	Count
Female_B	49	37	6	2	0	94
Female_C	12	68	48	7	5	140
Female_D	0	5	23	14	15	57
Male_B	24	19	7	0	0	50
Male_C	12	47	42	11	8	120
Male_D	3	11	27	9	22	72
Count	100	187	153	43	50	533
Chi-Square	267.977					
df	20					
p-value	.000**					

** significant at .01 level

In Table 4 below, a 6x5 contingency table is constructed to show three levels of academic performance of the students. Those levels are subdivided by race and GPA level such that the variables listed are

- Black B = Black student with GPA 3.0+
- Black C = Black student with GPA 2.0 – 3.0
- Black D = Black student with GPA < 2.0
- White B = White student with GPA 3.0+
- White C = White student with GPA 2.0 - 3.0
- White D = White student with GPA < 2.0

The null hypothesis now is stated as:

Ho: There is no relationship between race GPA levels and grade earned, with an alternative hypothesis stated as:

H₁: There is a relationship between race GPA levels and grade earned.

As shown in Table 3, the null hypothesis is rejected and we conclude that there is a relationship between race GPA level and grade earned in the course. This tends to indicate that it is previous academic performance (which we have used as a proxy for academic ability) that is the important relationship not the race of the student.

TABLE 4. CONTINGENCY TABLE COMPARING GRADES AND RACE ADJUSTED FOR GPA

	A	B	C	D	F	Count
Black_B	8	8	4	1	0	21
Black_C	4	26	27	4	5	66
Black_D	1	2	22	10	11	46
White_B	65	48	9	1	0	123
White_C	20	89	63	14	8	194
White_D	2	14	28	13	26	83
Count	100	187	153	43	50	533
Chi-Square	268.686					
df	20					
p-value	.000**					

** Significant at .01 level

CONCLUSIONS

Based on the data available, it appears that there is a relationship between gender of the student and the grade received in these classes and the race of the student and the grades received in these classes. However, when the students are further stratified by GPA level, the results imply that the relationships may be primarily due to the academic performance level of the student rather than

the simple status of gender or race. Further analysis beyond the simple Chi-Square test for independence may yield further insights into why students of different status tend to perform differently in these classes. As stated in the introduction, our main goal is to offer a method of analysis for college instructors to use in order to test for patterns of course grades that are related to race and gender. Also, by analyzing race and gender effects for college courses in multiple fields—economics and political science classes—we add to the literature examining race and gender effects in courses grades. Further, since many of the previously done studies examining gender or race effects in course grades focus on introductory courses, our project contribute to the literature examining the relationship between gender and race and grades received in upper level courses

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Sexual Harassment: A Preliminary Review for the Importance of Gender Status

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August 30, 2007

Submitted for Possible Presentation at the 2007 Meeting of SEINFORMS to be held in Myrtle Beach, South Carolina on October 4-5, 2007

Sexual Harassment: A Preliminary Review For the Importance of Gender Status

Abstract

Researchers tend to agree that working in a male-dominated work environment increases a woman's risk of being sexually harassed. Sexual harassment may be caused by one of several factors, including threats to a male's gender status. In addition, recent research by Berdahl (2007b: 434) indicated that a woman's risk of being sexually harassed is increased by working in "male-dominated jobs in male-dominated manufacturing plants" and that those women in that environment with a relatively "masculine" personality were harassed the most. After examining the topic of sexual harassment in general and reviewing some explanations for its occurrence, this paper concludes with several questions suggesting future research tied to the topic of gender status in male-dominated work environments.

Introduction

As early as 1874, published accounts of sexual harassment in the workplace began to surface. Louisa May Alcott documented unwanted sexual attention from the Reverend Joseph, her employer. Alcott was employed in a domestic occupation and claimed that the sexual harassment, not the physically demanding housework, made the job unbearable. Alcott was able to leave her job, becoming a well-known American author. Her accounts, however, give rise to many questions about sexual harassment. What increases a woman's risk of being sexually harassed? In what types of jobs is sexual harassment most prevalent? Does gender inequality in the workplace lead to increased occurrences of sexual harassment? (Morgan, 2001: 209)

Statistics

Between 1992 and 1999, reports of sexual harassment in the workplace were steadily increasing. Between 2001 and 2006, however, the number of sexual harassment claims reported to the Equal Employment Opportunity Commission, EEOC, began to decline. Nonetheless, the numbers are still astonishing. The EEOC received reports of 12,025 cases of sexual harassment in 2006 alone. Approximately 84.6% of these claims were filed by female employees. (EEOC, 2007a; EEOC, 2007b) See Table 1 below, which shows the number of reports filed in Fiscal Years 1992 through 2006, as well as the percentage of claims filed respectively by women and by men (EEOC, 2007a; EEOC, 2007b).

Table 1: Reports of Sexual Harassment to the EEOC

Fiscal Year	1992	1993	1994	1995	1996	1997	1998
Reports Received	10,532	11,908	14,420	15,549	15,342	15,889	15,618
% Filed by Females	90.90%	90.90%	90.10%	90.10%	90.00%	88.40%	87.10%
% Filed by Males	9.10%	9.10%	9.90%	9.90%	10.00%	11.60%	12.90%

Fiscal Year	1999	2000	2001	2002	2003	2004	2005	2006
Reports Received	15,222	15,836	15,475	14,396	13,566	13,136	12,679	12,025
% Filed by Females	87.90%	86.40%	86.30%	85.10%	85.30%	84.90%	85.70%	84.60%
% Filed by Males	12.10%	13.60%	13.70%	14.90%	14.70%	15.10%	14.30%	15.40%

The EEOC defines sexual harassment as the follows:

Unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature constitute sexual harassment when this conduct explicitly or implicitly affects an individual's employment, unreasonably interferes with an individual's work performance, or creates an intimidating, hostile, or offensive work environment (EEOC, 2007c).

By 1999, perhaps due to the steady increase in reports of sexual harassment, 97% of the workplaces and educational institutions in the United States had implemented policies that define sexual harassment and clearly prohibit such behaviors. As a result, 84% of employees and students in such institutions became aware of the consequences of violating the policies (Morgan, 2001: 209). Sexual harassment of men does occur; however, the focus of this paper is sexual harassment of women in the workplace.

Despite the increased awareness and precautions, the sexual harassment statistics are still striking. Oregon State University (2007) reports the results of a study by the American Psychological Association, which found that 12.7% of female graduate students have experienced some form of sexual harassment. Likewise, Newman, Jackson, & Baker (2003) found that between 6% and 16% of female public administrative workers experienced some form of unsolicited sexual advances. As many as 24% experienced “requests for sexual favors” while up to 36% experienced offensive physical contact. Another 57% experienced verbal behavior considered to be offensive. In positions within the federal government, 44% of women had experienced “unwanted sexual attention” within two years (Newman, Jackson, & Baker, 2003).

In the field of law enforcement, sexual harassment increasingly is becoming a problem. Within the Los Angeles Police Department, sexual harassment and discrimination against female employees is becoming an issue (Williams & Kleiner, 2001). Similarly, sexual harassment of women within the firefighting profession has become a widespread problem. Rosell, Miller, & Barber (1995) explain that one study indicated that 58.2% of female firefighters have reported sexual harassment in the workplace.

Response of Women to Sexual Harassment

A woman's response to sexual harassment can depend on many factors. For example, a woman who has experienced other forms of violence in the past may be more likely to feel violated at work. Past experiences can include "rape, battering, abuse, and incest" (Morgan, 2001: 216). A woman's values can also dictate how she responds to sexual harassment. A woman with feminist views is more likely to identify unwanted sexual attention as harassment than a woman with more traditional views (Morgan, 2001: 216). The type of relationship between the woman and her harasser can also play a role in how she responds to the harassment. An experience of sexual harassment is likely to be more upsetting and stressful when there is a great power inequality between a woman and her harasser (Morgan, 2001: 216). In addition, the gender and race of the harasser can play a role. A woman who is harassed by an individual of a different sexual orientation or race is likely to be more offended than if the harasser's orientation and race were the same as the woman's (Morgan, 2001: 216). Harassment often involves a difference in the authentic or apparent power of the harasser and the individual being harassed. As a result of the power difference, the individual being harassed generally has few alternatives regarding self-defense and retribution (Berdahl, 2007a).

Many women who have experienced sexual harassment in the workplace chose not to report their experiences. Several reasons form the basis for this choice to keep quiet (Morgan, 2001). First, talking about the experience of being sexual harassed is often viewed as “taboo.” Second, society has taught women to keep information about their harassment private. Many women attribute sexual harassment to a man “just being a guy” or “acting like a man” (Morgan, 2001: 212). Third, when a woman speaks out against sexual harassment in the workplace, her own integrity and rationality are brought into question. Some fear that they will not be believed or that reporting sexual harassment will “do no good” (Morgan, 2001: 218).

Fourth, some women fear job loss or retaliation when deciding whether to report harassment (Morgan, 2001: 216, 218). Specifically, those in blue collar jobs may fear “physical retaliation and intimidation.” In addition, blue collar women may deem “toughness” as a requirement of the job and may be more likely to accept sexual harassment and allow it to go unreported (Blue-collar blues, 1993). Women in blue collar jobs are, therefore, more likely to have less aggressive reactions to sexual harassment (Ragins & Scandura, 1995: 429).

Fifth, embarrassment and shame may lead women to avoid reporting their experience (Oregon State University, 2007). Finally, rather than reporting, some women who have experienced sexual harassment chose to escape or avoid the harassment by switching to a different office or shift. Others chose to quit their jobs completely (Morgan, 2001: 218).

Women who “successfully survive” their experiences with sexual harassment in the workplace are often “empowered” after their ordeals. Many face an increase in self-satisfaction and dignity. Others use the knowledge of the law gained during their reporting process to research future employees, to evaluate and react to their work assessments, and to set better

terms of employment in the future. Lastly, many women are motivated to establish support groups, contribute to the media, coordinate protests, or petition for change (Morgan, 2001: 219).

Effects of Sexual Harassment on Women

As a result of sexual harassment in the workplace, many women, as noted above, quit or change their jobs. This has led to a high job turnover rate for women and “slower career advancement.” Additionally, sexual harassment contributes to the “gender gap in pay” (Morgan, 2001: 212). In fact, women who are promoted are often judged on the way in which they seem capable of resisting or enduring sexual harassment in the workplace (Morgan, 2001: 212). Sexual harassment has also led to an increase in absenteeism in workplaces. An increase in sexual harassment also leads to a decrease in “organizational commitment and productivity” (Malamut & Offermann, 2001).

Sexual harassment has many effects on those who fall prey. Emotional distress is perhaps the most common form of anguish faced by those who have experienced sexual harassment. Approximately 90% of those who request help after harassment report some level of emotional distress. Many also experience anger as a result of the humiliation that accompanies sexual harassment. Sexual harassment can also lead to “depression and self-destructive behavior” as well as social segregation (Morgan, 2001: 217). Sexual harassment can also lead to physical distress and illness. Among the types of physical distress caused by sexual harassment are “nausea, headaches, and exhaustion,” the three most commonly reported. Lastly, sexual harassment in the workplace can lead to feelings of dissatisfaction on the job. Individuals who keep their jobs after being harassed often become apathetic about their labor and discontented with the administration (Morgan, 2001: 217).

Categories of Work Environments Based on Gender Ratios

What leads to increased incidences of sexual harassment in certain professions? One theory is the gender ratio in such professions. Professions can be divided into three categories based on gender ratio: (1) male-dominated, (2) female-dominated, and (3) gender-integrated. Male-dominated work environments include professions in the armed forces, criminology, criminal justice fields (Morgan, 2001: 214) and public office workers such as law enforcement officers, maintenance workers, corrections officers, bus drivers, and managers (Rosell et al., 1995). Male-dominated jobs can be further divided into blue collar jobs and white collar jobs. Blue collar workers include firefighters, police officers (Ragins & Scandura, 1995: 432), and miners (Morgan, 2001: 213). White collar workers include surgeons (Oregon State University, 2007), engineers, and attorneys (Ragins & Scandura, 1995: 432). Female-dominated work environments include clerical jobs and professions within the field of social work (Berdahl, 2007b).

Male-Dominated v. Female-Dominated

Most research indicates that the sexual harassment of women occurs more frequently in male-dominated work environments than in female-dominated work environments (Rosell et al., 1995; McCabe & Hardman, 2005). However, some sources indicate that sexual harassment may be underreported in female-dominated work environments (McCabe & Hardman, 2005). Additionally, other research suggests that there are no substantial reporting differences between male-dominated, female-dominated, and gender-integrated work environments (Sexual Harassment Support [SHS], 2006).

Researchers agree that women are exposed to a higher risk of being sexual harassed in male-dominated environments, such as construction and policing, than in female-dominated environments (Feminist Majority Foundation, 2007). The risk is also higher in occupations that

have conventionally excluded women, such as mining and surgery (Oregon State University, 2007). In addition, the risk of sexual harassment is increased in female-dominated work environments in which women receive low wages and management consists primarily of men (Feminist Majority Foundation, 2007).

Berdahl hypothesized that “women who have characteristics or engage in behavior considered more desirable for men than for women experience more sexual harassment than other women and men” (Berdahl, 2007b: 427). Berdahl performed a study to test this hypothesis. Participants (all women) in the study were first given a “personality gender evaluator,” based on a form of the Bem Sex Role Inventory, in order to determine if the women tended to have a masculine (or feminine) personality. The individuals were then administered a sexual harassment survey. Results showed that a woman with a “highly masculine personality” experienced approximately 1.5 times as much harassment as women with “low masculine personalities” (Berdahl, 2007b: 429).

In a subsequent study, Berdahl administered surveys to both men and women in male-dominated work environments and to both men and women in female-dominated work environments. The male-dominated work environments consisted of manufacturing plants in which employees executed conventionally male-dominated tasks. The female-dominated work environments consisted of community centers in which employees executed conventionally female-dominated tasks such as counseling. Results indicated that women in male-dominated work environments experienced more sexual harassment than did men in male-dominated environments or than did either men or women in female-dominated work environments. Within the male-dominated work environments, women with “relatively masculine personalities” (Berdahl, 2007b: 434) became the targets of the most sexual harassment.

In summary, Berdahl (2007b: 434) found that “the more women deviated from traditional gender roles – by occupying a “man’s” job or having a “masculine” personality – the more they were targeted for sexual harassment” (Berdahl, 2007b: 434). Berdahl’s studies indicate that women who deviate from the feminine prototype are most likely to be the targets of sexual harassment (Berdahl, 2007b: 434).

Blue Collar v. White Collar

Trainees and employees of women in blue collar jobs report more frequent occurrences of unwanted sexual advances than employees in other jobs (Newman et al., 2003). Likewise, sexual harassment is more prevalent in blue collar environments than in white collar environments (Blue-collar blues, 1993; Ragins & Scandura, 1995: 429). Sexual harassment in blue collar jobs is more severe and persistent than that in white collar environments (McCabe & Hardman, 2005).

Explanations for Sexual Harassment of Women

Women face a higher risk of experiencing sexual harassment in jobs where sex is treated as a commodity or “is performed as a service.” For example, some waitresses are expected to wear sexual or enticing uniforms or have been instructed to flirt with their customers. Such waitresses often experience sexual harassment from both their customers and managers. Sexual harassment is also more likely in environments where “economic and sexual power overlap” and in workplaces where “political, economic, and sexual power” unite. As a result, sexual harassment is an expression of the battle between those who possess power (the abusers) and those who seek to reclaim power (the victims) (Morgan, 2001: 220).

Morgan (2001) points to two main risk factors that lead to sexual harassment in the workplace. The first risk factor is simply being a woman. The second is “working or learning in

close proximity to men” (Morgan, 2001: 213). He also indicates that women who work in an environment in which their labor is both controlled and evaluated by men are at a higher risk of experiencing sexual harassment. Similarly, he believes women who have reservations about the superiority of men or who oppose male authority are prone to be labeled as “traitors” and treated as such by way of sexual harassment (Morgan, 2001).

One way that women contest the superiority of men is by gaining “social, economic, or organizational power over them” (Morgan, 2001: 215). By doing so, women become targets of “sexualized hostility,” according to Morgan. In a study by DeCoster, Estse, & Mueller and cited by Morgan (2001: 215), there was a positive relationship found between increased tenure and education and the risk of experiencing sexual harassment. As a woman gains more power, she is seen as more of a threat to those in power. As a result, her risk of being sexually harassed by those in power increases (Morgan, 2001: 215).

Ragins & Scandura (1995: 430-431) describe two explanations for sexual harassment in the workplace. The first one is the sex-role spillover model, which involves extending gender roles into the workplace. For example, female gender roles typically include qualities such as compliance, “nurturance,” and “dependency.” The female gender role can also involve “sexual aspects, such as the view of women as sex objects” (Ragins & Scandura, 1995: 430). Sex-role spillover can lead to sexual harassment in the workplace and can induce a sexualized environment. In addition, women may be more likely to be treated as “sex objects.” Male coworkers may expect women to “accept sexual behaviors or comments.” Studies of the sex-role spillover model found “women in male-typed jobs were more likely to report sexual harassment than women in female-typed or gender-integrated” jobs (Ragins & Scandura, 1995: 431).

The second explanation, the “contact hypothesis,” explains that sexual harassment is a result of contact with persons of the opposite gender. The “contact hypothesis” was used by Gutek, Cohen, & Conrad in their 1990 paper to contrast the sex-role spillover model, as cited by Ragins & Scandura (1995: 431). This alternate hypothesis states that women in male-typed occupations are more likely to experience sexual harassment than women in female-typed or gender-integrated occupations because these women in male-typed occupations have more contact with men. (Ragins & Scandura, 1995: 431).

Berdahl explains that sexual harassment is often viewed as a means of preventing women from entering advantageous careers and ensuring that they remain financially dependent on men (2007a). To a harasser, sexual harassment is more about belittling and repudiating those harassed than about engaging in sexual acts with them. Berdahl (2007a) cites research indicating that men who support male supremacy are more prone to commit acts of sexual harassment than other individuals. Similarly, individuals who oppose male dominance are more likely to be sexually harassed (Berdahl, 2007a).

Berdahl proposes, therefore, that a man’s yearning to exercise dominance over women leads to sexual harassment. She also suggests that the chief cause of sexual harassment is the aspiration to defend one’s social status when it appears to have been threatened. Berdahl argues that “sexual harassment should be viewed as behavior that is based on sex – as behavior that derogates, demeans, or humiliates an individual based on that individual’s sex” (Berdahl, 2007a: 641). Berdahl indicates that a society in which a system of “gender hierarchy” exists can lead individuals to “define and defend social status in terms of sex” (Berdahl, 2007a: 645). All societies assign a higher status to “being male” than to “being female” (Berdahl, 2007a: 645). Consequently, organizations within these societies “tend to mirror” this hierarchy (Berdahl,

2007a: 645). Berdahl (2007a) also suggests that “at one time or another, and to varying degrees of intensity, all individuals are motivated to defend their sex-based status and the benefits it yields when this status seems threatened, and all individuals are capable of doing so by derogating another based on sex” (Berdahl, 2007a: 645).

Threats Prompting Defense of Gender-Based Status

Berdahl points to four threats that can prompt an individual’s desire to defend his or her “sex-based status” (2007a: 646). Three of the four threats call attention to group divisions. The first of these, “acceptance threats,” contest an individual’s standing as an ideal or archetypal constituent of his or her gender. Acceptance threats challenge the masculinity of a man or the femininity of a woman. These threats cause an individual to want to demonstrate the ideal traits of his or her gender group.

The second type of threat is “category threats,” which link “an individual with a sex-based group against his or her will” (Berdahl, 2007a: 647). When an individual is linked to a lower status group, the individual is likely to feel more threatened than if the individual had been associated with a higher status group. Therefore, in most cases, both men and women are likely to feel more threatened when linked to women. Category threats often cause an individual to yearn to distance himself or herself from the group with which he or she has been linked. This desire is most often carried out through actions which demean women, such as crude sexist jokes.

The third type of threat, “derogation threats,” (Berdahl, 2007a: 648) lessens the value of the status of a particular sex group. Members of the group are threatened based on the degree to which they associate with the group. Derogation threats often cause an individual to either support his or her group or to dissociate from the group. This can entail criticizing members of the opposite sex-based group or degrading individuals in one’s own group (Berdahl, 2007a).

The fourth type of threat differs from the first three in that it blurs group divisions since a member of one sex takes on characteristics of the other sex group. These “distinctiveness threats” (Berdahl, 2007a: 647) lead to less obvious distinctions between the male and female gender. Examples of distinctiveness threats include incidences of an individual carrying out functions that are typically associated with the opposite sex. Similarly, when an individual exhibits characteristics generally connected with the opposite gender, a distinctiveness threat is created. Distinctiveness threats may account for the prevalence of sexual harassment in male-dominated work environments (Berdahl, 2007a). Berdahl’s study (2007b) showed that women in these work environments are more likely to experience sexual harassment than other women. Distinctiveness threats are also consistent with the frequency of sexual harassment of women in these environments who display more traditionally male characteristics (Berdahl, 2007b).

Berdahl (2007a) suggests that those who create a threat to the status of the harasser are likely to be harassed in an effort to suppress the threat. Specifically, individuals who threaten men’s status are likely to be sexually harassed. When a man wants to defend or increase his status when compared to that of a woman, he is likely to accomplish this by demeaning her, specifically in male-dominated work environments. When a man “sexually objectifies or dominates” (Berdahl, 2007a: 649) a woman, he may boost his feeling of masculinity by heterosexually dominating a woman (Berdahl, 2007a).

Other actions may increase an individual’s risk of being sexually harassed according to Berdahl (2007a). Individuals who reduce distinctions between genders (distinctiveness threat) are also likely targets of sexual harassment. Similarly, individuals who dispute another’s possession of sex-based traits (acceptance threat) or who classify another in a gender-based group against his or her will (category threat) are likely to be harassed. In addition, individuals

who question the value of a sex-based group (derogation threat) increase their likelihood of becoming a target of sexual harassment. Lastly, those who possess less power than the harasser are prone to experiencing sexual harassment (Berdahl, 2007a).

Conclusions and Implications for Further Research

To begin, I wonder whether or not the sexual harassment of women by men results from a threat to men's sense of supremacy. Berdahl (2007a) suggests that women who threaten the status of men experience an increased risk of being sexually harassed. Berdahl also believes that "the primary motive underlying all forms of harassment is the desire to protect or enhance social status when it seems threatened" (2007a: 645). Berdahl also indicates that societies attribute higher status to "being male" than to "being female" (2007a: 645).

Research Question 1: Does the sexual harassment of women by men in male-dominated work environments result from a threat to men's sense of supremacy?

The threat to men's sense of supremacy can occur in two ways. First, men's sense of supremacy is threatened when women work in male-dominated work environments. Morgan (2001: 213) supports the conclusion that working "in close proximity to men" increases a woman's risk of being sexually harassed. Berdahl's (2007b) third study also indicated that women who work in a male-dominated work environment experience an increased risk of being sexually harassed (Berdahl, 2007b). Some research, however, suggests that there are no substantial reporting differences between male-dominated, female-dominated, and gender-integrated work environments (Sexual Harassment Support, 2006). Thus, there is still some question whether working in a male-dominated work environment increases a woman's chance of being sexually harassed. I wonder whether an increase in risk is caused by increased contact with men, as suggested by the contact hypothesis (Ragins & Scandura, 1995: 431). Women who

work in male-dominated work environments come in contact with more men than do women who work in female-dominated work environments or gender-integrated work environments. Therefore, I wonder whether women in male-dominated work environments are more likely to pose a threat to men's sense of supremacy than women in female-dominated or gender-integrated work environments.

Research Question 2: Do women who work in a male-dominated work environment experience an increased risk of being sexually harassed when compared to women in female-dominated or gender-integrated work environments? If so, is this increased risk a result of increased contact with males?

The threat to men's sense of supremacy can also occur when a woman has a relatively "masculine" personality. Berdahl (2007b) indicates that a woman with a relatively "masculine" personality experiences an increased risk of being sexually harassed in a male-dominated work environment. She admits, however, that "larger sample sizes" would have been more valuable (2007b: 435). She advises that her results should "be viewed as preliminary" (2007b: 435). If possessing a relatively "masculine" personality does in fact increase a woman's risk of being sexually harassed, does this increased risk result from the creation of a distinctiveness threat? Recall, when an individual exhibits characteristics generally connected with the opposite gender, a distinctiveness threat is created (Berdahl, 2007a). When a woman displays relatively "masculine" traits, she is blurring the distinction between the male and female sexes. This poses a distinctiveness threat, using Berdahl's terminology (2007a). I also wonder whether women with relatively "masculine" personalities can indirectly lead to the creation of an acceptance threat, thereby increasing her risk of being sexually harassed. In other words, do men experience pressure from their male coworkers to "prove their masculinity" (Berdahl, 2007a: 648) by harassing a woman with a relatively "masculine personality?"

Research Question 3: Do women who have relatively “masculine” personalities experience an increased risk of being sexually harassed in male-dominated work environments? If so, is this attributable to the creation of a distinctiveness threat or an acceptance threat?

My research has raised additional questions related to the sexual harassment of women in male-dominated work environments. Further investigation and studies are needed to test variables that may increase a woman’s risk of being sexually harassed. Becoming aware of factors that increase the risk of sexual harassment in the workplace may help to eventually minimize occurrences of such.

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DUMPSTER DIVING: A STUDY ON DATA RECOVERY AND EXPLOITATION

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Abstract

Social Engineering is a 'low tech' method of attack that involves obtaining personal information and using it to hack into a system [1]. Social Engineering takes on many forms, including dumpster diving. Dumpster diving is where one goes through trashcans and dumpsters looking for information such as IP addresses, usernames, passwords, and other information [2, p. 63]. Individuals who set their old computers on the curb for trash pickup, companies who simply toss them in the dumpster or entities that donate their old computers to charity should think about what information is available on the hard drives and take every step possible to eliminate that information before disposal of the computer. Increased awareness of identity theft and corporate stealing has brought the issue of protecting one's personal information. However, do most people take a real effort to destroy data remaining on their hard drives? This research in progress study will attempt to identify the types of information found and/or recovered from hard drives in computers donated to charity and/or set out for trash pickup. The results of this study will be provided at the conference. In addition to the results, the authors will also make recommendations as to what the average individual can do to protect their personal data as well as changes to corporate security policies to ensure protection of corporate data and personal information of their employees.

INTRODUCTION

Today, many large companies either wipe their hard drives in house or they contract out to computer recycling companies when disposing of their old computers. However, it is incredibly easy for a computer to slip through the cracks, or for a hard drive not to be wiped sufficiently. Twenty-five percent of systems audited by Redemtech, a leading recycler of PC and IT products, still have data on them even though IT personnel thought the system had been wiped clean [4].

It is not known exactly what the majority of small businesses do with their old hard drives. One assumes that because they do not have access to the same resources as larger corporations, that they probably do not wipe their hard drives sufficiently clean, if at all, before disposing of them. In the consumer sector, often times, when consumers dispose of their personal computers, they have not even been an attempt to remove data from hard disks. There are several ways to destroy the data on hard disks, some are simple, and others are more complicated.

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When data is written to hard disks, the disk drive head is smaller than the track which it must write, so when data is erased, similar to the furrows left when plowing a field, the drive head spews the “erased” data to either side of the head, often intact and recoverable. A single pass with a program designed to wipe a hard disk clean of any data will often result in data left on the disk. To be effective it takes between 3 and 7 passes with the program to consider a drive fully erased. The more passes one makes with the program, the less of a furrowing effect is left on the drive, thus effectively eliminating more of the recoverable data with each pass of the drive head [4].

Many hard drives built after 2001 have a built-in program for securely erasing data, Secure Erase. It is accessed through a series of commands embedded in the drive, however, before it can be used, it has to be enabled in the motherboard BIOS, as most of the time it is disabled by default. This program works by overwriting every track on the hard drive. Most areas not touched by a simple deletion include “bad blocks”, directory structure, tracks not touched by the operating system, and unformatted sections of the disk, all of which can be touched by this embedded hard disk utility. There is external block overwriting software that can be purchased, there is now a free open source version called “Boot and Nuke” as well as a freeware version of Secure Erase [3].

As has become apparent post-September 11th, recovered data, especially that from government agencies, officials, and employees, as well as from government contractors and their employees, can jeopardize our national security and freedom if it is obtained by terrorist organizations. Many agencies in the federal government such as the FBI and the Department of Defense simply remove the hard drives and drill holes through them, effectively rendering the drive inoperable and shredding the data. Physical destruction of the disk is the ultimate surefire way to render data irrecoverable, but also destroy a potentially useful asset and prevent the computer from being sold or donated to those in need.

When computers have been disposed of by companies, or individuals, it can be relatively easy to recover the data off the disk. In many cases it simply requires booting the computer and getting around the security, if any, to browse the files on the disk. Other times it requires that special data recovery programs and/or hardware be used.

It is not just data containing personal and/or corporate information that can be exploited. Files containing video and audio footage, pornography, blogs and diaries, e-mails, and instant messenger conversations can prove to be equally damaging and more easily exploited, especially if it can be linked to an individual.

In some cases hard drives that have been insufficiently erased to ensure irrecoverable data are a violation of federal laws and/or regulations. For example, the healthcare industry is largely governed by the Health Insurance Portability and Accountability Act of 1996 (HIPAA). HIPAA states that hospitals and other “covered” healthcare entities must ensure that patient information is available only to the patient and those designated in writing by the patient [5]. Any entity found in violation of HIPAA can, depending on the violation, face fines up to \$250,000 and up to ten years of in prison per violation [6].

METHODOLOGY

Hard drives will be collected from thrift stores, goodwill, yard sales, and curbside trash piles in residential neighborhoods during the summer of 2007. The drives will then be analyzed first by simply browsing the programs and files on the disk and recording the types of data found. Once the first analysis is complete, file recovery software will be run on the disk to see what remains of previously deleted files.

Following a pilot analysis, types of information expected to be found during analysis includes social security numbers, names, addresses, credit card numbers, usernames, and ultimately passwords. Other items expected to be found include, but is not limited to e-mails, blogs, and pornography.

All identifying information is necessary for the research and will remain confidential, known only to the authors. The author(s) have an ethical responsibility to turn over to the proper authorities any information found regarding illegal activities.

Results, future discussion, recommendations and future research will be discussed at the time of presentation.

PRELIMINARY CONCLUSION

Some of the data found in the pilot analyses included full names, usernames, and e-mail addresses of the individual(s) who used the computer, as well as personal documents, websites, and files of a pornographic nature which were linked to individual e-mail addresses containing the individual's full name. All of the information listed would be useful to a hacker in some way. The e-mail addresses could be used to initiate phishing and spamming attacks, the full names in addition to the usernames could aid in identity theft, and the pornography could be used as leverage against the individual linked to it, as it contained embarrassing content.

In Today's age of ID theft, cyber crime, and terrorism, too many people are leaving data unguarded. This paper will raise awareness of the massive security issues surrounding unguarded data left on computers disposed of by consumers, corporations, and governments. In some cases some methods of data elimination may prove inadequate. This paper will make recommendations to ensure that there is minimal, if any, security risk when the computer is ready for disposal.

Complete data and discussion will be provided at the conference.

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CHARACTERISTICS THAT LEAD STUDENTS TO CHOOSE IT-RELATED MAJORS

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ABSTRACT

A survey has been administered in order to determine which traits or factors lead to students choosing a major. The survey consists of 28 questions that range from age to learning styles. The questions chosen target a variety of different factors in order to incorporate choices a student may have as well as involuntary life situations. Over 350 students at Georgia Southern University participated in the survey. All of the survey items relate to a student's choice of major either directly or indirectly as well as items that relate to demographic information.

INTRODUCTION

Students from different colleges and universities have all been faced with the challenge of picking a major that would accurately suit them. According to Paul Dressel, "students do not usually make a change in major except after considerable reflection or in reaction to significant disappointment with their current program." (Simpson 1987) The fact that so much work and dedication goes into changing a major, emphasis is placed more on the initial choice. Nahum Medalia believes "that choosing a specific major subject and choice is one of the most important decisions a college student must make." (Medalia, 1968) Most traditional students are not used to the new responsibility that a college student must take on. Living on his/her own is a scary thought especially in combination with choosing a major. Students entering college may not and usually do not know exactly what they want to be doing in their future. Among the inexperienced are the uncertainties of future plans that could potentially start with the initial major choice. "Identification of the major is very useful and helps explain why such a large population of students switch their majors." (Adamek, 1966) Students are required to choose majors but what major he/she chooses could potentially be because of factors that fit with the students personality and life style (Jacobs 1986).

People decide their life paths based on a variety of different reasons. Understanding trends in the traits that could potentially lead to why these particular choices are made is the key to this study. The traits/characteristics of students that chose a major within the College of Information Technology, Information Technology, Information Systems, and Computer Science, are compared against those of other majors. For the sake of the study, all three of the previously mentioned majors will be referred as Information Technology or

IT. In order to understand the methodology behind choosing Information Technology as an academic discipline, Information Technology should be defined. According to ABET, the accrediting organization for IT-related disciplines, defines Information Technology as “an umbrella, under which exists such disciplines as computer science, software engineering, management information systems, computer engineering, information systems, telecommunications and networking, and information technology.” (Results of the ABET Information Technology Colloquium, 2003) Many different disciplines make up the information technology discipline. Although a wide range of fields make up the IT discipline the traits that are up held by these majors are very similar. As technology evolved the need for new IT disciplines also evolved. The type of people to fill these roles has not changed that much from one generation to the next but the abilities and skill sets has evolved with the times. The newest of the information majors is information technology. The major covers a wide variety of computer related aspects but its main focus is on the dissemination of knowledge at a faster rate than ever before seen. IT, now seen as a utility by some, is used in just about every field and is becoming an essential part of every day business.

It is said that most students who enjoy hands on work as well as math would enjoy and choose IT as a major. Problem solving and computational problems go hand in hand with the abilities an information technology major should possess. Some characteristics that people have no control over could also be potential factor as to why an IT discipline major was chosen. Family’s income, first generation college student and future plans all could be factors why students choose a particular major. Data mining tools will help determine if there is actually a trend in traits among students that decide to choose IT as a discipline as opposed to other majors.

Determining the characteristics that lead to students choosing information technology as a major or a related discipline instead of any other available major is the sole purpose of this study. The relationship between an information technology discipline major and a non IT related majors should provide a distinct line based on the characteristics of information technology discipline majors.

BACKGROUND

For centuries, students have been going to college and following the American dream with the first step being choosing major. At Georgia Southern University there are 15,000+ students that all had to make this same decision. This very important decision is the focal point of this research project. The population of Georgia Southern University is diverse and the students being surveyed were randomly chosen. Most of the students at Georgia Southern University come from the state of Georgia. Throughout the years, the SAT scores of entering freshman have risen to at least 1000 for the math and verbal portions of the SAT. As the admission requirement increases, Georgia Southern’s quest for national distinction becomes clearer to the students and faculty alike. Georgia Southern University is located in South Georgia and is only 45 minutes away from Savannah. The students at GSU come from a variety of backgrounds and household living arrangements. There are few international students that attend GSU as well.

The survey was administered on the campus of Georgia Southern University in various classes throughout the College of IT. Participants in the survey were from different majors outside of the College of Information Technology. The survey has a total of 29 questions. The questions are mainly closed-ended questions with a few short open-ended questions. The questions to be asked were carefully chosen and are used to represent the characteristics involved in choosing a major. See Appendix 1 for actual survey. The actual questions on the survey underwent two drafts before the survey was finalized. The first survey only has 19 questions and was not designed for closed-ended questions. A mostly closed ended survey was designed in order to minimize the amount of error and discrepancies among questions. The format for the survey was front and back placed on one page to encourage students to participate despite the length of the survey. Most of the surveys that were administered were in the classroom by the professors. The survey was paper-based so that the professors could easily have students fill out the survey at the beginning or the end of the class period without having to be in a computer lab.

A survey was chosen because it is a very effective way to retrieve information from a large sample size in a uniform fashion. A survey is also a way to differentiate among people who were all pursuing a common interest which is a college degree. Gathering the data from college students to understand any relationships among those in the IT discipline could prove worthy after running data mining techniques.

RESEARCH FRAMEWORK AND METHODOLOGY

In order to understand clearly if characteristics of college students lead to certain major choices research on major choices and a survey was administered. The survey had 29 questions that not only related to personality but also test scores, abilities, preferences and hobbies. The dependent variable used in the study is the actual major that the students choose to pursue. The dependent variable has 2 possible values: IT-major or non-IT major. Originally, there was a third possibility of undecided. However, in the final sample, there were no students that were undecided in their choice of major. There are three IT-related majors at GSU: Information Technology (IT), Information Systems (IS) and Computer Science (CS). Once the survey was successfully designed, following draft three, professors were contacted in order to have students participate in the survey. Over 400 willing students participated in the survey but 339 surveys were complete enough to be used in the final results. Table 1 contains a list of the courses where the survey was administered. In addition to the courses in Table 1, a few surveys were completed by students in various areas of the GSU campus.

TABLE 1: SURVEY SAMPLE DESCRIPTION

CISM 1120 Computer Concepts	Mix of all GSU students (large class)
CISM 4130 Management Information Systems	Primarily business majors (non IS majors)
CISM 2530 Advanced Business Applications	Primarily business majors
CISM 2230 Advanced Java	IS and IT majors
CSCI 1301 Programming Principles I	CS majors
CSCI 1236 Intro to Java Programming	IS and IT majors
CSCI 5090 Special Topics in CS	CS majors

The sample consisted of 65% males. 92% of the students surveyed were between the ages of 18 and 23. 66% of the students had chosen a major that was IT-related. There was a fairly even split between freshmen (23%), sophomores (25%), juniors (27%) and seniors (24%) with the remaining students being graduate students or leaving the question blank. 33% of the respondents were first generation college students. 65% claimed they planned to continue their education after their bachelor’s degree. 54% of the students had switched their major at least once during their college career.

The software used to conduct the data mining session was iData Analyzer or IDA (Information Acumen Corporation) and was available with the textbook *Data Mining: A Tutorial-Based Primer* by Roiger and Geatz (2003). The IDA software is a java-based Excel add-on. The data mining technique used was production rules. Production rules were chosen because the data is mainly categorical. 200 data instances were used as training and the rest of the instances were used to test the model. There were several runs of the software done before deciding on an appropriate set of independent variables for the model. The independent variables were

- Sex
- Age
- High school and college GPA
- Single parent home
- Favorite college and high school classes
- Prefer math or English, science or history
- Like problem-solving
- Hobbies
- Learning style (kinetic, auditory, visual)
- Switched majors
- Expected graduation date
- Variety of other personal characteristics

The dependent variable was whether or not they were an IT major. Production rules were generated after the software was utilized.

DATA ANALYSIS AND RESULTS

After analyzing the data interesting information was brought to the surface. Students deciding to have Information Technology as a major showed little difference in characteristics compared to those that choose other academic disciplines as their choice of major. The classes were separated into two different groups; class 1 represented those that choose Information Technology as an academic discipline and class 0 represented those that choose any major outside of the Information Technology academic discipline. The confusion matrix, provided in Table 2, for the test data classified 67% of the instances correctly indicating that the model being used for determining majors based on certain character traits could be a good model. This indicates that the characteristics chosen to represent the traits that influence major choices could be weak or there may not be any specific traits that accurately represent IT majors as a whole. It is very possible that there is no underlying characteristic or trait that distinguishes IT from any other academic discipline.

TABLE 2: CONFUSION MATRIX FOR TEST DATA

		Major Predicted by Data Mining Technique	
		0	1
Actual Major	0	59	31
	1	14	35

Percent Correct: 67.0%

No production rules were created for IT majors. However, production rules were created for non-IT majors. The two rules for non-IT majors were:

- If video games = no, then class = 0 (non-IT major). The accuracy for this rule is 85.98 % and it covers 68.66% of the instances.
- If Science or History=History, then class = 0. This rule indicates that those people whose major isn't IT related will have a knack for History instead of Science. The accuracy for this rule is 76.70% and the coverage is 58.96%.

The two rules cover 85.82% of the students who were not IT-related majors.

In addition to the two rules, there were a few characteristics/traits that were highly necessary for IT majors and non-IT majors. Table 3 summarizes these characteristics and traits. Since writing and crosswords were not hobbies for either group, these are not really distinguishing characteristics between the two groups. However, the majority of IT majors (85%) enjoy problem solving. Most of the non-IT majors do not enjoy learning (82%) and do not have art as a hobby (83%).

TABLE 3: ATTRIBUTES HIGHLY NECESSARY FOR CLASS MEMBERSHIP

IT Majors	Non-IT Majors
Enjoys problem solving = yes	Art as a hobby = no
Writing as a hobby = no	Writing as a hobby = no
Crosswords as a hobby = no	Crosswords as a hobby = no
	Enjoys learning = no

DISCUSSION AND CONCLUSION

The data from this study shows that there are no characteristics that clearly separate IT discipline majors from other majors. There were several indications that there might be a difference. First, the test data was classified correctly in 67% of the cases. There were two production rules formed for classifying the non-IT major: not having video games as a hobby and a preference for history over science. Finally, there were a few attributes worth noting that were necessary for IT majors and non-IT majors. IT majors tend to enjoy problem solving while non-IT majors do not claim to enjoy learning and do not enjoy art as a hobby. The lack of production rules for IT majors and the fact that there were so few for non-IT majors may indicate that there are not strong differences between the two groups. However, it could just be that the wrong questions were asked.

Just as there is a chance that the wrong questions were asked there is a chance that the right questions were asked and that there is not a difference. More and more students are pursuing a higher level of education and the once typical students of the past just may be molding into unique students with the same common interest. Classification of students based on traits and uncontrollable factors may have less influence on the student's major choice than expected. Some things are unexplainable or at least no formula can be used to pinpoint a typical student that would major in a discipline like IT. The hypothesis that there was a difference between the groups was refuted. Perhaps there is more to the picture in choosing a major, more than the survey that was administered could capture.

One limitation of the study is that the data was only collected at one university. Therefore, the results are not necessarily generalizable. In order to get more accurate results or at least a stronger model more data needs to be collected and the attributes or characteristics/ questions need to be analyzed and modified in order to retrieve better results. If the survey was administered online more students would be able to take the survey along with the necessary error checks to ensure the data was entered in a proper format. Once more data is collected the hypothesis of are there characteristics that lead to students choosing information technology as a major or a related discipline instead of any other available major could be better supported or even more strongly refuted.

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APPENDIX 1

Survey

Please answer the following questions by checking the response that best fits you or filling in the blank with your answer.

1. What is your sex? Male Female
2. What is your age? _____
3. What was your high school GPA?
 1.00 – 1.50 2.01 – 2.50 3.01 – 3.50
 1.51 – 2.00 2.51 – 3.00 3.51 – 4.00
4. What is your current GPA?
 1.00 – 1.50 2.01 – 2.50 3.01 – 3.50
 1.51 – 2.00 2.51 – 3.00 3.51 – 4.00
5. What do you plan to or what are you majoring in?
 Computer Science (CS) Other
 Information Systems (IS) Undecided
 Information Technology (IT)
If “Other”, please specify your major or intended major _____
6. What is your family’s estimated income?
 \$0 – 20K \$40 – 50K \$70 – 80K
 \$20 – 30K \$50 – 60K \$90K+
 \$30 – 40K \$60 – 70K

7. Do you come from a single parent home? Yes No
8. What is your expected starting salary?
- \$0 – 20K \$40 – 50K \$70 – 80K
- \$20 – 30K \$50 – 60K \$90K+
- \$30 – 40K \$60 – 70K
9. What was your favorite class in high school? _____
10. What was your ACT/SAT score? ACT SAT
11. What was your favorite class in college? _____
12. Do you prefer Math or English? Math English
13. Do you prefer Science or History? Science History
14. Do you enjoy problem solving? Yes No
15. What are your hobbies? (Check all that apply)
- | | | |
|--|-----------------------------------|--|
| <input type="checkbox"/> Video games | <input type="checkbox"/> Writing | <input type="checkbox"/> Crosswords |
| <input type="checkbox"/> Playing sports | <input type="checkbox"/> Learning | <input type="checkbox"/> Math puzzles
(like Sudoku) |
| <input type="checkbox"/> Watching sports | <input type="checkbox"/> Dancing | |
| <input type="checkbox"/> Music | <input type="checkbox"/> Cooking | |
| <input type="checkbox"/> Art | <input type="checkbox"/> Reading | |
- Other: Please specify _____
16. What is your preferred learning style?
- Kinesthetic (Hands-on)
- Visual (Understanding through seeing)
- Auditory (Understanding through listening)
17. Have you ever switched majors? Yes No
- If yes, how many times? 1 2 3+
18. What is the number of credit hours you have completed? _____

19. What is your expected graduation year?

2007 2008 2009 2010 2011 2012
 After 2012

20. Are you a first generation college student? Yes No

21. Do you plan to continue your education after your bachelor's degree? Yes No

22. Do you plan to live with your parents after graduation? Yes No

23. Did you attend private or public high school? Private Public

24. Do you have any financial obligations due to attending school (i.e. loans)? Yes No

25. Are you planning to stay in Georgia or move elsewhere? Stay Move

26. Were you forced to choose you're major by anyone other than yourself? Yes No

27. What is your classification?

Freshman Sophomore Junior Senior Graduate student

28. Do you currently work while attending school? Yes No

29. Do you have any prior experience in your major/field? Yes No

AN INVESTIGATION OF UNITED STATES VOTING METHODS: A MULTIDISCIPLINARY PERSPECTIVE AND LOCAL IMPLICATIONS FOR THE RICHMOND METROPOLITAN AREA

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ABSTRACT

While voting fraud has been a prevalent issue since the issuance of paper ballots in the 19th century, the debate wages on as to whether elections will ever be entirely secure. The Help America Vote Act of 2002 helped localities throughout the United States replace outdated voting technologies with computerized and often paper-less ballots. The City of Richmond, Virginia and surrounding localities have seen a fairly smooth transition to the newer technologies, though area Registrars are divided on the merits of the WINvote Direct Recording Electronic (DRE) machines and the paper-based AutoMARK machines.

INTRODUCTION

This research, funded by the Center for Civic Engagement at the University of Richmond, investigates what some would call the most widely available and important form of civic engagement for citizens of the United States. The right to vote is fundamental to our democracy and provides a solid foundation for our local, state, and national governments only to the extent that citizens believe that elections are conducted in a fair, honest and secure fashion. Backed with a historical analysis of U.S. voting procedures and technologies, we identify what we believe to be, the best solution to current technological shortcomings that have been known to disenfranchise and reduce confidence in a significant portion of the voting population. This paper illuminates the important issues that lead to or detract from voter confidence in elections. Through face to face interviews with election officials of the City of Richmond, Virginia and the surrounding counties, the current status of the methods used in those localities is determined, then compared and contrasted to each other and with the best practice.

HISTORY OF VOTING IN THE UNITED STATES

Contentious Issues Leading to 2000

The Supreme Court stated, “The concept of political equality from the Declaration of Independence to Lincoln’s Gettysburg Address, to the 15th, 17th, and 19th Amendments can mean only one thing – one person, one vote.” Although the United States was founded on equal opportunity for all citizens, voting disenfranchisement and discrimination have been prevalent in the United States for much of the country’s

existence. From the country's founding until the mid-nineteenth century, restrictions on voting and registration allowed only for white males over the age of twenty-one to have voting rights (Saltman, 2006, pg.65). The right to vote is a central characteristic of possessing full citizenship, but for many years, women's and minorities' votes were suppressed as they were viewed as subordinates or in some cases, less than people. Voting rights have made great progress through three major amendments instituted in United States history in order to ensure people's right to vote is consistent across all races, ages, and genders.

One of the major amendments ratified in 1870 after the American Civil War was the Fifteenth Amendment which granted suffrage to all eligible male voters regardless of their race (Saltman, 2006, pg. 77). Even with this Amendment in place, racial discrimination would continue to occur at the polls through harassment, intimidation, and sometimes even murder of minorities and their supporters (Saltman, 2006, pg. 77). Around this time, the U.S. Supreme Court ruled that the Fifteenth Amendment did not require African Americans be given the right to vote without qualification. Therefore, as long as a poll tax or literacy test was administered without racial bias, it was in effect, constitutional. It was a common trend among Southern lawmakers to require everyone to take a literacy test or pay a poll tax; however this greatly disenfranchised African-American voters (Saltman, 2006, pg. 77). Poll taxes and literacy tests were often biased and capable minorities were commonly turned away from polling stations. In an attempt to end racial discrimination, Congress adopted the Enforcement Act of 1870, which classified any action, prevention, or attempt to inhibit a person from voting or registering to vote to be a federal crime. The Act established the Department of Justice as a Cabinet-level department and was made responsible to uphold voting rights; yet minority voters were still oppressed (Goldman, 2001, pg. 17). An effect of the Civil Rights Movement was the Voting Rights Act, where in 1965 the use of tests or devices as methods of voter suppression was subsequently ended (Saltman, 2006, pg 137). The Voting Rights Act and Civil Rights Movement fought pervasive segregation and the inferior treatment of minorities in every aspect of life.

Prior to the ratification of the Nineteenth Amendment in 1920, women's suffrage had only been granted in Utah, Wyoming, and Colorado. Women's voting rights had a huge impact on the electorate by almost doubling it in size and started a movement for women to gain more equality socially, politically, and professionally. Many believed that women's presence would have a positive effect at the polls and decrease the occurrences of violence and rowdiness (Saltman, 2006, pg. 130).

The latest major development in the voting rights movement resulted from the Vietnam War in which men under the age of twenty-one had been drafted to fight. In 1971, the Twenty-sixth Amendment lowered the voting age from twenty-one to eighteen in order to provide the youth of America a voting voice in choosing officials that could send them to war (Saltman, 2006, pg. 140).

Examples of election fraud from a historical perspective

Despite the purity of the democratic process, where everyone has a voice in the governing of a nation, history has seen elections won and lost through unethical and illegal means. Election fraud, through various schemes and tactics, greatly influenced American politics, most notably in the 19th century. While widespread fraud in a Presidential election would be difficult to achieve and to detect, most published accounts of fraudulent elections occurred at the local or city level.

In the early 19th century when elections were administered through non-standardized paper ballots, those looking to alter the outcomes of elections were met with little resistance. The use of "floaters" and "repeaters" was quite common. A floater was someone who was willing to vote for a particular ticket in exchange for a monetary award. Similarly, a repeater did much of the same and tended to vote often, including in other precincts (Saltman, 2006, pg. 72). During this time, organized political rings had

considerable say in how people cast their ballots. The most famous political ring of this era, the Tweed Ring of New York City, was instrumental in shaping the outcome of elections. In the 1868 national election, the Tweed Ring organized gangs of repeaters to register and then cast ballots. Each recruited member was given a piece of paper with information including a name and address to be used for registration and voting. Once a repeater cast the initial ballot, he returned to the headquarters location and was given another phony name and address. This practice was being carried out throughout Election Day (Davenport, 1894, pp. 168-174).

The New York City Board of Aldermen's later submitted a report in 1878 to examine the involvement of the Tweed Ring during the same 1868 election. It was estimated that 8% of all votes cast were voted in excess of the population and that 50,000 votes had been cast illegally (Saltman, 2006, pg. 75). Tammany Hall, a large political machine responsible for controlling New York City politics for nearly 200 years, would withhold final ballot figures until it was known how many votes would be needed to surpass any out-of city total. That type of large-scale manipulation was common during the era, especially under the guidance of strong political groups with financial motivations. The success of such political machines was due in large part to the lack of regulation in the polling process. Voter eligibility was difficult to determine due to the lack of voter registration laws across most states. It is also to be noted that election officials were generally partisan, rather than taking a more neutral stance (Argersinger, 1986, p. 672). These flaws within the system made the concept of rigging or even stealing an election that much more plausible.

While not everyone participated in a large political machine, similar to Tammany Hall, it was not uncommon for voters to be bribed in the late 19th century. In New Jersey in 1883, a state legislative committee found "a large proportion of... the voting population depended upon Election Day as a regular source of income" (McCormick, 1953, pp. 159-162). Also in New Jersey, the 1889 election was reported by the *State Gazette*, to be an election involving large scale bribery. "Ward workers were given stacks of money at the same time that they picked up stacks of ballots to be distributed among constituents." It was estimated that 50,000 votes involved bribery among the 270,000 votes cast for governor (Saltman, 2006, pg. 91).

In South Carolina, also in the late 19th century, there was a formal investigation of the permission of "tissue ballots" by election officials. Essentially, tissue ballots were thin copies of an original completed ballot that were attached prior to submitting the ballot. This method, while clever and illegal, received the cooperation of election officials. Their cooperation was measured by the deliberate shaking of the ballot boxes at the close of the election, where at that point all of the loosely attached thin copies would separate from the original ballot (Goldman, 2001, pg. 68). Another technique used to defraud elections was the technique known as chain voting. Under chain voting, a lead voter would enter the polling station with a ballot indicated with the "assigned" votes, per instructions. The voter would exit the station with the unmarked ballot in hand and pass it off to the next voter, who would then follow the given voting instructions. The first voter would lose the opportunity to vote; however this scheme could be run continuously as long as there were voters willing to participate in the operation (Saltman, 2006, pg. 103). This method of defrauding elections would later be prevented by including sequenced numbers on the blank ballots.

While some fraudulent actions are more overt than others, such as the tissue ballot and the recruitment of felons to vote, the use of intimidation constitutes a tacit form of fraud. In the 1888 national election it was known that large companies in the Mid-West and in New York intimidated their employees to vote a certain way, while some firms even threatened their workers with unemployment (Josephson, 1938, p. 428). There were also reported instances of intimidation at the 1926 Republican primary in Chicago, known to be one the most corrupt elections in history. Violence, kidnapping, repeating, and ballot stuffing were also reported (Harris, 1929, pp. 362-377, 1934, pp. 340-369).

Also during the Prohibition era, it was not uncommon for people to be paid to impersonate dead or moved persons during an election. Such was the case in an election in Louisville, Kentucky in 1925, which was subsequently set aside by the Kentucky Court of Appeals. In Cleveland, it was found in 1928 that votes were deliberately cast in the names of dead or out-of-town voters to sway election results (Harris 1934).

History of Voting Technology: Early Methods to Present Trends

As noted by Saltman and expounded upon by Roth, the study of human usability of voting equipment has not been well considered by social scientists of recent history. Roth explains that “the human use of voting equipment and voters’ perceptions of the voting experience have largely been overlooked” (Roth, 1998, p. 29). This has been a motivation for this study as we examine the disenfranchisement of particular groups with respect to voting methods.

The history of voting technology in the United States spans a period that involves the most rudimentary methods of recording and tallying votes as well as the most sophisticated; with thousands of lines of computer code to perform the same function, albeit in a more anonymous and theoretically secure manner. The methods employed by election officials to record and tally votes have adapted as technological ingenuity and democratic idealism have allowed.

Even before votes were cast by paper ballot, eligible voters in the United States were required to publicly declare their chosen candidates. Under this method, referred to as *viva voce*, voters would precede to an established voting location, usually a church, home, store, or pub and be prompted to verify their legal status, i.e. residence and financial state, in front of the election board and others present. *Viva voce* in itself is a fairly pure form of the democratic process. It permitted all those eligible to vote, an opportunity to select candidates with little chance of misinterpreting the voter’s intent, as there were typically several witnesses present. After indicating their choices, the votes were recorded by the election officials. (Saltman, 2006, p. 43). It also would not be uncommon for candidates to be present at polling places, where they could then thank voters for casting their ballots. The simplicity of this method allows for high voter verifiability as well as high voter assurance; however this method greatly lacks anonymity. This “open-air” method of voting permits opportunities for coercion and intimidation among potential voters. The 12th Amendment, ratified in 1804, required ballot use for Presidential elections. It was not until the enactment of the Federal Election Law of 1871 did Congress formally mandate voting technologies, thereby requiring the use of paper ballots in all elections, Federal and State. At that time Kentucky and Oregon were the only two remaining states who continued to use *viva voce* as a viable method of election procedure (Saltman, 2006, pg. 82).

Prior to the Federal Election Law, many states began to move away from the *viva voce* method and opted for secret, paper ballots. During this time the ballots were rather simple; most often they were scraps of paper marked only with a voter’s written choice. The voter would then submit his hand-written ballot to the election officials, where it could be recorded and retained in the event of a recount. This method allows for anonymity of the voting population and is auditable. While this was seen as an improved form of voting technology, there remained possibilities for fraud and coercion. Cases involving ballot stuffing and the use of tissue ballots were widely known.

The paper ballot did not see its next phase in development until the introduction of the Australian ballot in the late 19th century. The Australian ballot was the first known standardized ballot provided to voters that featured candidates and their party affiliations directly on the ballot (Saltman, 2006, pg. 96). First used in the Australian state of Victoria in 1856, its use spread to the state of South Australia later that year. The development of the Australian ballot came at a good time as there were several contentious issues

surrounding the non-standardized paper ballots. First, the paper ballots provided to the voter at the polling stations were typically given by two main parties. Therefore, it was clear to other voters who one would be voting for, based upon the distinctive partisan ballots. It was also difficult for voters to deviate from straight ticket voting. In some states the Australian ballot featured, along with all represented parties and their respective candidates, party symbols to help denote a candidate's particular affiliation. Given this, the Australian ballot was preferable over other forms of the paper ballot because it was deemed more accessible to the illiterate.

In Virginia the first Australian ballot law was passed in 1894 and provided for an "office group" notation on the ballots, rather than assortment by party. The law did not provide for straight ticket voting or blank spaces for write-in candidates. The state constitution provided that all elections would be conducted by ballot, each provided by the Commonwealth and without any signifying marks or symbols to denote party affiliations. Therefore under this law, only a candidate's name and the office he was seeking could be displayed (Ludington, 1911, pgs.190-191). This differs from the regular concept of an Australian ballot, which would feature symbols that could aid the illiterate in identifying political affiliations.

In order to correctly mark a ballot in the early 20th century, voters in Virginia were required to strike a line through the names of the candidates he did *not* wish to vote for and keep all candidates he did wish to vote for unchanged. The law stipulated specifically that the lines must cover at least three-fourths of the names indicated or else the mark would not be considered valid. In order to write in a candidate, a voter could erase the name of a candidate and fill in the desired name as there was not a space allocated for write-ins on the early ballots (Ludington, 1911, pgs. 190-191). The secret ballots used in the early 20th century are referred to by Kornbluh as "defacto literacy tests," where blacks, immigrants, and the poor contributed to record low participation rates (Kornbluh, 2000, pg 126).

The demonstration of the Myers machine, the first voting machine to be used in the United States, occurred in Rochester, New York in November of 1889 (Ludington, 1911, p. 51). The "Myers Automatic-ballot cabinet" as it was called, was first implemented in Lockport, New York in 1890 and then in about a dozen small villages around Lockport in 1893 (Saltman, 2006, pg. 112). The early machine was described as being a large cabinet featuring six party columns and thirty-five "knobs" per column. The early reactions of voters and election officials were that they were quite pleased with the new technology. Between 1900 and 1910, several cities began to implement voting machines for election purposes, including Buffalo, Indianapolis, and Hartford. Illinois and Michigan also permitted their use in elections; however Detroit and Chicago did not utilize them in their elections until later in the 20th century (Saltman, 2006, pg. 118). It was with the advent of the voting machine that the democratic process began its gradual move away from paper-based elections. The recording of votes occurs within the machines and the final tallies are read from the counters, also within the machines. While this reduced the need for manually tabulating final election results, this method requires a great deal of trust in the system, as noted by Zukerman. He writes that "presumably the voting machine does require an act of faith on the part of the voter in a mechanical contrivance whose workings he cannot see" (Zukerman, 1925, pg. 63). It is striking to note that the issues of voter assurance and transparency were as relevant in 1925 as they are now with electronic voting machines.

As the beginning of the computer age was getting underway in the latter half of the 20th century, voting technology began to move back towards paper ballots with the use of pre-scored punch cards (PPCs). Saltman notes that after 1964, PPCs began to replace much of the lever machines previously used, however some municipalities including New York City, continued their use into the 2004 election (Saltman, 2006, pg. 157). PPCs are designed to be read by computers, making the counting of ballots more efficient and accurate. Under PPC voting, a voter would be instructed to select candidates by completely punching through the appropriate boxes with a stylus or another similar device. This type of voting, most famously known as the Votomatic system, grew in its national use, accounting for 40 percent

of all votes in 1988 (Saltman, 1988, pg. 49). A significant difference between PPC voting and voting by lever machines is that a voter's intent can be recorded, a highly debated issue during the 2000 Presidential Election.

Also during this period defined by increasing computerization, marksense ballots were more frequently used. Marksense ballots are similar to PPC voting in that both types of ballots are read and counted by computer. The main difference between the two however is the way in which a voter will indicate a choice on the ballot. As mentioned before, a choice is indicated on a PPC ballot by removing the pre-scored chad with a stylus. A choice on a marksense ballot is indicated by connecting an arrow near the candidate's name or the filling in of the respective circle or square with a pencil, much like a standardized test, such as the SAT. The ballot is then read by an optical scanner where the votes are later tallied. Saltman notes an advantage of the marksense ballot over the PPC ballot in that the marksense ballot is not limited by size constraints, such is the case with standard punch cards. Another advantage of the marksense system, sold mainly as precinct-count systems, is that it can be programmed to return the ballot to the voter if an overvote has been cast (Saltman, 2006, pg. 164). It is also to be noted that in the 2000 election, more voters used a marksense system than a PPC based system (Brace, 2004, attach. 6).

The next development in voting technology was the implementation of Direct Recording Electronic (DRE) machines. Following the 2000 Presidential race that was determined by the interpretation of voters' intent on Florida's PPC ballots, Congress passed the Help America Vote Act (HAVA) in 2002 and with that came the ushering in of electronic voting machines. The DREs were seen as the best solution to preventing another election debacle that occurred in 2000 by helping to eliminate voter error during the voting process. The touch screen based systems require voters to select from a list of candidates until voting is complete. In particular, the Diebold Accuvote system requires the use of digital smart-cards that are to be inserted into the machine by each voter before voting can commence. The smart-cards act as proof that the voter is eligible to vote and contains basic information such as political party and the voter's voting language (Electronic Frontier Foundation, 2004). After completing the voting process, the voter will return the smart-card to the election official where it will be reset to ensure that a voter may not cast additional ballots. At the close of the polls, election officials will use another smart-card, known as the *administrator card*, which will extract all internally stored votes from the DREs and collect them for tabulation and transmission through physical or electronic means to a remote computer.

EVENTS: 2000 AND FORWARD

Florida and the 2000 Presidential Election

In many ways the 2000 Presidential election changed the course of how elections are conducted and how democracy may be ensured for the future. The election debacle in Florida has served as an impetus for new legislative measures that have dispersed billions of dollars to states (most specifically HAVA of 2002) to alleviate concerns of unreliable voting methods. This period has also been marked by technological innovation, where DREs have altered the landscape of elections. While both the legislative and technological innovations have been lauded as giant steps forward to ensure reliable election results, both have come under tremendous scrutiny from politicians, advocacy groups, and computer scientists for being either misdirected or incomplete.

The Supreme Court of Florida spoke of the 2000 election in *Gore vs. Harris*, that "this Presidential election has demonstrated the vulnerability of what we believe to be a bedrock principle of democracy: that every vote counts" (Supreme Court of Florida, No. SC00-243). The fallout of the events in Florida in 2000 has left many to believe that the system in place prior to the election was doomed to fail; it just

happened to occur during one of the most highly contested Presidential elections in history. Florida's election procedures were in the national spotlight for weeks following the election, showing all of the weaknesses that a PPC-based election possesses. The Votomatic punchcard ballots, like those used in Florida, tend to produce more unrecorded votes than other voting methods (Alvarez, Sinclair, Wilson, 2003; Ansolabehere, Stewart, 2005; Knack, Kroph, 2003a). It was known to election officials that a punch card ballot disfavored a certain portion of the electorate and that a significant amount of voter error was a natural element of the system. Still, no overhauls were made for fear of great costs to the local political groups (Saltman, 2006, pg. 36).

Florida, as well as many other states, used varied forms of voting methods during the 2000 election, including PPCs, marksense, and DREs. Among the three, PPCs were used by more than 60% of the electorate; thus their principal significance in the election process. Issues surrounding the PPC ballots during the election included misvotes, overvotes, and undervotes on the "butterfly" designed ballot. The spacing of the candidates' names as well as the size of the font of the butterfly ballots confused voters as for whom they voted. It was a common mistake among voters who were looking to select the Democratic candidate located beneath the Republican candidate to have mistakenly selected the Reform party candidate of Pat Buchanan (Saltman, 2006, pg 16).

The issue of undervotes and overvotes also proved to be significant in the final tally of votes. Undervotes occur when the voter, either purposefully or accidentally, fails to select the appropriate amount of candidates. For example, an undervote would occur if the voter selected two candidates from a list of five, while being instructed to choose three. This decision is solely the voter's and is legal, however the counting of the votes can be complicated; such was the case in 2000. An overvote occurs when a voter chooses more candidates than allowed. For example, if a voter was instructed to choose two candidates for a town councilman post and consequently selected three candidates, the ballot would become void under the computer- read PPC ballot system.

Despite the ordered manual recount in Miami-Dade, Palm Beach, Broward, and Volusia Counties, Bush retained the lead and won the election. However, the results may have been different had Vice-President Gore ordered a manual recount of all votes in Florida. According to a study conducted by the Consortium Group, Gore's margin of victory would have been approximately 171 votes (Keating, 2002, pg. 8). The legal actions surrounding the ballot issues, from the Florida Courts to the U.S. Supreme Court, produced what would be the beginning of sweeping changes to how elections would operate. The Florida Supreme Court issued this as part of its statement during the review process: "in these election contests based upon allegations that functioning punchcard voting machines have failed to record legal votes, the demonstrated margins of error may be so great to suggest that it is necessary to reevaluate utilization of the mechanisms employed as a viable system" (Supreme Court of Florida, No. SC00-243). This early call for reform would gain steam in the months following the election and would result in the passing of HAVA in October of 2002.

Reform Attempts

In response to the Presidential Election of 2000, legislative acts were passed to avoid future election problems by developing voting technology and registration. The Help America Vote Act (HAVA) was a major act passed in October of 2002 which sanctioned federal funding to upgrade voting equipment across the country (Saltman, 2006 pg. 3). The program reserved \$650 million dollars to advance voting technology with computerized devices, train poll workers, improve accessibility, update voter databases, and perform election research and studies (Katel, 2006). The Act's main goals were to create uniform and nondiscriminatory elections. The Act formed the Election Assistance Commission (EAC), founded in 2004, to implement the voting upgrade process by collecting election information, reviewing voting procedures, and distributing funding (Hite, 2007).

HAVA's financial services promote computerized voting stations like the DRE touch screen devices and the update of databases. The quick shift from punch card and lever voting stations to DRE or optical scanners has created much resistance, due to issues concerning transparency, reliability, and security issues. Opposition to the DRE machines has arisen mostly due to the lack of paper records used to confirm voting records as well as the open possibility to corrupt multiple voting machines, which would certainly influence the aggregate results of an election (Rubin, 2006, pgs. 21, 37, 189). Advocates of electronic voting machines have argued that electronic voting is more reliable than punch-card machines, easier to use, and reject reports of vulnerability to software manipulation as extremely rare hypothetical scenarios (Katel, 2006; Rubin, 2006).

In addition to HAVA, Congressman Rush Holt (NJ-12) has introduced the Voter Integrity Bill in the spring of 2007, an act that calls for voter-verifiable paper ballots, security chains with documentation to prohibit vendor fraud, and random audits by hand counting a number of voting precincts in each Congressional District. Furthermore, Representative Holt calls for the inspection of voting system software which would allow for more transparent election processes. Representative Holt has stepped forward to meet the concerns of voters who have become skeptical of the widely used DREs and with this bill, would put pressure on the manufacturers of voting machines to equip machines with paper printout functions.

Other issues concerning HAVA have come from the updating of voter databases and the enacted new voter identification laws. HAVA has allowed first time voters to register to vote by mail while first time voters who did not register by mail will need to show photo identification in order to cast their ballot. In response to terrorism and immigration issues, many states have been creating more stringent photo identification laws, such as Arizona which requires all voters to show definitive proof of U.S. citizenship for registration. Since 2000, twenty-two states have raised their standards for identification, even though HAVA has not imposed any mandate regarding the issue. In 2005, The Carter-Baker commission called for tougher voting identification cards to prevent multiple voting and other forms of voter fraud.

The Democratic Party and the American Civil Liberties Union (ACLU) have been in opposition to stricter ID cards because the fees to acquire the cards parallel the poll taxes Southern states used to inhibit blacks from voting prior to the Voting Rights Act of the 1965. Those in opposition to the ID cards claim that the fees disenfranchise the poor and minority group voters, and also do not toughen requirements for absentee voters. The lack of proper identification among minorities and the elderly could affect the polls and would marginalize these groups by muting their right to vote. The Real ID Act of 2005 calls for proof of citizenship through passports or birth certificates by 2008, and would further disenfranchise the poor, minorities, and the elderly (Katel, 2006).

Part of HAVA calls for the disbursement of funds to states to update voting machines and to educate voters of their use. It was at this time that the touchscreen DREs began to be implemented throughout the country as states were looking to replace the PPC based systems that had failed miserably in Florida. States were beginning the process of upgrading to touchscreen DREs in the summer of 2003 that is, until the release of the industry shaking Johns Hopkins-Rice Report, spearheaded by computer scientist Dr. Aviel Rubin of Johns Hopkins. The study led by Rubin uncovered that the source code behind Diebold's Accuvote voting machine, made available on the internet, possessed critical design flaws that could leave the machine vulnerable to fraud. The immediate impact of the study left many states uncertain and skeptical of the reliability and security of the voting machines. Other issues surrounding this new technology included the lack of voter verifiability. Dr. David Dill of Stanford identifies it as the concern that without a paper record there is no way for a voter to verify that the vote has been recorded accurately. Even if a confirmation screen tells the voter that the vote has been recorded, it does not mean that the vote

has been stored or recorded correctly (Rubin, 2006, pg. 21). These concerns are cause for a reduction in voter confidence.

Rubin describes two scenarios of how an election could be vulnerable to malicious activities, via the DRE machines. The first is retail fraud. Retail fraud is the result of someone wanting to manipulate an election by tampering with each individual machine. The second example is wholesale fraud, which is the ability to corrupt many machines in multiple locations from a single action (Rubin, 2006, pg. 37). While the occurrence of retail fraud in an election is more detectable, the impact of a wholesale fraud attempt would be devastating and would be difficult to trace. Dr. Rubin as well as others in the information security field, believes it is possible for a manufacturer of an electronic voting machine to imbed malicious software that would go undetected even by trained professionals. However, manufacturers of the machines as well as politicians tend to believe that such a scenario is impossible (Rubin, 2006, pg. 39).

At the Center for Information Technology Policy at Princeton, a group of computer scientists took a closer look at the Diebold AccuVote-TS Voting machine to examine its hardware and software for design and security flaws. Among their principal findings, they found that it is possible that malicious software running on the machines could easily and unnoticeably modify all records, audit logs, and counters on the voting machine (Feldman, Halderman, Felten, 2006). The group also found that it is feasible for anyone who would have physical access to the machines to install malicious software in under a minute (Feldman, Halderman, Felten, 2006). Their third finding is that it is possible for software viruses to spread from machine to machine during normal election activity as well as the pre- and post-election activities. Their finding was conclusive as they were able to design a vote-stealing virus that spread easily to different machines through the transfer of memory cards. Their final and most fundamental finding is that the problems uncovered by their previous discoveries could be eliminated by improving both the hardware and software of the Diebold machines (Feldman, Halderman, Felten, 2006). The study is the first to publicly field test the DRE machine and its hardware. Despite critical responses from Diebold, the Princeton group maintains their claims that the systems widely used in U.S. elections are insecure and susceptible to fraud.

In order to combat certain types of fraud, officials are calling for parallel testing to try and identify any rigged machines. Under parallel testing, election officials would randomly select DREs from a randomly selected precinct and test them under normal conditions. On the day of election, testers would come into the selected voting location and remove several random machines where they could later cast votes on them at what is called a *phantom precinct*. At the end of the day the testers would compare the electronic results with the actual amount of votes cast on the machines. If the totals do not match, the testers could reasonably assume that the machines had been manipulated. The aim of parallel testing is to fool any malicious software that was designed to perform under normal testing conditions but would begin to manipulate results during an election (Rubin, 2006, pg. 180). While parallel testing might seem as a positive step forward to supervise the administration of this new technology, some feel that it is inadequate. In essence, testers will only examine a fraction of one percent of all voting machines in a state. This would permit a type of attack that cheats only a small percentage of the time or on a small number of DREs (Rubin, 2006, pg 180). Another limitation of parallel testing is that it would be unable to detect a “knock” attack. A knock attack is a malicious activity that is caused by some action by the voter, for example, touching the bottom right hand corner of the screen four times in a row.

Integrity Still in Question

There have been several well documented accounts of the new voting machines failing to meet the needs of the electorate. During the 2004 election, major problems with e-voting machines occurred in both Columbus and Youngstown, Ohio, and Jacksonville, N.C. In Columbus, errors with the voting systems

gave President Bush 3,893 extra votes when Franklin County, a suburb of Columbus, recorded almost three thousand votes in excess of total voters. The election's results would not be affected by the erroneous votes as President Bush won by more than 136,000 votes in Ohio, but the findings demonstrate significant flaws in the e-voting systems that could potentially change a close election. The Youngstown case, as reported by an investigation by the *Washington Post*, involved an undetermined transfer of votes for Senator Kerry to President Bush. This unexplained transfer of votes involved 25 voting machines (House Judiciary Committee, 2005, pg. 52).

In the other instance, citizens of Jacksonville, North Carolina voting for commissioner of agriculture lost more than 4,500 votes due to officials believing the e-voting computers stored close to 10,000 votes when in reality the storage unit could only handle 3,005. Officials were misinformed when there was confusion on the model of machines used in the county. Sadly, the computers had no ability to retrieve the 4,530 lost votes that were discarded in Carteret County, NC.

Entering the 2004 Presidential election, the state of Ohio was largely known as a "battleground state" where a significant amount of campaigning was to take place by both President George W. Bush and Senator John Kerry. The election results from Ohio have been widely disputed, due to irregularities in exit poll figures as well as final tallies. The winning margin for Bush in Ohio was substantial, however many are suspect of the methods by which the election was managed.

Secretary of State J. Kenneth Blackwell, charged with overseeing the election in Ohio, came under fire for various accusations of impropriety. To begin with, Mr. Blackwell, while serving as Secretary of State in Ohio, also served as co-chair of President Bush's reelection committee. This relationship was not very different from Florida Secretary of State Katherine Harris' questionable ties in 2000. In the weeks and days preceding the election, Secretary Blackwell modified long-standing election procedures, such as changing the type of acceptable paper for provisional ballots and restricting the use of provisional ballots themselves. The House Judiciary Committee, led by House Representative John Conyers (D-MI.) issued a report on the events of the Ohio election. It notes that in mid-September of 2004, Secretary Blackwell directed that all provisional ballots were to be cast in the actual precincts of the voters or else they would be discarded. His rationale was that allowing voters to cast provisional ballots from outside of their precincts would be "a recipe for Election Day Chaos." This directive however, led to thousands of validly registered voters to have their ballots thrown out. Ohio Governor Bob Taft believed that decision could have affected over 100,000 voters (House Judiciary Committee, 2005, pg 31). Also, Mr. Blackwell prevented the issuance of provisional ballots for all of those who requested absentee ballots, even if they failed to receive them prior to the official deadline or if they did not receive them at all (Ibid, pg 47). It was not until a lawsuit filed by a college student who did not receive her absentee ballot and was later denied a provisional ballot, did Secretary Blackwell's directive become overturned. This court decision did not occur until late on Election Day and many were not given the opportunity to vote.

The House Judiciary Committee also found that there were large groups of disenfranchised voters, most notably in historically minority and Democratic precincts. This disenfranchisement was due in part by the misallocation of voting machines among precincts. The report cites a *New York Times* investigation that found that officials had relocated voting machines assigned to the city of Columbus to the surrounding suburbs (House Judiciary Committee, 2005, pg 25). This translated to more voting machines per voter among the Bush-supported suburban precincts. This decision helped to influence long waiting lines, such as four to five hour waits in precincts 35B and C in Columbus and a seven hour wait in a precinct with one voting machine per thousand voters. It was told that the adjacent precinct had one machine for every 184 voters (House Judiciary Committee, 2005, pg 26). On that Election Day, many voting machines were held back for unknown purposes. For example, the estimated need for Franklin County was 5,000 voting machines, however was given just 2,866. This number was further reduced as the Franklin County Board

of Elections revealed that 81 voting machines were never put to use and that another 77 malfunctioned on Election Day (House Judiciary Committee, 2005, pg 25).

Adding more suspicion to the election supervised by Secretary Blackwell, there were numerous accounts of electronic votes switching from Senator Kerry to President Bush in Mahoning County. In historically Republican Warren County, election officials locked down their administration building during the counting of votes and refused entry to the media to observe the tallying. When that decision was questioned, officials responded that they were reacting to a terrorist threat, a “10” on a 1-10 scale, while operating with information given by the FBI. When asked about the incident, the FBI stated that they had no information about a terror threat in Warren County (House Judiciary Committee, 2005, pg 49). This type of “behind closed doors” behavior characterized the proceedings in Ohio, as many of the questions surrounding the official results and other contentious issues were not resolved in the months following the election.

Disenfranchisement

Voting disenfranchisement is the suppression or threat to an individual’s voting rights. In the past, disenfranchisement was more apparent with legal restrictions during the Jim Crow Era of the Southern United States, but today voter suppression is more subtle (Friedman, 2005). Today, disenfranchisement tends to increase with population density, high black populations, Democratic loyalty, and as the margin of support between the two main candidates for a nationwide office is narrow. Friedman offers two forms of disenfranchisement; partisan disenfranchisement, consisting of strategies one party uses to depress the turnout of another party’s voters, and structural disenfranchisement, which entails laws and regulations that depress the voter of low status groups. An example of Party disenfranchisement would be the Republican opposition to same day voter registration, as Democrats are more likely to lose if there is low voter turnout at the polls. Structural disenfranchisement is apparent in the registration process of voting (Friedman, 2005). In most cases a form of photo identification or proof of residency is required to register to vote. This requirement disenfranchises the poor who need to pay at a minimum \$40.00 in Virginia for a driver’s license or \$82-\$97 dollars for a passport (U.S. Department of State). A recent study in 2005 at the University of Wisconsin found that 45 percent of African-American men and 51 percent of black women in Wisconsin had valid driver’s licenses. Similarly, only 54 percent of Hispanic men and 41 percent of the women had licenses. The Wisconsin study demonstrates the disadvantage that minorities have in presenting identification when only about half of the population has driver’s licenses, the most common form of identification. The registrars’ offices also allow for utility bills as proof of residency, which may accommodate some of the poor population to acquire identification but still can disenfranchise those who are part of large public housing or are living illegally with a family member in an apartment. Potential voters could be hesitant to acquire utility bills because attempting to prove their residency could jeopardize their housing situations (Friedman, 2005).

Disenfranchisement can also be perceived in the makeup of precincts. Minority voters tend to be less educated and less wealthy than white voters. (Buchler, Jarvis, McNulty, 2004, pg 518) Wealthier precincts which are predominantly white have the necessary resources and funding to acquire the most advanced technological voting equipment, while poorer precincts must prioritize their budget which forces them to focus programs like education instead of voting equipment upgrades. Poorer counties tend to have older, less accurate voting machines.

Prior to the 2000 election Rep. Roybal-Allard (D-CA) requested a national report investigating the connection of race and income to the number of undercounted and uncounted votes in the 2000 election. The study found that voters in low income districts with a high minority population were significantly more likely to cast residual votes than voters in affluent counties with a low minority population. More advanced technology significantly reduced uncounted votes in low income counties with high minority

populations. In any given election, minority voters are casting residual votes at a much higher rate than white voters, mostly due to the fact that their districts have inferior voting technology that allows their votes to be discarded. One way to improve discarded voting is by using DRE or lever machines which cut the gap in voting errors by a factor of ten (Tomz and Van Houweling, 2003).

EXTENDING THE RIGHT TO VOTE

Immigration and Voting

The Immigration Reform Bill considered in Congress in 2007, if passed, would have criminalized illegal immigrants to the point of detention or deportation. Politicians are treading lightly around the issue for fear of losing valuable votes among minority populations, most specifically Latino and Asian votes. While this issue is continuing to play out in 2007, the results of the legislation should have measurable impacts on the minority electorate.

The immigrant population's involvement in the electoral process is a key contemporary voting issue. It is pertinent in Virginia as 269,121 immigrants entered the commonwealth between 1990 and 2000. There are currently 337,512 non-citizens living in Virginia, compared to the national total of over 18 million (GCIR, 2001). While only naturalized immigrants are granted permission to vote, some localities nationwide grant suffrage to immigrants, both documented and undocumented, for local elections. In Takoma Park, Maryland—a suburb of Washington D.C., non-citizens may vote in local elections. Also, non-citizens in Chicago may vote in school board elections. In 2004, there was a strong effort among immigrant voting advocates in New York City to grant suffrage to approximately 1 million immigrants, of which 35% are of voting age (Zimmer, 2006). This effort was rekindled in early 2007, though Mayor Michael Bloomberg remains firm in his stance to deny suffrage to non-citizens. Immigrants were permitted to vote in national elections until 1926 when the xenophobic conditions of post-World War I United States were enough cause for Congress to prohibit non-naturalized immigrants to vote. Those opposed to allowing non-naturalized immigrants the opportunity to vote believe that such a move would “cheapen” the significance of citizenship. Mayor Bloomberg holds that the only path towards immigrant voting is through the naturalization process (Zimmer, 2006).

Currently, foreign-born voters account for approximately 5 % of the electorate while non-naturalized immigrants would add significantly to that percentage. The strong argument for immigrant suffrage is that they work and pay taxes yet have no say in the government. In New York, immigrants alone pay \$18.2 billion in state income taxes (Zimmer, 2006). Others argue that the laws currently in place to prohibit non-naturalized immigrants to vote muffle the voice of the nation. According to the Urban Institute's Immigration Studies Program, nearly 62% of all Latinos living in the U.S. could not vote in 2000 due to age or citizenship requirements. Also, 59% of Asians were not permitted to vote in the same election. These figures compare to 35% of blacks and 25% of whites who were disenfranchised for similar reasons (Tactaquin, 2004). It is difficult to ignore the large disparity between the two sets of numbers.

A *Washington Times* article from 2004 acknowledges that it is possible for illegal immigrants to vote in elections, however it is expected that only a small number of them do so. First time voters in Virginia are required to show photo ID however any subsequent time at the polls does not require ID. Also, social security numbers are required at the polls, but the cards themselves are not required. Therefore, illegal immigrants who have obtained driver's licenses (and have registered to vote through the Department of

Motor Vehicles) could feasibly vote in an election. Also, election boards at the polling places have no way of determining citizenship (Bellantoni, 2004).

In Richmond, there is a growing Latino community that has the potential to shape local politics; however they have yet to fully mobilize, according to Ms. Tanya Gonzalez, Director of the Hispanic Liaison Office in South Richmond. Currently the Latino population in Richmond has not reached the point where ballots would be available in Spanish. Ms. Gonzalez believes that the Latino aliens in Richmond would vote if given the chance and that those seeking citizenship cite the opportunity to vote as one of the main benefits of becoming naturalized.

Felons

The justice systems of many states across the country deny or limit the access to vote on the basis of criminal convictions. In particular, Southern states with the smallest voter turnout rates among African American males have permanent disenfranchisement laws revoking the rights of felons from voting for life (Weaver, 1996). In fact, the states with the highest African American populations often have the harshest laws. More than 25 percent of the black male population has prohibited voting rights in Alabama, Mississippi, Virginia, and Florida. In some states, criminals with probationary sentences may lose the right to vote for life. These voting restrictions have disenfranchised 3.9 million people or 2% of the population. Most of the restricted felons are not currently incarcerated (Green, et al. 2004).

Advocates of criminal restrictions argue that felons lost their rights and privileges as citizens when they committed crimes. Some individuals believe that when the felons broke the law they violated their social contracts and should have their civil liberties revoked. Supporters believe that to further punish the criminals and deter from future crime, felons' voting rights should be restricted (Dhami, 2005). The disenfranchisement of felons' voting rights promotes civil responsibility and respect for the law. The major debate over felon disenfranchisement creates tension between disciplinary actions and civil liberties (Uggen, 2006). According to a 2002 study by Uggen, there is little public support for the disenfranchisement of voting rights for all people convicted of felonies. Most of the public perceives the restrictions as severe punishments in a democratic society with universal suffrage. In addition, most Americans believe that the right to vote should be revoked during incarceration but should be reinstated following the completion of the sentence. States such as Florida and Virginia, allow ex-felons to apply for voting right restoration. Applicants are required to have no more than \$1000 in delinquent fines. Opposition to the restriction of voting rights link the requirement to pay fines to poll taxes used in the Jim Crow Era which discouraged minorities from voting. In 2005 Congressman John Conyers (D-MI.) introduced the Civic Participation and Rehabilitation Act, which asserts that citizens of the United States should not be denied the right to vote because of a criminal conviction, unless the citizen is serving a sentence or is imprisoned. Strong opposition to the Act came from fellow legislators who did not want to appear soft on crime, and hence, the legislation never passed.

Please see Appendix C for more information on the felon rehabilitation effort in Richmond.

Absentee Voting

In an effort to increase voter turnout, states passed laws allowing for citizens of the United States the ability to receive absentee ballots before an election and cast their votes without having to be present at the polling stations on Election Day. Voters are to apply prior to the election to receive their ballots and then submit the completed forms by the required date determined by each state. Absentee ballot voters need to be cautious when voting to complete all requirements in order to have their votes certified and

counted. Almost all states offer an early voting option with absentee ballots and most have a “no fault” policy that allows voters to cast their ballots by absentee regardless of reason (Moore, 2003).

The United States established absentee voting during the American Civil War in order to guarantee voting rights to soldiers (Steinbicker, 1938). It was not until 1896 (almost thirty two years later) when the first law allowing absentee ballots for civilians in the state of Vermont was adopted (Feigert, 1973). Many states did not institute laws enabling the use of absentee ballots until World War I to permit electoral action by armed forces and government employees (Steinbecker, 1938). Kornbluh asserts that the states introduction of absentee ballots attributed to higher voting rates among the better educated and higher income voters (Kornbluh, 2000, pg 126).

Following World War I many laws were passed to grant citizens the right to absentee voting in order to account for citizens’ absence due to professional duties, disabilities, or illness (Feigert, 1973). Laws differ among states, as each state’s Secretary of State or Director of Elections independently controls their own system for absentee ballots, including requirements of verifying legal ballots in order to maintain fair elections. In the past, absentee ballots were problematic due to laws specifying the cause of absence, laws regarding the geographical acceptance of votes, and the lack of government reporting (Oliver, 1996). Some states require voters to be within the U.S. territories in order to cast their ballot. Today, the Uniformed and Overseas Citizens Absentee Voting Act of 1986, guarantees nearly all U.S. citizens temporarily residing abroad the right to register and vote (Moore, 2003).

Other evolutions in absentee voting rights have come from the innovation of new technologies and the demand for commercial travel. Many states have permitted the use of absentee ballots by professionals in order to give the right to vote to those engaged in business that are unable to be at their local precinct on election day. The laws mostly affect business people overseas or those in the train or airplane industries. Due to the number of astronauts living in Houston, state officials passed a law in 1997 giving astronauts the right to vote by absentee ballot in case they were in outer space. As a service to these citizens who have trouble getting out to the polls, absentee ballots are also offered to the sick, students living in different countries or states at college, and the handicapped to cast their ballots before Election Day.

Historically, absentee ballots have comprised a significant portion of vote totals. For example in the 1970 Presidential election, absentee voters from California provided Richard Nixon with 147,717 votes to only 94,990 votes for Kennedy, resulting in a Nixon overall margin of 35,623 votes. The national election’s outcome was not decided by this contest, but Nixon did carry California’s 32 electoral votes (Feigert, 1973). Recently in the Presidential election of 2000, it was discovered that absentee votes swayed the election in Florida when the *New York Times* reported (after the election had been certified) that over 680 ballots that were mailed were in violation of Florida law, but were still certified and counted (Imai, 2004).

It has been shown that Republicans hold a distinct advantage when it comes to absentee ballots, in that their vote counts are enhanced, leading them to victory or narrowing the vote margin when the Democrats win (Feigert, 1973). During the 2000 election, Republican lawyers identified the pro-Bush counties that would be crucial to win Florida and argued to officials to accept armed forces votes regardless of written law (Imai, 2004). In heavily Democratic counties, Republican lawyers argued to officials to uphold the law and not allow late absentee ballots to be accepted. Lawyers managed to overturn ballots that had been late, ineligible, or missing postmarks in most counties (Imai, 2004).

BEST PRACTICES

Presently the United States voting process has many issues concerning the reliability and security of elections and equipment. New methods need to be established in order to create a more reliable and

secure voting system that can benefit all voters. The ideal voting machine would be a direct-recording electronic computer instituted nationally that could assure accuracy, security, anonymity, and an auditable paper trail.

Electronic touch screens are ideal because they are quick and easy to use and prevent over-voting and notify voters of any under voting. The machines can be configured to suit any election without difficulty and allow the ballots to be in a variety of languages (Dill, 2003). The electronic touch screens also benefit the visually disabled, as the font sizes may be enlarged and screen contrasts adjusted to better aid those in need of voting assistance. As another option, DREs may be enabled with an audio component to further aid the disabled. To securely and accurately account for all of the votes, electronic touch screen devices would have paper printouts so that voters could verify their selections. Immediately after verification, voters' ballots would be officially counted using an optical scanner, and all paper printouts would be collected as a secondary form in case of a recount. This aspect of voter verifiability would ensure voters that the votes indicated on the DRE touch screens will indeed translate into accurate and transparent results. This ideal voting method involving a "ballot-marking machine" can be attributed to Dr. Avi Rubin of Johns Hopkins. This type of machine would alleviate many of the problems of transparency, accessibility, and verifiability of current voting methods.

Security and reliability can also be enhanced through the separation of manufacturing duties. Different independent companies should be committed to produce the e-voting machines and manufacture optical scanners. The division of production responsibilities among different companies would prevent companies from engaging in fraud or tampering with machines.

Also, in order to prevent such conflicts of interest that have complicated the last two Presidential elections, we prescribe that voting officials be prohibited from serving on political committees that may otherwise interfere or call to question the integrity of their position as elected or appointed voting officials. Should an official be so involved, he or she must release him or herself from the position to protect the integrity of the election process.

MOVING FORWARD

Research continued through a series of interviews with local Richmond, Virginia area election officials, in order to ascertain election procedures, methodologies, and future plans, mostly concerning the upcoming 2008 presidential election. The differences in voting practices within and between local jurisdictions were analyzed with special attention to the effects of socioeconomic factors that can be associated with these differences. The six areas of focus are Henrico County, Hanover County, Goochland County, the city of Richmond, Powhatan County, and Chesterfield County. A contact list of the election officials of the respective counties has been assembled to initiate the interview process [Appendix A]. A group of questions focusing on security, ballot design, and election processes was created to guide the interviews and to help identify relevant differences between the counties' election procedures [Appendix B].

INTERVIEW RESULTS

Henrico County

Background

Henrico County, a locality with over 284,000 residents, represents suburban Richmond to the north, west, and southeast of the city (2000 Census). The General Registrar of Henrico County, Mr. Mark Coakley,

has served in this position since 2004. Prior to arriving in Virginia, Mr. Coakley served as the director of elections in Asheville, North Carolina from 1999-2004. He currently operates with a staff of nine individuals including the Deputy Registrar, Jacqueline H. Timmons. The Registrar reports to the Electoral Board, comprised of two members of the current Governor's political party and one member of the opposing party.

Voting Technology

The county is divided into 91 voting precincts and is served by Advanced Voting Solutions (AVS) WINvote DRE machines. The machines were selected by the county first through an exploratory committee, where it was decided among the General Registrar and other committee members that the WINvote machines would best suit the County's needs. The suggestion was then taken to the three-member Election Board where it was approved and subsequently taken to the County Supervisors for final approval and procurement. Soon after the purchase of 800 DRE machines in 2005, the county took part in a voter education program, providing demonstrations at different locations, including fairs, festivals, libraries, supermarkets, and Rotary Club meetings. Since the introduction of the machines, Henrico County holds public demonstrations only at the General Registrar's office as well as at polling places on Election Day.

Ballot Design

Mr. Coakley is currently responsible for ballot design in Henrico County. While other localities might contract the ballot design service out to a software vendor, Henrico County performs this service in-house with software acquired from AVS. After designing the ballot, it is submitted to the State Election Board for approval. After the approval of ballots, the ballots are then programmed onto SMART cards, where they may then be transmitted onto the voting machines on Election Day. During an election, the Registrar's office may be responsible for the design of up to 11 or 12 different ballots, depending on the precinct and its related political races.

Security

The WINvote machines are stored in locked cages in an offsite, unmarked warehouse, which is locked and secured with video surveillance. When preparing for the election, the machines are transported from the storage location by voting machine technicians to the various precincts. The machines are delivered on the Thursday, Friday, or Monday prior to the Tuesday election depending on the precinct location. On arrival, the machines will have been sealed and secured with numbered locks. Prior to the election, each machine will have had a Logic and Accuracy Test performed on it to ensure that the machine is functioning properly and will record votes accurately. Before the opening of the polls on Election Day, each machine will have run another test to certify that no prior votes have been cast. Throughout Election Day, each precinct is responsible for monitoring the machines to prevent tampering.

Polling Places

In the 91 precincts of Henrico County, each polling place is typically staffed with 7 to 13 poll workers, depending on the size of the precinct. Each poll worker receives between 2-3 hours of training by the county two weeks prior to an election. The number of voting machines present at each polling place will also tend to vary with precinct size. The county has approximately one machine for every 150 voters; therefore the number of machines will be different for each precinct and will vary depending on expected voter turnout.

Other Points

Presently, General Registrar Mark Coakley believes Henrico County has sufficient resources to administer fair elections. In Fiscal year 2007, the Electoral Board has been allocated \$1,351,297 in 2007, an increase of 16.2% from 2006. (Henrico County, 2006).

Asked if he could change anything in the election process, Mr. Coakley said that he would like to see a move to Early Voting, thus giving voters more than just one day to cast their ballots.

Mr. Coakley foresees that the Presidential Election in 2008 could be frustrating for General Registrars across the state. A Virginia law that goes into effect July 1, 2007, further prohibits the purchasing of new DRE equipment that is not equipped with a voter-verifiable paper ballot. Any existing DRE equipment may be used until they become worn out. This puts registrars and localities into an interesting position as the Commonwealth is advocating the use of equipment that is not yet invented.

Goochland County

Background

Goochland County, located between Charlottesville and Richmond, is a predominately rural locality with a 2006 Census estimated population of 20,085 (Census). The General Registrar serving Goochland County is Frances Ragland. Ms. Ragland has served in that capacity since 1992. Her staff consists of 1 part-time assistant. The county has approximately 14,000 registered voters who cast ballots in nine precincts. The Registrar's office is overseen by the three-member Electoral Board of Goochland County.

Voting Technology

Voters in Goochland County cast ballots on the Advanced Voting Solutions (AVS) WINvote DRE machines. The Electoral Board recommended the purchase of forty WINvote machines which was then approved by the County's supervisors. Prior to the DREs, Goochland employed lever machines to cast ballots. The County received the machines prior to the 2004 General Election and received training by the voting machine vendors. Ms. Ragland credits AVS for the smooth transition between voting methods. In order to educate voters on the use of the machines, the Registrar traveled to different civic groups and churches throughout the County and held demonstrations of the WINvote machines. There is also a demonstration machine located in the Registrar's office for voter education. The demographics of the County were measured when selecting the voting equipment as the older population of Goochland County was considered.

Ballot Design

In Goochland County, ballot design is a responsibility of AVS. The county has contracted the service out to the voting machine vendor instead of producing the digital layout of the ballot in-house. This was an economic decision for the County as it weighed the costs of purchasing the necessary software and using the vendor's ballot design service.

Security

The County's forty WINvote machines are stored in locked, metal cages at an undisclosed location, where the Office of the Registrar has access. Prior to Election Day, the voting machines are given to the Chief of Elections of the various polling places until the Monday before elections. The night before Election Day, the machines remain in the possession of the Chiefs of Elections, who are then responsible for transporting the machines to the precincts the following morning. This is a practice encouraged by the General Registrar. Following the close of the polls, the results are telephoned to the Registrar's office.

While there is statement of the DRE results available to be printed, there is no voter-verifiable paper record produced.

Polling Places

In order to maintain a balance of political party representation at the polling places, Goochland County will often ask poll workers to represent either party during Election Day. It can be difficult to staff a totally bi-partisan panel of poll workers in each of the precincts in the strongly Republican Goochland County. However it is made sure that the Chief of Elections and Assistant Chief of Elections at each precinct are of different parties. The amount of poll workers per site will depend on the size of the precinct. The largest precinct, Manakin, will be staffed by about ten poll workers, whereas some of the smaller precincts will be staffed by three workers.

Other Points

The Registrar of Goochland County is currently pleased with the amount of funding that is used towards election administration. In 2007, the office of the General Registrar has been allocated \$104,998 (Goochland County, 2006).

Ms. Ragland shares in the uncertainty of other area registrars over the new legislation going into effect in July, 2007. Any new election equipment that would be used in the 2008 election has yet to be invented, according to the Registrar.

Hanover County

Background

Hanover County, located Northeast of Richmond, is another mostly rural locality with an estimated population of 98,983 (Census). The General Registrar of Hanover County is Robert M. Ostergren and he is assisted by the Deputy Registrar, Shirley M. Morris. Mr. Ostergren has held the post of General Registrar since 1987. He reports directly to the Electoral Board of Hanover County and the State Board of Elections on aspects such as ballot design approval. The Registrar of Hanover County administers elections for 64,000 registered voters.

Voting Technology

In Hanover County, elections are conducted through the use of optical scan technology, where votes are read and tallied by counting machines manufactured by Election Systems and Software (ES&S). For disabled voters or for those with special needs, Hanover County employs the AutoMARK machines also manufactured by ES&S, which will magnify the paper ballots and will mark the ballots as indicated by voters. The AutoMARK machines also include an audio component to further aid voters who might need further assistance.

Each precinct is provided with one counting machine and at least one AutoMARK machine. The counting machines are able to automatically detect undervotes and overvotes, and as long as the voter does not leave the polling place before the ballot is counted, the voter will have a chance to correct his or her ballot, should they so choose.

Ballot Design

In Hanover County, the responsibility of ballot design falls on the General Registrar. Mr. Ostergren designs the layout of the ballots by using a software package before submitting it to the Electoral Board of Hanover County and the State Board of Elections for approval. He cites the appropriate amount of oversight of the process as a reason why there is little issue with ballot design in the locality.

Security

The use of optical scan technology in Hanover County was implemented over the DRE machines because of concerns regarding the lack of a paper trail with the DREs. Even if it means more work for the Registrar's office, Hanover County is committed to provide enough transparency and verifiability of election results, Mr. Ostergren said. The testing and programming of the ballots takes place well in advance of the election and includes the participation of different individuals to ensure oversight of the process.

Counting machines are received at the polling sites on the Thursday or Friday prior to Election Day. They are transported from a secured storage location by a law enforcement officer and Mr. Ostergren's twin brother, who has been appointed by the Electoral Board, to carry out the task. The machines are secured through a series of locks and the Chief of Elections is responsible for unlocking the machines on Election Day. The counting machines contain a log of all recorded operations that occur throughout Election Day and can be recalled on a memory card or through a physical paper printout. The AutoMARK voting machines arrive with the counting machines and require a password to turn on.

Polling Places

In Hanover County there are 300-400 voting stations that are distributed among the 33 voting precincts. Each precinct will receive an ES&S M-100 Counting Machine and at least one AutoMARK machine. As with other counties, the amount of poll workers per precinct will vary on the election and size of the precinct. Typically the range of poll workers will be from a minimum of three to approximately ten. Again, the Commonwealth of Virginia asks that each polling place have equal representation of parties by poll workers, and is often met in Hanover County by asking poll workers to represent either party on Election Day. As with some of the other counties surveyed, Hanover County is predominately Republican.

Other Points

At this time Mr. Ostergren believes that his office is sufficiently funded to administer fair elections in Hanover County. In 2007, the office of the General Registrar has been budgeted \$321,829, representing an 8% increase from the \$298,118 allocated in 2006 (Hanover County, 2006). While well funded, Mr. Ostergren notes that he tries to remain fiscally responsible. However, Mr. Ostergren believes that his office is understaffed. He would like to see 1-2 staff members added to the Registrar's office.

When asked if there is an area locality which implements elections well, Mr. Ostergren identified Chesterfield County. He credits the leadership in Chesterfield as well as the financial support from its government for its honorable reputation.

When asked if he could change any election process, Mr. Ostergren would like to see a "No Fault Absentee Ballot," where voters would not have to state a reason as to why they are voting by absentee ballot. He also believes that the Commonwealth should be more involved in the oversight of technology issues and voting. He notes that there are too few people who are trained in technology who could be of assistance in administering elections and that technology issues require close attention; especially when the integrity of elections could be called to question.

Chesterfield County

Background

Chesterfield County, located Southwest of Richmond, is home to an estimated population of 296,718 (Census). Lawrence C. Haake, III was named the General Registrar of Chesterfield County after serving as a lieutenant in the Richmond police force for sixteen years, a year on the Chesterfield Electoral Board, and five years working for a software publishing company. He reports directly to the Electoral Board of Chesterfield County and the State Board of Elections on aspects such as ballot design approval. The Registrar of Chesterfield County administers elections for 183,000 registered voters.

Voting Technology

In Chesterfield County, elections are conducted through the use of optical scan technology, where votes are read and tallied by counting machines manufactured by ES&S. For disabled voters or for those with special needs, Chesterfield County employs the AutoMARK machines also manufactured by ES&S, which will magnify the paper ballots and will mark the ballots as indicated by voters. The AutoMARK machines also include an audio component to further aid voters who might need further assistance.

Each precinct is provided with one counting machine and at least one AutoMARK machine. The counting machines are able to automatically detect undervotes and overvotes. The shift from punch card voting to optical scanners occurred after the enactment of the Help America Vote Act when Chesterfield County, like many other localities across the country, needed to make a decision to replace their voting technologies. General Registrar Lawrence Haake met with the Electoral Board, County Administrator, and Board of Supervisors to evaluate optical scanners and computerized DRE machines as possible options. In an effort to maintain transparency, confidence, and familiarity, the committee decided that optical scanners would be an easy transition for voters and provide for a secure election. The committee came to their final decision to use optical scanners because of their many concerns with DRE machines, such as the lack of a voter verifiable paper trail and security issues surrounding the systems that have wi-fi capability. Today, Chesterfield County has established a cutting edge and reliable infrastructure with a strong checks and balances system for maintaining the integrity of elections.

One significant factor that establishes Chesterfield County as a technologically progressive locality is the Election Reporting and Voter Verification (ERVV) software developed by Mr. Haake. ERVV is unique to Chesterfield County and provides poll workers with voter name verification, social security number verification, precinct maps, tallies, and reporting abilities. Chesterfield uses the technology to verify voter's precincts and direct voters to the correct polling places. The program provides quick and efficient transmission of results for two thirds of the county's precincts.

Ballot Design

In Chesterfield County, the responsibility of ballot design falls on the General Registrar. Mr. Haake designs more than twenty layouts of the ballots before submitting one of the designs to the Electoral Board of Chesterfield County and the State Board of Elections for approval.

Security

The use of optical scan technology in Chesterfield County is designed to provide enough transparency and verifiability of election results. To ensure secure elections, Chesterfield County has a system of

checks and balances to prohibit tampering with voting machines. Testing and programming of the ballots takes place well in advance of the election and includes the participation of different individuals to administer the process. The County tests the machines again on Election Day to analyze the machines for possible technical problems. Machines are locked in transportable cages with multiple locks for counting machines and storage areas. The Friday or Monday prior to the election, government employees deliver the machines and ballots to the polling stations. The night before the election, the Chief of Elections is responsible for unlocking the cages and setting up voting booths if they choose to, but the optical scanner and ballots are not opened until the morning of the election. The counting machines contain a log of all recorded operations that occur throughout Election Day and can be recalled on a memory card or through a physical paper-printout.

Polling Places

In Chesterfield there are approximately 450 voting stations that are distributed among the 33 voting precincts. Each precinct will be provided with an ES&S M-100 Counting Machine and at least one AutoMARK machine. As with other counties, the amount of poll workers per precinct will vary on the election and size of the precinct and the projected turnout for the election. Typically the range of poll workers is from seven to sixteen workers. Again, the Commonwealth of Virginia asks that each polling place have equal representation of parties by poll workers, and is often met in Chesterfield County by asking poll workers to represent either party on Election Day.

Other Points

Mr. Haake expressed how fortunate he felt to be in a county like Chesterfield that provides him with more than adequate funding, but if he had the power to change election processes he would close schools for the day to ensure the safety of voters and provide adequate parking. Mr. Haake also stated that it would be beneficial to create more communication with Department of Motor Vehicles so that provisional ballots could be verified with more efficiency and speed. In the next year, Mr. Haake will update ERVV by providing an option for provisional ballot entry so that the process of verification could begin faster. He is also creating a second deputy registrar position to focus solely on the election process. Mr. Haake would also like to explore the possibility for transportation to the polls if possible and feels it would enhance the election by providing for more voters to reach the polling station. In 2007, the budget for the General Registrar's office in Chesterfield is \$709,600, which is an 8.3% increase from the previous year (Chesterfield County, 2006).

Powhatan County

Background

Powhatan County, located west of Richmond, is home to an estimated population of 22,273 (Census). Inez L. Poe is the General Registrar of Powhatan County and is supported by the Assistant Registrar Jamie Swemba. She reports directly to the Electoral Board of Powhatan County and the State Board of Elections on aspects such as ballot design approval. The Registrar of Powhatan County administers elections for 16,000 registered voters.

Voting Technology

In Powhatan County, elections are conducted through the use of electronic touch screen technology, where votes are processed by the WINvote DRE machines manufactured by Advanced Voting Solutions. The machines provide for easy transportation, quick programming, and the ability to adapt the ballot for foreign speakers and the disabled. Ms. Swemba explained to us that the technology has the ability to

reproduce every vote with a paper trail, which may be printed from a master voting machine or each individual machine at each precinct.

Powhatan County followed similar procedures as other local counties to choose new technology to meet HAVA's standards by reaching a collaborative decision from the Electoral Board and Registrar's office. The committee decided to switch from lever machines to DRE machines produced by Advanced Voting Solutions. The company provides the county with WINvote machines as well as creates state certified ballot designs, which takes a great deal of pressure off the Registrar's office to create and adapt ballots for state approval every year. When making the decision to switch voting methods, the county desired the latest, most advanced technologies that would benefit the county the most. During the switch, area voters responded very positively and praised the technology as quick and easy to use. Assistant Registrar Swemba also applauded the DRE machine on its ability to efficiently collect votes, easy transportability, and claims that the technology decreases the chance for human error in counting.

Ballot Design

In Powhatan County the ballot is designed by Advanced Voting Solutions. The design is presented to the Electoral Board of Powhatan County and the State Board of Elections for approval.

Security

To make certain the machines are safe before an election, Powhatan County keeps the WINvote DRE machines locked in a warehouse. The machines are secured in cages. The day before the election Mrs. Swemba delivers the voting machines to the Chiefs of the Precincts. Mrs. Swemba explained that the machines are in the Chiefs of Precincts possession for the night and usually the machines are brought home with the Chiefs. Prior to the election, all members working in the precinct need to verify that the machines have blank voting counts. Also prior to the election, the workers need to deactivate the wireless interface on the computers to shield them from internet hacking. The machine's wireless function is turned on for three minutes prior to the election and three minutes after the election to collect all of the data.

Polling Places

In Powhatan there are 45 voting machines that are distributed among the 10 voting precincts. Each precinct has one to three machines and a backup machine in case of any problems that might occur. The number of poll workers per precinct varies with the type of election and size of the precinct. Powhatan has an average of eight poll workers per precinct. The Commonwealth of Virginia asks that each polling place have equal representation of parties by poll workers, Powhatan County has trouble finding Democratic representatives in the mostly Republican county, but poll workers are willing to sit in as Democratic poll workers for the day.

Other Points

Some areas that Assistant Registrar Swemba would like to change would be to allow the wireless connection on voting machines to remain on for longer periods in order to have a master computer that would collect all of the voting machines tallies automatically. Assistant Registrar Swemba expressed the importance of the wireless connection to aid the poll workers especially at the end of the day. Ms. Swemba feels the process of manually counting each machine in the precinct leaves open the ability of human error and if the wireless component was permissible by the State, the main computer could calculate the votes without error. In addition, Mrs. Swemba feels the county has an adequate number of voting machines but would still like to see more purchased. In FY 2007, Powhatan County has

appropriated \$119,529 for the Registrar's office, which is an 18.5% increase from 2006 (Powhatan County, 2006).

Richmond City

Background

Richmond, the capital of the Commonwealth of Virginia is located in central Virginia and has a population of 192,913 (Census). Ms. J. Kirk Showalter serves as the General Registrar of Richmond City. She previously worked in the Governor's budget office and was appointed General Registrar in 1995. Ms. Showalter reports directly to the Electoral Board of Richmond City and the State Board of Elections. The Registrar of Richmond oversees elections for 74,784 registered voters. For 2007, the office of the General Registrar of Richmond has been apportioned \$811,012, down from \$827,953 in 2006 (City of Richmond, 2005).

Voting Technology

The City of Richmond formed a committee to select new technologies after the 2000 election. Each committee member was instructed to rate the various systems using a grading scale. The top two scorers were tested and the committee found WINvote to be the more reliable of the two. Members of the committee took into regard the high elderly population of Richmond City when grading the machines. The city mainly chose the DRE machine because of its easy adaptability and General Registrar felt that paper ballots created more security issues than DRE machines. Ms. Showalter, commended the technology for being able to be programmed in any language, provide easy readability, is a light machine and can easily provide for curbside voting. The machines have zoom capability as well as an audio component for the elderly or sight impaired. Ms. Showalter realizes the capability of computer tampering through "hacking" but she feels that the potential of tampering to occur would be highly unlikely.

Ballot Design

In Richmond City, General Registrar Showalter designs the ballot design using Advanced Voting Solutions software and submits it to the Electoral Board of Richmond City and the State Board of Elections for approval.

Security

Pre-election, Ms. Showalter holds a mock election with county employees to check for tampering of election equipment. Prior to the election, the machines are locked in steel cages and stored in an unmarked warehouse. The week before the election, county employees deliver the machines to the precincts and machines are secured at the polling places in locked closets until Election Day. All voting tallies are transmitted by telephone to the Registrar's office and then the official canvass is taken the next day for final confirmation.

Polling Places

In Richmond sixty-five voting precincts are accessible for voters to cast their ballots. Each precinct has on average, 2,500 people and is equipped with eight voting machines on average, but larger precincts can have up to fifteen machines. The number of poll workers per precinct varies because of the expected turnout for the election and the number of workers available. Normally a polling station has two workers per check-in table, two workers for every three machines, and a chief of the precinct. Richmond tries to

uphold the equal representation of parties at election polls but the city has few volunteers and often is fortunate to get enough people to work regardless of party affiliation.

Other Points

If Ms. Showalter could change the elections in Richmond City she would like to keep DRE machines and open the wireless option. She also would like central voting stations in four areas of the city and allow for voters to vote over a two week period to increase turnout. In reference to poll workers, Ms. Showalter believes that election officials should have some formal training and would like a system of public service to be instituted much like jury duty to increase the number of poll workers.

CONCLUSION

In this study, we illuminated the history of voting in the United States through its methods, technologies, and procedures. We found that the current system of elections is far from perfect, where everyone who is eligible to cast a ballot, would have their vote counted. It took a disastrous national election for lawmakers to begin to maintain any serious oversight on the type or quality of voting equipment. The resulting legislation, the Help America Vote Act, initiated the massive procurement of voting technologies that should theoretically prevent another large-scale election fiasco made famous by Florida in 2000.

While the advancement from punch card-based elections to DRE or optical scan technology is an improvement, each technology has its shortcomings. As it currently stands, a vast majority of DRE machines used by localities produce no paper record. While the DREs have been touted as a highly accessible and convenient means by which to cast ballots, the lack of an auditable paper trail is troubling. The DRE machines currently in use in the Richmond metropolitan area have been widely accepted by Registrars and voters alike. However, the technology was at one time, vulnerable enough to cause concern. Prior to the passage of State Legislation, the wi-fi or wireless component of certain DRE machines was an encouraged and widely accepted practice among users of the WINvote DREs. The wireless technology would enable election administrators to quickly initiate and close the polls through machine to machine communication. Yet this feature of the WINvote machines leaves elections highly vulnerable to attack, according to one Registrar familiar with the technology.

Optical Scan technology, used in two of the six metropolitan jurisdictions, is perhaps the most secure and transparent form of election technology currently used. The paper ballots serve as the official record of a voter and can be used in an audit or recount, whereas the DREs do not have a physical paper record of each vote. While one area Registrar cites that the use of paper in an election increases security issues by "one-hundred fold" over DRE machines, we have not found evidence to support it. Despite its transparency and voter verifiability, optical scan technology by itself, is not as accessible to the vision-impaired or voters who would require a ballot in another language. The use of the AutoMARK system in conjunction with the optical scanning devices allows the vision-impaired to mark their ballots on a magnified screen. We believe that the AutoMARK system is the closest technology currently implemented in the Richmond Metropolitan area that satisfies our terms for best practice. The AutoMARK system is, in essence, a ballot marking device that produces a paper record that is voter verifiable. However, according to the General Registrar of Chesterfield County, Mr. Lawrence Haake, the main obstacle for widespread implementation of the technology is the cost and transportability of the device. Mr. Haake stated that the AutoMARK devices currently implemented by Chesterfield were paid for by the County and not with federal assistance from HAVA.

The prospect for election fraud in the six localities examined in this study is relatively low. However, we did find a trend among the more rural counties that appeared disconcerting on the surface. Two counties, both using the WINvote DRE machines, would place the voting machines in the possession of election chiefs the day before elections. While other localities implementing the same technologies will have the machines delivered and secured in the voting precincts in the days prior to an election, the reliance on election chiefs to store and transport the voting machines unilaterally is cause for some concern. However, in the defense of the localities, the dependence on election chiefs to transport the machines to remote and occasionally insecure precincts may be their best logistical solution. Yet the potential to tamper with the voting machines remains. While there are levels of security to detect any physical tampering with the machines, someone with enough external motivation could possibly find ways to defraud the equipment. Though it is unclear if other rural localities across the nation employ a similar practice, it would not seem uncommon if it were the case.

A solution to this issue would include finding a polling place within the precinct that could be secured to the point where election chiefs would not be required to keep the voting machines in their homes the night before an election. If that is not possible, the machines could be transported to the various precincts in the early morning hours of Election Day. While this might be difficult to implement in a logistical sense, it does not call to question the integrity of the election as much as the current practices might.

We see in the budgetary figures for the various Registrars' offices that the amount of funds divided among registered voters differs considerably among localities (Table A). Among the two localities that employ optical scan technology, Hanover and Chesterfield Counties, we see the lowest budgeted dollars per registered voter among the set of six localities which can be attributed to the lack for software and vendor contracts that localities using DRE machines would be required to pay as part of the regular upkeep of the voting machines. Common among all localities in their budgetary figures are salaries and benefits, funds to staff election officials, office equipment, postage to mail voter ID cards, rent, either for the voting machine storage or for the registrars' offices, and the printing of absentee ballots.

In Table B we demonstrate that the voting technologies are employed regardless of the sociological characteristics present in each locality. We do not believe that there is any neglect or discrimination of any group occurring in the six localities when it comes to using voting equipment. It can be seen in Table B that similar technologies are used in diverse populations as well as more homogeneous populations and that technologies used in wealthier localities are also used in localities where a greater percentage of the population lives beneath the poverty line. Also, each type of voting equipment selected by each locality and is used throughout; therefore all voters in a particular precinct will use the same voting equipment as the entire locality.

Appendix A

Richmond Area Election Officials Contact Information

Richmond City-

J. Kirk Showalter, General Registrar
900 E. Broad Street, Room 105
Richmond, Virginia 23219
Telephone: 804-646-5950
Fax: 804-646-7848
E-mail: Kirk.Showalter@Richmondgov.com

Chesterfield County-

Lawrence C. Haake III, General Registrar
9848 Lori Road
Chesterfield, VA 23832
Telephone: (804) 748-1471
Fax: (804) 751-0822
E-mail: registrar@chesterfield.gov

Powhatan County-

Inez L. Poe, General Registrar
Powhatan County Administration Building
3834 Old Buckingham Road, Suite G
Post Office Box 58
Powhatan, Virginia 23139
Telephone: (804) 598-5604
Fax: (804) 598-5877
E-mail: govote145@state.va.us

Hanover County-

Robert M. Ostergren, General Registrar
General Registrar
P O Box 419
Hanover, VA 23069-0419
Telephone: (804) 365-6080
Fax: (804) 365-6078
E-mail: rmostergren@co.hanover.va.us

Goochland County-

Frances C. Ragland, General Registrar
P.O Box 1013
Goochland, VA 23063
Telephone: 804-556-5803
Fax: 804-556-6323
E-mail: fragland@co.goochland.va.us

Henrico County-

Mark J Coakley, General Registrar
P.O. Box 27032
Richmond, VA 23273
Telephone: (804) 501-4347
Fax: (804) 501-5081
registerandvote@co.henrico.va.us

Appendix B

Sample Questions for Voting Officials

Official's Background

- What path did you take to arrive at your present position?
- Where did you receive your training?
- To whom do you report?
- How many people report to you?
- Is there one person on whom you rely to execute election procedures?

Election Preparation

- What is the next election on the calendar?
- When did the preparations for that election begin?
- Could you give me the timeline for preparation prior to an election?
- How is the ballot designed?

Decision Maker

- Who is responsible for ballot design?
- Who makes the decision to determine which type of voting method is used in your county?-If not you, are you permitted to make recommendations?

Voting Machine Security/Procedures

- Where and how are voting machines stored?
- What voting machines are used in your jurisdiction? Are they the same for every precinct?
- What brand of machine is used?
 - What model?
 - If DRE, is there a paper record?
- Is there a predetermined audit procedure?
- Were demographics a consideration when selecting voting technologies for your county?
- Who is responsible for transporting the machines?
- How are election results transmitted?
- What is the current ratio of voters per machine in your county?
- Are there any laws governing such an issue?
- Who guards the machines?
- What security measures are taken to ensure a reliable election?
- Prior to Election Day, when are the machines received?

Polling Places and Workers

- How bi-partisan are panels of poll workers? Is there a prescribed formula?
- How many polling places are in your jurisdiction?

How many registered voters are there per polling place?
How vast is the voting register per precinct? Does it cover more than those assigned to the precinct?
How many voting machines are available at each voting place? How is this determined?
Can a voter vote at a polling place other than the one to which s/he was assigned?
What time do the polls open/close?
What happens at closing time? Are voters in line allowed to vote? How is it determined who is in the line at closing time (specific logistics)
Who implements the “end of line” policies?
How many poll workers per place?
What is their training? Is it the same for all workers?
What is the “order of operations” among poll workers from opening the polls to closing?

Voter Characteristics

What kind of education programs are in place for voters to use and accept DREs?
-How has HAVA impacted this?
Does the county/city provide voter transportation to the polls?
What requirements must be met by voters?
Must voters provide ID?
What forms of ID are acceptable?
Are there any materials located at the poll sites to further educate voters to use the equipment?
If I was a voter, what would be the process by which I vote, from arriving at the poll place to leaving?

What would you change if you could?

Do you have sufficient resources to administer fair elections?

Which county, do you consider, is the gold standard for elections among area counties? How much communication takes place between counties?

What differences if any, will there be in procedures, methods, or technologies will be in place for the 2008 Presidential election?

Appendix C

Boaz and Ruth

www.boazandruth.com

Founded by Martha Rollins in 2002, Boaz and Ruth is a faith-based nonprofit organization that serves to reconnect ex-convicts to society by providing life skills training as well as jobs within its six business enterprises. The organization started as one building located in the center of Highland Park, one of Richmond, Virginia's most troubled areas, and grew to become an entire block including the main retail and training facility, a café/catering service, a moving company, ex-offender housing, and a newly renovated firehouse that will eventually be a small retail shopping area (Boaz and Ruth). Upon leaving the penal system, many ex-convicts have trouble mixing back into society and, without the proper programs in place, often find themselves returning to their old communities that have the same influences that initially lead them in to a life of crime (Boaz and Ruth). Boaz and Ruth address issues concerning economic development, prisoner reentry, recidivism, and cultural isolation and through community involvement and service create personal growth (Boaz and Ruth). The organization has a comprehensive approach to the systematic problems that afflict both released prisoners and the communities to which they return. Every week there are planned events, including forums, lectures, and social activities, designed to foster friendships and create a stable foundation for trainees (Boaz and Ruth).

One of the main ways in which Boaz and Ruth helps ex-offenders is through their morning workshops in which trainees learn emotional and relational competency, perform self examinations, and challenge their own beliefs and perceptions in their support group to heal the emotional wounds from prison and life experiences (Shapiro, 2007). Most of the morning sessions are life-labs that are operated by prisoner reentry trainees. Trainees are involved in every stage of the process, from construction to management, to teach personal empowerment, so that ex-convicts will be able to grow into active contributors to society (Shapiro, 2007). The personal growth and empowerment is an important aspect of rehabilitation for people to regain an identity and purpose in society (Boaz and Ruth). After the morning classes, trainees go to work at their day job working in one of the six businesses where they learn vocational skills and get on the job experience.

One of the main issues Boaz and Ruth confront is that the punishment of criminals extends far beyond the walls of prison, as most criminals have restricted rights and face social discrimination on a daily basis. At first, reestablishing a role in society is the most challenging barrier for the ex-offenders because they are constantly being punished for a sentence that has been served. Many of the ex-convicts working for Boaz and Ruth claim that reentering society was difficult because very few employers and landlords would consider their applications. One trainee who served a sentence for over twenty five years obtained his Bachelor's Degree and performs service work with Boaz and Ruth, yet even now is being denied some of his most basic rights, such as the right to vote. In the state of Virginia, felons are permanently disenfranchised and can never vote again unless the government chooses to reinstate their rights. Convicts imprisoned at a young age for a felony charge are punished in the state of Virginia for the rest of their lives. "We live in a society that preaches forgiveness, but forgives so few," one trainee told us when asked about the fairness of the statute. Boaz and Ruth continues to grow in its fifth year of operations and has expanded to provide GED classes, computer training and computer lab for clients and the community, and job placement services for residents to help provide "a way out" of poverty and hopelessness (Boaz and Ruth). The organization has been a vital aspect in the restoration of a troubled community and provides individuals with a second chance (Shapiro, 2007).

Table A
Locality Comparisons

	Chesterfield County	Goochland County	Hanover County	Henrico County	Powhatan County	Richmond City
Population*	296,718	20,085	98,983	284,399	27,649	192,913
Registered Voters	186,000	13,838	64,000	176,000	16,000	74,784
2007 Registrar Budget	\$709,600	\$104,998	\$321,829	\$1,351,297	\$119,529	\$811,012
Budgetary Dollars per Voter	\$3.81	\$7.59	\$5.02	\$7.68	\$7.47	\$10.84
Voting Technology (Manufacturer)	Optical Scan (ES&S)	WINvote (AVS)	Optical Scan (ES&S)	WINvote (AVS)	WINvote (AVS)	WINvote (AVS)
Paper Trail	Yes	No	Yes	No	No	No
Voters Per Machine	425#	400	160#	150	355	190
Precincts	64	9	34	91	11	65
Ballot Designed In- House?	Yes	No	Yes	Yes	No	Yes
Previous Technology	Punch Cards	Lever Machines	Lever Machines	Punch Cards	Lever Machines	Lever Machines

Source: Census 2000
***2006 Population Estimates**
#Voters per Voting Station

Table B
Sociological and Economical Data by Locality

	Chesterfield County	Goochland County	Hanover County	Henrico County	Powhatan County	Richmond City
Population for whom Poverty Status is Determined	255,117	15,546	84,211	258,106	19,932	188,116
Population below Poverty Level	11,586	1,068	3,065	15,917	1,133	40,185
% of pop. below poverty level	7%	6.9%	3.6%	6.2%	5.7%	21.4%
Per Capita Income*	\$25,286	\$29,105	\$25,120	\$26,410	\$24,104	\$20,337
White Population	196,896	11,834	74,723	177,566	17,252	71,482
% White pop. beneath poverty level	3.4%	4.5%	2.7%	3.8%	5.5%	10.8%
Latino or Hispanic Population	6,971	80	934	6,005	136	4,981
% Latino or Hispanic pop. beneath poverty level	9.0%	0%	4.2%	14.33%	0%	30.9%
Black or African- American Population	43,472	3,509	7,504	63,245	2,375	108,206
% Black pop. beneath poverty level	8.0%	14.7%	12.2%	11.5%	7.7%	27.6%

Source: Census 2000

***In 1999 Dollars**

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THE EFFECT OF DIFFERENTIAL TAXATION ON COMPETITION IN THE TELECOMMUNICATIONS INDUSTRY

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ABSTRACT

The tax differentials in the telecommunications sector have the potential to affect the playing field between different providers and may negatively impact the expansion of critical infrastructure to rural areas and consequently state economic growth. The primary objective of our paper is to examine the impacts of tax differentials on the output levels and market shares of traditional providers versus new market entrants. The results from preliminary multivariate regression models indicate that sales and property tax differentials have no statistically significant effects on competition in the telecommunication industry. However, we would like to conduct a series of robustness checks before finalizing these conclusions.

INTRODUCTION

Since the passage of the Telecommunications Act of 1996 which eliminated barriers between telephone and other forms of telecommunications, advances in technology have enabled nontraditional firms including wireless and internet telephony providers to enter the market for local telephone services, aggressively increasing competition. However, deregulation of the industry has not been accompanied by a change in the statutory definition of telecommunication services to include these new technologies, resulting in differential taxation of functionally equivalent services. Traditional telecommunication services often face fees and user chargers in addition to the full range of federal state and local taxes imposed on other businesses, while new entrants are either subject to a different set of taxes or no tax at all. Such a tax structure seemingly fails to promote the fundamental regulatory objectives of universal coverage and fair competition.

RESEARCH QUESTION

The tax differentials in the telecommunications sector have the potential to affect the playing field between different providers and may negatively impact the expansion of critical infrastructure to rural areas and consequently state economic growth. Traditional telecommunications providers face higher effective transaction, use and property tax burdens which are ultimately borne by households in the form of higher prices. The tax system increases the prices of services provided by market incumbents relative to the prices of services provided by new entrants, thus decreasing the demand for traditional services and making it more difficult for them to compete in the market. While industry leaders and policymakers have recommend that state and local taxes be simplified to ensure a level playing field and enhance economic development, little if any empirical work has been conducted to estimate the magnitudes of these effects [1].

The primary objective of our analysis is to explore whether competition in the telecommunications sector is indeed sensitive to tax differentials. Specifically, we examine the impacts of tax differentials on the output levels and market shares of traditional providers versus new market entrants. Although a complete analysis of the effects of the telecommunications and general business tax differentials on economic growth is beyond the scope of this analysis, we hope to contribute to this discussion by examining the effects of these differentials on the level of services provided in the market.

DATA

Our primary source of data will be the Federal Communications Commission which provides semiannual data on the status of local competition in the telecommunications market including the number of lines in service by traditional providers and the number mobile wireless telephone subscribers. These data indicate that the nationwide market share of traditional providers has decreased from roughly 70 percent in 1999 to 45 percent in 2004. Our objective is to examine whether the unfavorable tax treatment of traditional services has contributed to this decline.

To this local exchange market data, we will merge tax data collected by the 1999, 2000, 2001 and 2004 Committee on State Taxation Telecom Studies which document the rate and administrative burden of taxes imposed on telecommunications services, including separate tax rates imposed on traditional and wireless services. The study accounts for variation in upwards of 20 different broad types of state and local taxes and fee charges levied on telecommunications providers. While these data provide sufficient information for calculation of the necessary transaction and property tax differentials, their limited availability restricts our analysis to a rather short panel of four years. Although a longer time span would be ideal, a panel of even four years should provide efficiency gains over a simple cross-sectional study.

DESCRIPTIVE STATISTICS

The COST study shows that effective sales tax rates applied to telecommunications services far exceed the effective sales tax rates applied to general business transactions. The average total effective sales tax rate for the telecommunications industry (including federal excises taxes and fees) was 18.16 percent in 2004, compared to a total effective sales tax rate of only 6.1 percent for general business and 15.5 percent for wireless services. Figure 1 below shows a summary of the differences between telecommunication and general business sales tax rates. The average difference in tax rates between these sectors was approximately 12 percent.

On average traditional telecommunication providers have experienced a 34.5 percent decline in market share between 1999 and 2004, while the market shares of both wireless and high speed broadband providers has increased. Figure 2 shows a summary of the change in market share for individual states. While few patterns seem to emerge when comparing the data provided in the figures, the correlation between the average tax difference and percentage change in market share for incumbent local exchange carriers is -0.3274 and 0.1747 for competitive local exchange carriers, which suggests there may indeed be a discernable relationship between these variables. The positive correlation is certainly unexpected but may reflect the effects of changing telecommunication regulations across states. A multivariate regression analysis is necessary to isolate the effect of tax differentials on competition from the effects of economic, regulatory and demographic differences between states.

Figure 1: Total Sales Tax Differentials between Telecommunications and General Business in 2004

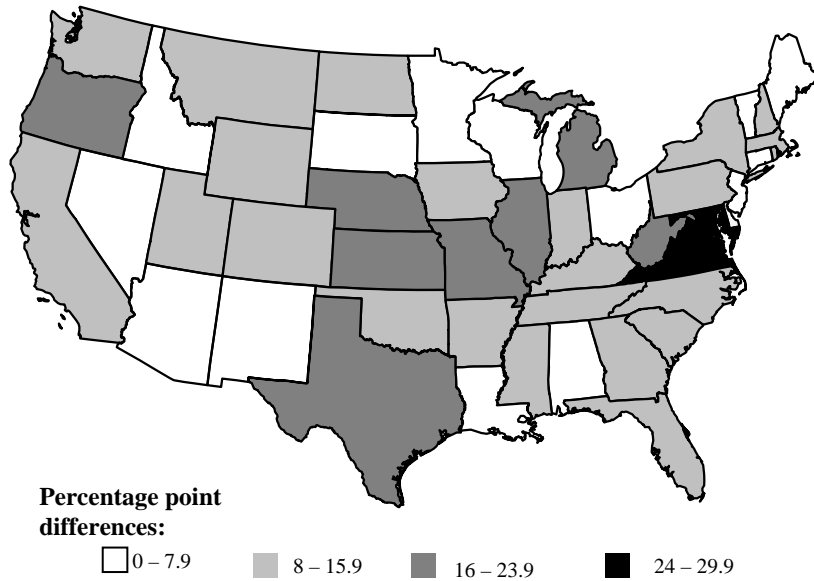
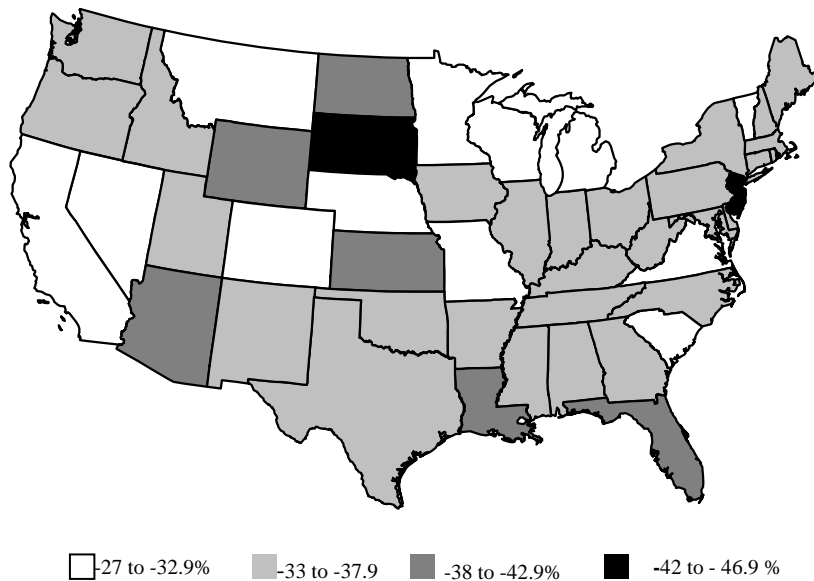


Figure 2: Percentage Change in Market Share of Traditional Communication Providers between 1999 and 2004



METHODOLOGY

Our analysis uses a modeling framework very similar to that used by Loomis and Swann (2005) to examine local competition between incumbent and competitive local exchange carriers. Loomis and Swann used a Cournot model in which two firms compete for market share through output setting decisions to derive reaction curves which were then estimated separately using OLS. We expand this framework to examine competition not only between incumbent and competitive exchange carriers but also wireless and high speed broadband providers. This modification allows us to examine how the output levels (lines in services for traditional providers and subscribers for wireless and high speed broadband providers) respond to competition from opponents as well as other factors. The primary variables of interest in the model include a measure of the tax differentials for traditional and wireless services and a measure of the property tax differentials for telecommunications and general businesses. The telecommunication variables are weighted by density (population/square mile) to allow for economics of scope and network externalities that exists in the industry. Variables that control for variation in economic conditions, regulatory environment and demographics are also included in the model.

PRELIMINARY RESULTS AND CONCLUSIONS

The results from preliminary multivariate regression models indicate that sales and property tax differentials have no statistically significant effects on competition in the telecommunication industry. However, we would like to conduct a series of robustness checks on the models before finalizing these conclusions. While our preliminary results may not present a strong case for the reduction of telecommunication taxes based on anti-competitive effects, further research should be conducted to evaluate telecommunication taxes using the criteria of efficiency, equity and simplicity. Cordes et al. (2000) provides an excellent summary of these issues and offers recommendations for future research.

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The Effect of Yield Curve Differentials on the Bond Call Premium
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Abstract

Much of today's corporate debt is callable and the value of the call provision attached to a corporate debt instrument is a function of the likelihood of the call provision being exercised by the bond issuer. This study examines the effect of the shape of the yield curve on the call premium placed on callable bonds over similar non-callable bonds. Since a bond issuer will only call a bond when interest rates are currently lower than they were at the time of the bond's issue, then the likelihood of a call being exercised will increase as interest rates are expected to decline over time. The market conveys its expectations about the future direction of interest rates by the way it prices fixed income securities. This expectation is reflected in the shape of the yield curve on government debt. If the yield curve is upward sloping, then the market is conveying its expectation that, over time, interest rates will rise. This would represent a set of expectations that reduce the likelihood that a call would be exercised, reduce the call premium, and drive the price of the callable issue closer to the price of similar non-callable issues. Conversely, if the yield curve is downward sloping, then the market is conveying its expectation that, over time, interest rates will decline. This would represent a set of expectations that increase the likelihood that a call would be exercised, increase the call premium, and drive the price of the callable issue below the price of similar non-callable issues.

Introduction

Corporate bond yields are a function of several factors generally assumed to be additive in nature. First, bonds yields compensate investors for the act of deferring consumption today in favor of increased consumption at some later time. Investors will not defer consumption today in

return for the same consumption at a later time. It is only the expectation of greater future consumption that will prompt an individual to defer consumption to a future time. Additionally, compensating an investor for deferred consumption alone is insufficient for prompting investment. Purchasing power must also be preserved. For example, if an investor requires 3% to defer consumption for a year, and prices during the year rise by 3% then a 3% rate of return, which would cover the deferral of consumption, results in zero gain to the investor and they have essentially deferred consumption for nothing. Inflation is unknown until after the fact. Therefore, the extra amount required to compensate for inflation is based on the expectation of the average level of inflation over the corresponding holding period. This inflation premium is common to all securities.

Bond contracts often contain various covenants that are designed to benefit one party or the other to the agreement. Most indenture provisions are designed to make the bond more attractive to the bondholder and thus enhance the price and lower the yield. For example the imposition of restrictions on the firm such as a non-subordination provision will cause the market to perceive the bond as less risky, more attractive and thus more valuable. This results in downward pressure on the interest rate that the issuer will be required to agree to over the life of the bond. [Jones (1998)]

Another contract element that one might find in a bond contract is the conversion right. The conversion right gives the bondholder the option to convert the bond into a specified number of shares of the company's stock. This has the theoretical effect of a call option to the bondholder on the company's stock and allows the bondholder to participate in share price appreciation resulting from the company's investments if they so desire.

For example: A bond is sold in the primary market for its face value of \$1,000. At the time the bond is issued, the issuing company's stock is trading for a price of \$40 per share. The bond contains a conversion privilege that allows the bond holder to convert the bond to 20 shares of stock (the conversion ratio). Since this conversion ratio remains constant, the bondholder now has a call option on the company's stock at a strike price of \$50 per share ($\$1,000/20 = \50) and the option is currently out of the money (strike price > market price).

Most convertible bonds are issued with the conversion option "out of the money" for obvious reasons.¹ However, if the market believes that price appreciation in the company's stock is likely to occur, then the value of the conversion option will increase the value of the bond. This will lower the yield that the market requires on the convertible bond. (Jones 2001)

The call provision, which allows the issuer to redeem the bond early in the event of a lower interest environment, has been associated with lower bond prices and higher yields. [See for example: Allen, Lamy and Thompson (1990), and Jones (2001)]. The current study will examine the continuing effect of these contract elements on yield premia. Since the value of the call option on the bond accrues to the borrower (issuer), it is exacted from the lender (bondholder). If the value of the option increases, then the value of the callable bond declines in similar fashion.

For example, if we compare two bonds that are identical in every aspect except that one is callable and one is not, then the difference in their market values must be attributable to the call option. However, the value of the call option actually has two components: the dollar value of the option, and the likelihood that the option will be exercised. As noted earlier, the call option is only valuable to the issuer when interest rates are lower than they are currently paying. Therefore, the expected value of the call option will increase as current interest rates differ on the

low side from the interest rate on the bond. This is why finance professors often note to students that bonds that are trading at a discount to face value (i.e. market rates are above the coupon rate) are not likely to be called. In this instance, the value of the call option is essentially zero because the likelihood of the option being exercised is essentially zero.

As the market expects interest rates over time to decline (as indicated by a downward sloping yield curve) then the likelihood of a future call increases, and the price of the callable bond should fall below that of the otherwise identical non-callable bond.

The Model

To examine the effect of the shape of the yield curve on bond yield the following model is specified.

$$OTY = \alpha + \sum \beta_i EV_i + \delta Slope$$

Where OTY is the off treasury yield (the difference between the bond's yield, and the contemporaneous yield on three month treasury bills) in basis points. "Off treasury" yield controls for the general level of interest rates and recognizes that potential investors have the option of "parking" their money in short term risk free assets in the event that other investment opportunities are perceived as less than optimal. The EV_i 's represent a vector of explanatory variables included as the result of theory and prior empirical work. These explanatory variables include call protection, term to maturity, issue size, issue rating, presence of a conversion option and whether the issue is dually or split rated¹.

¹See Allen, Lamy and Thompson (1990), Altinkilic and Hansen (2000), Billingsley, Lamy, Marr and Thompson (1985), Blackwell, Marr, and Spivey (1990), Chatfield and Moyer (1986), Ederington (1986), Jewell and Livingston (1998), Liu and Moore (1987), Livingston et al. (1995) Logue and Rogalski (1979) Sorensen (1979), Rogowski and Sorensen (1985), and Livingston and Miller (2000).

The **slope** variable is the slope of the characteristic line through the yield curve on the day the bond was issued. This variable is used as a proxy for the likelihood of a bond call being exercised by the issuer. It is assumed that a bond issuer would not exercise a call provision in an environment of higher interest rates than those that exist at the time the bond is issued and conversely, that conditions of falling interest rates will increase the likelihood that a call option will be exercised. In this case, the bond issuer would be able to exchange higher interest cost for lower interest cost.

If the issue is callable prior to maturity a binary indicator variable (**Callable**) is given a value of 1, otherwise it is set to zero. The interaction of the call variable and the yield slope variable will inform the results of this study and is included in the analysis because the ability to call an issue early represents an option to the issuing firm that has a positive value which will accrue from some other party, in this case, the purchaser of the bond. In addition, the ability to call the issue early raises the possibility that under conditions of falling market rates, the very condition under which the holder of the bond will want to keep it, the bond issue may be prematurely recalled forcing the holder to reinvest at a lower rate (reinvestment rate risk). These arguments suggest that the relationship between the call grouping variable and a bond's excess yield should be positive. The greater the likelihood that the bond will be called the higher the return required by the investor interested in buying the issue.

Term is the number of years to maturity of the issue. This variable is included as a proxy for interest rate risk. Interest rate theory suggests that interest rate risk rises with term to maturity. Therefore, it is expected that longer term issues will have a higher required yield than shorter term issues to compensate for the additional interest rate risk. The model is tested with

both the nominal value in years for the term variable as well as the natural log of the term variable

Size is the proceeds of the issue in dollars. This variable is included as a proxy for the liquidity risk of the issue. Fisher (1959) suggests that the amount of debt issued will have an impact on the liquidity risk of the issue. This impact can be either positive or negative. Larger issues may be traded more frequently thus reducing the liquidity risk of the issue or a large issue may have a negative price impact increasing liquidity risk. The model is tested with both nominal value in millions as well as the natural log of the size variable.

Default risk is proxied by the issue's Standard and Poor's rating. While each issue in the sample has a rating from both Moody's and Standard and Poor's, previous work by Jones (1998) suggests that the market places greater weight on the rating of Standard and Poor's, therefore, the S&P rating is used to categorized issues with respect to default risk. The issues are placed into one of four default risk groups. The four groups are: **Very High Grade** (AAA), **High Grade** (AA to A), **Medium Grade** (BBB) and **Speculative** (BB+ and lower). Three indicator variables are assigned a value of 1 or 0 depending upon in which category the issue's S & P rating falls. The Speculative grade issues will have a value of 0 for all three, Medium grade would be coded as 0,0,1; High grade as 0,1,1; and very high grade as 1,1,1. Indicator variables are used as opposed to a continuous variable because the ratings represent categories of risk rather than a continuous risk measurement. That is that AA is not more risky than AAA by some fixed amount.

Split is an indicator variable set equal to one if the issue is rated differently by Moody's and Standard and Poor's and zero otherwise. Billingsley et. al. (1985) examined 258 bonds issued between January 1977 and June 1983, 12.9% of which were split rated. Their study found

that investor's perceive split rated issues as more risky than non split rated issues. It is therefore expected that split rated issues will have a higher yield than non split rated issues [See also Ederington (1986), Liu and Moore (1987) and Jones (1998)].

Conv is an indicator variable that will have a value of one if the issue is convertible prior to maturity at the option of the holder and zero otherwise. The option to convert the bond into shares of stock acts fundamentally the same as a call option on the issuer's stock at a strike price equal to the conversion price of the bond. Jones (2001) examined whether or not the bond purchaser places a value on the conversion option. Theory suggests that the added option value of the conversion privilege would increase the price that an investor would be willing to pay for a particular issue which would have the effect of lowering the required yield. Jones (2001) work supported this theoretical construct finding that in his sample convertible bonds had an average excess yield lower than non convertible bonds.

Data

The dataset for this study consists of 5,337 new corporate debt issues made between 1983 and 1993.² Information on the slope of the yield curve was derived from data downloaded from the Federal Reserve Board's H15 interest rate series.³ A general description of the data is found in tables 1 and 2 below. Thirty-four % of the issues were callable, 7.8% were convertible, and 21.9% were split rated. All risk classifications were well represented. The average dollar value of the issues in the sample was \$139.75 million and they ranged in size from \$100,000 to \$2.26 billion. The average issue had a yield of 9.62% and they yielded on average 369.37 basis points above the rate on contemporaneous 3-month treasury bills. The callable issues were on average

² This dataset was created originally by T. Opler from data acquired from the Federal Reserve Board of Governor's Capital Markets Division. The data was acquired by the author from the Fisher College of Business datafinder website in 1996. The dataset has subsequently been removed from that site.

protected from being called for a period of 1.35 years and this ranged from immediately callable to call protected for 20 years.

Variable	Number	%
Callable	1816	34.0%
Convertible	415	7.8%
Split	1169	21.9%
Very High Grade	269	5.04%
High Grade	2769	51.88%
Medium Grade	1126	21.10%
Speculative Grade	1173	21.98%

	Range	Minimum	Maximum	Mean	Std. Deviation
SIZE	2259.9000	.1000	2260.0000	139.748698	122.0392763
Term	98.0000	1.0000	99.0000	14.882518	10.0015304
YLD	16.4400	3.4500	19.8900	9.621316	2.3004184
XYTB03 (%)	14.2700	.0000	14.2700	3.693705	1.9016415
CP	20.0000	.0000	20.0000	1.350009	2.5649064
Oty (basis points)	1427.00	.00	1427.00	369.3705	190.16415
Valid N (listwise)					

Results

Results will be provided at the conference.

³ <http://www.federalreserve.gov/releases/h15/update/>

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¹ If the bond were issued with the conversion option "in the money," then investors would buy the bond and convert it to stock and make a riskless profit. This would drive the price of the bond up until the conversion call option is approximately "at the money."

**FINANCIAL LIBERALIZATION, INCREASED COMPETITION, AND
IMPROVED BANKING SERVICES:
EVIDENCE FROM SINGAPORE**

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ABSTRACT

This paper examines the effect of financial liberalization on bank competition in Singapore. Specifically, the study explores whether the extensive liberalization of the once tightly protected domestic banking market in Singapore, which has paved the way for the entry of large international banking institutions has improved the availability quality of banking services and products.

INTRODUCTION

On 17 May 1999, the Monetary Authority of Singapore (MAS) announced its move to liberalize the country's "compartmentalized" commercial banking, aiming to attract foreign financial institution and hoping to turn the city-island into a world-class financial hub. Prior to the intended liberalization, Singapore banks were sheltered from foreign competition through the availability of "full service bank" licenses available only to local banks. Foreign commercial banks were allowed to practice on a more restricted basis through obtaining licenses which allowed them to operate as limited service banks, offshore banks or merchant banks.

The program, as announced, consisted of 3 key elements: the improvement of corporate governance, lifting of the 40% foreign shareholding limit and a five-year liberalization package, allowing foreign banks to enter the local banking market. The assumption of the MAS was that a more open and competitive banking environment would be the result of financial liberalization, and this in turn would lead to availability of a more diverse range of banking services, development and upgrading of local banks through competitive behavior, and eventually the flow of investment and deposit funds in to the Singapore market.

Prior research has indeed pointed to heightened competitive banking behavior following financial liberalization--Caminal et al. (1990), for example, found evidence that the slow loosening of the severe regulation environment led to the evolution of competition in banking. Increase in competition, in turn, has been found to lead to an improvement in perceived quality and range of products and services in several countries. The Organization for Economic Cooperation and Development (2001), for instance, noted that foreign bank entry "improves standards, and that open financial systems are more efficient and offer better services."

Research on the effects of liberalization in Peru identified increased competition in the banking system as one of the main impacts of liberalization, itself resulting from greater number of banks and increased presence of foreign banks (Illescas et al., 1998). Competitive behavior, in turn, improved the quality of banking services and contributed to a reduction of spread between the lending and deposit rates.

According to Zank et al. (1991), barriers to entry imposed on foreign banks in effect protected existing firms from competition and allowed them to operate inefficiently. "Through the provision of market access to new banks, competitive forces are introduced and market participants can turn to new sources for funds and financial services. Competition in banking and financial intermediation tends to limit the spread between the interest paid by borrowers and that received by depositors. Narrowing this spread is an incentive for increasing savings and will provide more and cheaper funds to investors. Competition, when combined with other liberalized financial sector reforms, enhances the efficiency with which intermediation is performed."

Financial liberalization in Nepal, as another example, intensified competition and not only resulted in improved financial services such as longer opening hours and the provision of personalized services but also led to availability of new products through innovation as a consequence of increased competition (Pant, 2000). Chandrasekhar's (2001) concluded similarly in the case of India--the liberalization process resulted in "dynamic" private banks, which were seen as pace setters for the rest of the banking sector. Furthermore, there was an improvement in the quality of the banking sector as these banks attracted depositors by offering better terms and better service.

Findings from International Financial Services (2002) showed foreign trade restrictions to a significant determinant of the interest rate spread for banks. Foreign trade restrictions protected domestic banks, which charged higher prices for their services and operated less efficiently. This was reflected in interest spreads that were 5-60% higher than they would have been in the absence of trade restrictions. In addition, the presence of foreign financial institutions may help in building more robust and efficient financial systems by gaining access to modern financial services that facilitate the development of a competitive export sector; improving access to foreign capital and international capital markets; and introducing international standards and practice. Other examples the strengthening of the country's banking system as a result of successful reduction and abolishment of entry barriers include Chile, the Philippines and Turkey.

The purpose of this study is to assess the success of the financial liberalization in Singapore. As stated above, liberalization is expected to have several consequences and increased competition amongst banks is one of the main impacts (Caminal et al., 1990, discussing Spain, and Illescas et al., 1998, citing Peru). This article is modeled after Illescas et al. (1998) and hypothesizes that financial liberalization in Singapore has led to heightened competition among financial institution, and this in turn, has motivated Singaporean banks to improve product range and availability, and to provide better quality services.

The availability and quality of both core value services, and consumer-identified "important" banking services were assessed through administering a carefully designed survey questionnaire. Additionally, services offered by local banks with full banking licenses (e.g. UB and OCBC banks) were compared to those offered by foreign banks holding qualified full banking licenses (e.g. HSBC and Citibank). The results of the study not only point to the fact that liberalization has indeed improved the banking scene in Singapore through the availability of a wider range of products and better banking services, but also that foreign banks do have a competitive edge in both product availability and provision of banking services as compared to traditionally-protected

local banks. In addition, the results of the survey are important from a marketing point of view as the perception of consumers are revealed as to what services are important in their selection of banking institutions.

METHODOLOGY

To assess the availability and quality of banking services as perceived by consumers, a carefully designed survey questionnaire was administered at various locations in Singapore, including the Central Business District as well as housing estates. Potential respondents were approached and asked about their willingness to complete the survey (every 5th person was approached). Trained interns explained the purpose of the study and the affiliation of the researchers. A total of 450 questionnaires were distributed, with 414 usable responses, translating to a response rate of 92%.

The Questionnaire

Questions 1 and 2 were used to determine the target population as well as to ascertain if there was an increase in consumer banking in since liberalization started in 1999. The percentage of account holders that have opened new accounts with local and/or foreign banks is used to determine the popularity of the respective banks with the surveyed population.

(Q1): Select the banks in which you have an account. (*You may choose more than 1 bank*) and

(Q2) Select the bank or banks in which you have opened a new account during the last four years (i.e. since 1999). (*You may choose more than 1 bank*)

TABLE 1: FULL AND QUALIFYING-FULL LICENSE BANKS IN SINGAPORE

	UOB
	OCBC
	DBS
	ABN Amro Bank NV
	Banque Nationale de Paris
	Citibank NA
	Standard Chartered Bank
	HSBC
	Malayan Banking Berhad

The next two questions assessed the perception of bank customers regarding a bank services cited in the literature as having an influence in bank selection are listed in Table 2.

TABLE 2: FACTORS INFLUENCING BANK SELECTION

Category	Factors
<p>Convenience <i>Lewis and Bingham (1991)</i></p>	<p>Long Opening Hours Location of Branches Wide ATM Network</p>
<p>Pricing of Products and services <i>Gupta and Torkzadeh (1988); Leonard and Spencer (1991) Khazeh and Decker ((1992) Stafford (1996)</i></p>	<p>Low Borrowing Rates High Deposit Rates Low Service Charge</p>
<p>Reputation <i>Yoon et al. (1993) Khazeh and Decker (1992); Boyd et al. (1994) Stafford (1994)</i></p>	<p>Good Image Prestige</p>
<p>Service Quality <i>Grönroos (1990) Gupta and Torkzadeh (1988) Leonard and Spencer (1991) Sudin et al. (1994) Zineldin (1996)</i></p>	<p>Efficient Staff Friendly Staff Good Credit Facilities Knowledgeable Staff Loan Repayment Flexibility Wide International Network Wide Range of Currencies Available Wide Range of Maturities for Time Deposits Wide Range of Banking Services</p>
<p>Perceived Risk <i>Hampton (1977)</i></p>	<p>Financial Stability</p>

There are 2 overriding dimensions of service quality (Levesque and McDougall, 1996; McDougall and Levesque, 1994).

The first dimension referred to the core aspects of the service such as reliability and the second referred to the relational or process aspects of the service such as tangibles (Jamal and Naser, 2002).

Grönroos (1987) and Storey and Easingwood (1998) defined core services as a main component of the basic service package. This result corroborated with that of the core and augmented product schema employed by Levitt (1980). TrendWatch (2002) defined value-added services as products and services outside a core product area that brings added value to the total customer relationship and which would strengthen the revenue stream for both customer and supplier.

(Q3) Which of the following factors do you consider as a “core consumer banking service?” and which do you consider only a “value-added service?”

(Q4) When selecting a bank, which of the following criteria you would be most concerned with?

TABLE 3: CONSUMERS’ PERCEPTION OF “CORE VALUE” VS. “VALUE ADDED SERVICES, AND THEIR IMPORTANCE IN BANK SELECTION

Question 4	Core Value Services				Value Added Services	
Question 5	Very Important			Not Important		
Efficient Staff	1	2	3	4	5	NA
Financial Stability	1	2	3	4	5	NA
Friendly staff	1	2	3	4	5	NA
Good credit facilities	1	2	3	4	5	NA
Good Image	1	2	3	4	5	NA
High deposit rates	1	2	3	4	5	NA
Knowledgeable staff	1	2	3	4	5	NA
Loan repayment flexibility	1	2	3	4	5	NA
Long opening hours	1	2	3	4	5	NA
Low borrowing rates	1	2	3	4	5	NA
Low service charge	1	2	3	4	5	NA
Prestige	1	2	3	4	5	NA
Wide international network	1	2	3	4	5	NA
Wide range of currencies available	1	2	3	4	5	NA
Wide range of maturities for deposits	1	2	3	4	5	NA
Wide range of services	1	2	3	4	5	NA
Wide ATM Network	1	2	3	4	5	NA
Location of Branches	1	2	3	4	5	NA
Others: (Please State)	1	2	3	4	5	NA

Questions 5 appraise the perception of consumers whether banking services have improved and question 6 asked them to list to identify which service(s) ought to be further improved.

(Q5) Which of the following services have been improved in recent years?

(Q6) Are there any banking service, which you think should be improved? Please Specify.

TABLE 4: CONSUMERS' PERCEPTION OF IMPROVED BANK SERVICES

	UOB	OCBC	DBS	ABN Amro Bank NV	Banque Nationale de Paris	Citibank NA	Standard Chartered Bank	HSBC	Malayan Banking Berhad
Efficient Staff									
Financial Stability									
Friendly staff									
Good credit facilities									
Good Image									
High deposit rates									
Knowledgeable staff									
Loan repayment flexibility									
Long opening hours									
Low borrowing rates									
Low service charge									
Prestige									
Wide international network									
Wide range of currencies available									
Wide range of maturities for deposits									
Wide range of services									
Wide ATM Network									
Location of Branches									
Others: (Please State)									

Finally, question 7 asked about the services consumers intended to use in the near future, and whether they were likely to approach local or foreign banks for such services.

(Q7): Please indicate

- (a) Bank services that you are currently using or are likely to use in future, *and*
- (b) whether you are using or would use the service provided from local Banks or foreign banks.

TABLE 5: CONSUMERS' INTENTIONS TO USE BANK SERVICES AND THEIR INTENDED SELECTION OF LOCAL OR FOREIGN BANKS

	Currently Using	Likely to use in future	Use service from Local Banks	Use service from QFBs
Advisory/ Consultancy services				
Asian currency unit (ACUs)				
ATM				
Credit cards				
Current/ Checking account				
EFTPOS cards (e.g.: NETS)				
Fixed deposit account				
Internet banking				
Investment services				
Loan facilities				
Payroll services				
Phone banking				
Safe deposit services				
Savings account				
Share brokerage				
Unit trusts				
Others: (Please State)				

Statistical Analysis

The following tests were conducted to analyze the results of the survey:

Frequency Analysis to summarize and describe the observations, such as the means and percentage of population that holds a local or QFB bank account; Factor Analysis to determine the statistically significant core value services in each category based on rotated factor matrix. A higher value of the service matrix as compared to others will implied that the service is perceived as more important and hence a core value Additionally, this technique was employed to assess which banks have made the most improvement; Chi-Square Test for Relatedness or Independence was used to analyze the relationship between the current or future usage of the banking products

and consumers' preference for the banks, and their consumers' preference for QFBs' products. In addition, results were used to determine the market penetration by the QFBs; One-way Analysis of Variance (ANOVA) was used to compare the statistical means of the consumers' perceptions on the important core value services of the different levels in each of the demographic groups (qualification, income and age). Results were used to evaluate if there were similar or different perceptions within each demographic group.

RESULTS

1. Pricing of the products and services is perceived as the highest ranked core value service; followed by perceived risk, service quality and convenience-related factors. The rotated factor matrix shows that Low Borrowing Rates, Efficient Staff, Financial Stability, Wide Range of Currencies, Location of Branches and Wide ATM Network are significantly regarded as the core value services.
2. In selecting a bank, the results show that the important categories are pricing of products and services, service quality, and convenience-related factor. Likewise, the rotated factor matrix was used to determine the significantly important services, which are Low Borrowing Rates, Wide Range of Currencies Available, Wide International Network, Efficient Staff, Wide ATM Network and Location of Branches.
3. Improved Core Value services were not perceived significant for Maybank, ABN Amro and BNP Paribas. As shown in Table 6, DBS and UOB have only perceived improvements on Wide Range of Currencies and Low Borrowing Rates, respectively. In addition, OCBC's services have not improved significantly. However, QFBs are making greater improvements as perceived by the respondents, where each QFB has improved on three important core value services.

TABLE 6: PERCEIVED IMPROVED CORE VALUE SERVICES

Improved Core Value Services	DBS	UOB	OCBC	Citi Bank	Standard Chartered	HSBC
Low borrowing rate	√			√		√
Wide Range of Currencies Available	√				√	√
Efficient Staff				√	√	√
Wide ATM Network				√		√
Location of Branches					√	

4. Table 7 depict other services perceived as improved by the respondents.

TABLE 7: PERCEIVED IMPROVED VALUE-ADDED SERVICES

Other Improved Services	DBS	UOB	OCBC	Citi Bank	Standard Chartered	HSBC
Wide Range of Deposit Maturities	√	√				√
Low Service Charge	√			√		
Friendly Staff		√	√	√		
Good Image				√		√
Long Opening Hours				√		√
Financial Stability					√	
Knowledgeable Staff						√

5. Respondents generally felt that there should be an improvement in ATM network; namely for QFBs. Inefficient staff especially during peak hours and apparent lack of staff’s knowledge of products were a source of many complaints for all banks. A large number of respondents had requested for an extension of opening hours for branches and increased branches in well-located areas.

6. Most of the respondents currently use products from local banks. However, they are willing to try products from QFBs in the future. Such products include Advisory Services, Asian Currency Units, Credit Cards, Current/Checking Account, EFTPOS cards, Investment Services, Savings Account, Share Brokerage and Unit Trusts. This shows that QFBs are slowly penetrating into the consumer banking market through these products. Consumers still prefer to use basic banking products, like ATM and Fixed Deposits and Internet Banking from local banks.

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PERFORMANCE AND COMPENSATION ON THE EUROPEAN PGA TOUR: A STATISTICAL ANALYSIS

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ABSTRACT

This paper investigates the determinants of player performance as measured by scoring average and earnings on the European Professional Golf Association (EPGA) tour for the 2006 season. Among other findings, this research shows that the percentage of greens reached in regulation (*GIR*) and putts per round (*PPR*) are by far the most important determinants of both scoring average and earnings on the EPGA. We further find that driving distance and driving accuracy are approximately equally important in determining scoring average.

INTRODUCTION

Professional golf tours keep a variety of performance statistics presumed to measure important skills related to success. One dominant statistic is greens in regulation—the percentage of golf holes for which the player reaches the surface of the green in at least two fewer strokes than the par score for that hole. Other major statistics include driving distance (*DD*), driving accuracy (*DA*) which measures the percentage of drives in the fairway of the hole being played, sand saves (*SS*) which measures the percentage with which a player takes two or fewer strokes to hole the ball from greenside bunkers, putts per round (*PPR*), and putts per green reached in regulation (*PPG*). Each of those measures, *GIR*, *DD*, *DA*, *SS*, *PPR* (or *PPG*), are related in theory to scoring and scoring is clearly related to monetary success.

The purpose of this paper is to provide empirical estimates to aid in determining if and how those statistics are related to scoring average and money winnings as measures of success on the European PGA golf tour. This paper will employ regression techniques to capture the influence of the measures of the skills enumerated in the previous paragraph on success on the EPGA tour.

LITERATURE REVIEW

There are several strains of research on professional golf performance based on the statistics compiled by the PGA and LPGA and EPGA tours. One of the first studies of the statistical determinants of success in professional golf was by Davidson and Templin [2]. Utilizing data from the 1983 PGA (119 of the top 125 money winners) in a multiple regression framework, Davidson and Templin found that greens in regulation (*GIR*), putting (*PPR*), and a combined driving efficiency measure were capable of explaining 86% of the variation in scoring average for the PGA tour, with *GIR* the most important single variable. When the dependent variable was earnings, putting was slightly more important statistically than the other explanatory variables, based on standardized beta coefficients. Shmanske [11], also using a multiple regression framework for data from the 1986 PGA tour (the top 60 money winners), finds that putting and driving distance are the two most important skills in determining success on the PGA tour. When player money winnings per event are the dependent variable, he finds no significant role for *GIR* as an explanatory variable. Shmanske also attempts to estimate the greatest payoff for practice, and finds the greatest payoff is for putting practice. Belkin et al. [1] utilize PGA statistics for three years (1986-88) in correlation and step-wise regression frameworks. Their research confirms the importance of *GIR* and putts per round (*PPR*) as dominant variables in determining scoring average, with lesser, but statistically

important roles for driving distance, driving accuracy and sand saves. They conclude that their research confirms the importance of tour statistics in predicting scoring average.

A 1995 paper by Englehardt [4] concludes that the rankings of the top 10 money winners are *not* significantly correlated with *GIR* for 1993 and 1994 PGA seasons, and cites an increasingly important role for “total driving,” which is the sum of the ranks in driving distance and driving accuracy. This study utilizes, however, a sample size of only 10. Moy and Liaw [8] find evidence that conflicts with that from Englehardt for the same PGA year. They find statistically important roles for driving distance, driving accuracy, *GIR*, and putting in determining earnings on the PGA tour for the 1993 season. The latter study utilizes a multiple regression framework and a much larger sample size than Englehardt. Moy and Liaw’s work also includes analysis of the LPGA and the Senior PGA tours and they offer the general conclusion that a well rounded game is necessary for success in professional golf. Nero [9] using data from the 1996 PGA tour finds statistically important roles for driving distance, driving accuracy, putting, and sand saves in determining money won. Interestingly, Nero does not include *GIR* in his analysis.

Nero also estimates a frontier earnings function in an attempt to identify the most efficient golfers—that is those golfers who earn more than that predicted by the regression equation.

Dorsal and Rotunda [3] using data from the top 42 players on 1990 PGA tour found that *GIR* was the most important variable determining scoring average, and that driving accuracy was more important than driving distance. Their analysis included simple correlation analysis and multiple regression techniques. They also used scoring average, top 10 finishes, and money winnings as dependent variables.

METHODOLOGY

The primary research method for this paper is multiple regression analysis with scoring average and money won per event as the dependent variables (the money winnings equation is estimated in log form due to heteroskedastic residuals in the untransformed version), and the general set of performance statistics as the explanatory variables.

The general models may be represented as:

$$SA_i = \beta_0 + \beta_1GIR_i + \beta_2DD_i + \beta_3DA_i + \beta_4PPR_i + \beta_5SS_i + \varepsilon_i, \quad (1)$$

and

$$\ln(M_i / E_i) = \beta_0 + \beta_1GIR_i + \beta_2 \ln DD_i + \beta_3DA_i + \beta_4 \ln PPR_i + \beta_5SS_i + \varepsilon_i \quad (2)$$

Where,

SA = Scoring average (strokes per round)

M/E = money winnings per event

GIR = greens in regulation (percentage of greens reached in regulation or fewer strokes)

DD = driving distance in yards

DA = driving accuracy (the percentage of drives in the fairway)

PPR = putts per round

SS = percentage of sand saves,

and the *i* subscript refers to the *i*th observation (here the individual player), and *ln* is symbol for the natural log.

SUMMARY STATISTICS ON THE EPGA TOUR

Table I represents the summary statistics for the 2006 EPGA tour. For 2006, the EPGA tour reported full statistics on 178 players. Unlike the PGA tour in the United States, the EPGA tour in 2006 was not dominated by a single player. Paul Casey was the leading money winner (2.5 million euro), Sergio Garcia had the lowest stroke average (70.04), but the gaps between those leaders and the other top players were relatively small.

Table I: Summary Statistics for the 2006 EPGA Tour

Variable	Mean	Standard Deviation	Minimum	Maximum
Scoring Average (SA)	71.90	0.755	70.04	74.03
Greens in Regulation (GIR)	66.08%	3.63%	57.8%	75.6%
Driving Distance (DD)	284.28	9.97	260.2	314.1
Driving Accuracy (DA)	59.51%	5.89%	42.0%	75.6%
Putts per Round (PPR)	29.69	0.767	28.0	32.6
Sand Save Percentage (SS)	51.92%	8.63%	24.6%	75.9%
Putts per GIR (PPG)	1.79	0.032	1.72	1.90
Money Winnings (M)	€390,929.00	€443,790.23	€1,842.00	€2,454,084.00

(n = 178)

SOME REGRESSION RESULTS

In this section we present and discuss the regression results for scoring average and money winnings.

Scoring Average

Table II presents the results of the regressions with scoring average (*SA*) as the dependent variable. The column titled Regression 1 contains the empirical estimates for equation 1 from above. The coefficients for each variable have the anticipated signs, however only *GIR* and *PPR* are strongly significant in the statistical sense (*DD* is weakly significant). The equation explains over 85% of the variation in scoring average and the standard error is slightly over one-quarter of a stroke. It is clear from regression 1 in Table II that *GIR* and *PPR* are dominant variables in the equation, and *PPR* is fairly near its theoretical value of 1.

In order to assess the effects of variables such as driving distance and accuracy, we offer Regression 2. Since *DD* and *DA* are dominated by *GIR* as explanatory variables in equation 1, at least in part because the percentage of greens that a golfer hits in regulation is in fact determined by the distance and accuracy of his drives, we eliminate *GIR* from Regression 2. In this way we believe a clearer assessment of those skills, and some evidence of the value of each can be estimated. Notice that all of the variables remaining in Regression 2 are signed in accord to theory and statistically significant. However, without *GIR* in the regression, the explanatory power of the regression is significantly reduced—the adjusted R-squared value is only .33. It is often considered a controversy as to whether driving distance (*DD*) or driving accuracy (*DA*) is more important for professional golfers. Much of the recent commentary (and some research) tends to emphasize distance over accuracy. We offer Regression 2 as contradictory evidence. First, each of those two variables is statistically significant at approximately the same levels. Second, assuming regression 2 is properly specified, some indication of the relative importance of the two variables may be offered. Suppose other things equal, a player improved one standard deviation in each

of *DD* and *DA*. Driving distance would increase by 9.97 yards and driving accuracy would rise by 5.89%. The product of the coefficient estimate and the respective one standard deviation change would represent the change in scoring average. For *DD* this procedure would lower scoring average by .361 strokes per round ($-0.0362 \cdot 9.97$) and for *DA*, the corresponding effect would lower scoring by .352 strokes per round ($-0.0597 \cdot 5.89$). While it is clear that each of these variables is important in scoring average, it is not at all clear which is the more important influence on scoring average for the EPGA tour. Based on this analysis, their respective contributions appear to be approximately the same.

Table II: Regression Results: Scoring Average = Dependent Variable

Variable/ Summary Statistics	Regression 1	Regression 2	Regression 3	Regression 4
Constant	60.63	72.40	79.07	59.30
<i>GIR</i>	-0.2038* (-25.13)		-0.1087* (-8.14)	-0.2092* (-29.86)
<i>PPR</i>	0.8881* (26.03)	0.4711* (7.33)		0.8900* (28.82)
<i>DD</i>	-0.0047*** (-1.62)	-0.0362* (-6.40)		
<i>DA</i>	-0.0038 (-0.78)	-0.0597* (-6.28)		
<i>SS</i>	-0.0011 (-.415)	-0.0125** (-2.28)		
\bar{R}^2	.8561	.3315	.2695	.8563
<i>SEE</i>	.2862	.6170	.6450	.2861
$F_{k, n-k-1}$	211.62*	22.94*	66.30*	528.31*

(notes: n = 178; k = number of regressors; t-statistics in parentheses; *, **, *** indicate significance at $\alpha < .01$, .05, and .10, respectively)

Regressions 3 and 4 are examples of more parsimonious estimations. In Regression 3, greens in regulation (*GIR*) alone explain 26% of the variance in scoring average. It is interesting to note that the corresponding statistic is similar for the US PGA tour, but approximately 75% for the LPGA tour (see [10]). Finally, Regression 4 indicates that an equation including only *GIR* and *PPR* explains as much of the variance in scoring average as does Regression 1. Put differently, only 15% of the variance of scoring average is explained by factors other than *GIR* and *PPR*.

We also experimented with putts per green in regulation (*PPG*) rather than *PPR*. It turns out that when *GIR* is in the equation, *PPR* is a stronger explanatory variable, and when *GIR* is not in the equation, *PPG* is the better explanatory variable. The reason for this, we believe, is that players who miss a larger proportion of greens (lower *GIR*) have fewer total putts (because they are able to get the ball closer to the hole when they eventually get the ball on the green). Indeed the simple correlation between *GIR* and *PPR* is 0.535, clear evidence of the effect we describe.

Tournament Winnings

Since different tournaments have different purses, tournament winnings per event is a more difficult variable to explain. Table III depicts the results of the regressions aimed at predicting tournament winnings. In the specifications presented here, the form of the dependent variable is the natural log of

tournament money winning per event ($\ln(M/E)$). Since it is necessary to control for the number of events that a particular player enters, winning per event is a natural transformation.¹ The log form is chosen for two reasons: first, the residuals are heteroskedastic unless the log transformation is used and, second, the predicted winning per event is bounded by zero in log form, but predicted money per event can be negative without the log transformation.

Table III: Regression Results: Log of Money per Event = Dependent Variable

Variable/ Summary Statistics	Regression 1	Regression 2	Regression 3	Regression 4
Constant	90.96	-16.33	-0.4438	98.25
<i>GIR</i>	0.2613* (12.89)		0.1454* (7.12)	0.2634* (15.09)
$\ln(PPR)$	-30.92* (-12.13)	-14.96* (-4.81)		-31.41* (-12.71)
$\ln(DD)$	1.027 (0.495)	12.602* (4.82)		
<i>DA</i>	-0.0056 (-0.452)	0.0664* (4.31)		
<i>SS</i>	0.0062 (0.957)	.0210* (2.37)		
\bar{R}^2	.5893	.1975	.2192	.5916
<i>SEE</i>	.7158	1.001	.9871	.7139
$F_{k, n-k-1}$	51.80*	11.89*	50.67*	129.20*

(notes: n = 178; k = number of regressors; t-statistics in parentheses; * indicates significance at $\alpha < .01$, .05, and .10, respectively)

The explanatory variables *PPR* and *DD* are in log form so that their coefficients are interpreted as estimates of elasticities. Since the other variables are already in percentages, they are not in log form. Their coefficients (*GIR*, *DA*, *SS*) when multiplied by 100) are sometimes called semi-elasticities, i.e., the percentage change in the (untransformed) dependent variable due to a one unit change in the independent variable.

Regression 1 of Table III explains approximately 59% of the variation in the log of money per event across players on the EPGA tour. Again, the coefficients on sand save percentage (*SS*), driving distance (*DD*) and driving accuracy (*DA*), suggest little independent predictive power for any of those variables in regression 1. The coefficient for *GIR* suggests that a one-unit change in *GIR* implies a 26.13% increase in money winnings per tournament. The coefficient for *PPR* suggests that a 1% decrease in putts per round leads to a 30.92% rise in money winnings per event. Since *DD* and *DA* operate through *GIR*, their interpretation is left for regression 2. In regression 2, the *GIR* variable is dropped. Notice that the coefficients for *PPR*, *DD*, *DA*, and *SS* are all correctly signed and statistically significant. Regression 2 is offered to assess (as in Table II) the effects of *DD* and *DA* on the dependent variable without *GIR* absorbing most of their effects. In that regression, the elasticity of money winnings per event with respect to *PPR* is estimated to be 15.0%, that is, a one percent decrease in *PPR* implies a 15% increase in money per event. In regression 2, the implied elasticity of *DD* is 12.6%, meaning that if *DD* increases by 1%,

¹ It is also (of course) possible to control for events entered by entering the number of events as an explanatory variable.

winnings per event are estimated to increase by 12.6%. The semi-elasticity for *DA* is estimated to be 6.64%.²

Regression 3 is offered to assess the effect of *GIR* alone on money winnings per tournament. *GIR* in this estimation has an implied semi-elasticity of 14.5%, and explains almost 22% of the variance in tournament winnings. Finally Regression 4 suggests that *GIR* and *PPR* explain approximately 60% of the variation in money winnings per event across players—the same proportion as the less parsimonious model in Regression 1. Further the *GIR* and *PPR* coefficient estimates for Regression 4 are nearly identical to those of Regression 1.

CONCLUSIONS

We present evidence of the determinants of success on the European Professional Golf Association (EPGA) tour. Whether the measure of success in scoring average or money winnings, the percentage of greens reached in regulation (*GIR*) and a measure of putting success (here, putts per round) are dominant explanatory variables in regression formats. To assess the effects of driving accuracy and driving distance, it is necessary to remove *GIR* from the estimating equations. Those formulations suggest that driving accuracy and driving distance are approximately equally important in determining scoring average.

A comparison of the United States PGA tour, the European PGA tour, and the Ladies PGA tour is a potential future project.

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² One must be careful with this interpretation. Since the explanatory variable is in percentage form, a one unit change is one percentage point, but that is a larger percentage of the mean of the variable, since all mean percentages for these variables are considerably less than 100%.

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SUB PRIME LENDING

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ABSTRACT

This paper examines the liquidity crisis in the US financial markets in 2007. This liquidity crisis was not altogether unexpected but widely predicted by market watchers. Nevertheless it seems to have taken several market participants by surprise causing considerable market volatility and losses to investors.

INTRODUCTION

In March of 2000 the US Equity markets began crashing following six consecutive increases in the Federal funds rate by the US Federal Reserve Bank. On November 17, 1998 the Federal funds rate stood at 4.75 percent. Then from June 30, 1999 to May 16 2000 the Federal Reserve raised the Federal funds rate by 0.25 percent five consecutive times with the last increase occurring on March 2000. The NASDAQ hit its peak crossing 5000 in early March of year 2000 and began a precipitous and prolonged slide thereafter. This slide was accelerated by the Fed raising interest rates by an additional 0.50 percent on May 16, 2000 and the events of September 11, 2001. The Federal Reserve Bank began cutting interest rates in January of 2001 when the NASDAQ stood at 2291, full 55% below its all time high. But the NASDAQ continued to fall as the unexpected terrorist attack on the world trade Center on September 11, 2001 deepened investor risk aversion. So despite eleven rate cuts bringing the Fed funds rate from 6.5% to 1.75%, the NASDAQ continued to fall bottoming out on Oct 8, 2002, at 1109.64. The Federal Reserve Bank continued to cut rates two more times and the thirteen rate cuts brought the Federal Funds rate to one percent and interest rates in the United States to a forty year low [1]. The low interest rates made credit cheap and easily available to both businesses and consumers in the United States.

FINANCING THE AMERICAN DREAM

Owning ones own home is part of 'The American Dream' and lenders like Countrywide Financial grew rapidly by providing first time mortgage and refinance solutions for millions of American home owners. In the company's website [2] Countrywide Financial (which trades on the NASDAQ exchange under the ticker symbol CFC) advertises itself as a firm that was founded in 1969 with the "commitment to break down the barriers to owning a home." The company which was rated in 2006 as "America's #1 Home Loan Lender" by Inside Mortgage Finance, states it "has helped millions of families find ways to accomplish their home ownership needs, whether buying a first home or refinancing their current loan." The firm's advertising slogan is "*No one can do what Countrywide Can.*" The company's website also states that it has been one the best performing financial services companies in the past twenty five years and that it is ranked #91 in the Fortune 500.

SUB-PRIME LENDING

Sub-prime loans are loans made to people with poor credit histories. A borrower's credit worthiness is measured by a credit score. Credit scores generated by the Fair Isaac Corporation or the FICO credit score are the most well known and used by mortgage lender. FICO scores range between 350 and 850 and sub-prime borrowers usually have credit scores below 620. Considerable published research exists about predatory lending practices among lenders to sub-prime borrowers. Bernstein [3] reports "abusive lending practices often involve lower-income and minority borrowers...Elderly homeowners, in particular, are frequent targets of some sub-prime home equity lenders, because they often have substantial equity in their homes, yet have reduced incomes" Squires [4] writes "After decades of redlining practices that starved many urban communities for credit and denied loans to racial minorities, today a growing number of financial institutions are flooding these same markets with exploitative loan products that drain residents of their wealth. Such "reverse redlining" may be as problematic for minority families and older urban neighborhoods as has been the withdrawal of conventional financial services. Instead of contributing to homeownership and community development, predatory lending practices strip the equity homeowners have struggled to build and deplete the wealth of those communities for the enrichment of distant financial services firms." One of the commonly adopted practices by lenders to sub prime borrowers is to convince the borrower that he could afford the loan using a very low adjustable teaser rate that would be reset at a later date.

LIQUIDITY CRISIS AND FIRM VALUE

Firms like Countrywide relied for their liquidity and continued operation on their on their ability to resell the loans they made. The loans that were resold were securitized by financial institutions and distributed among investors across the globe. Hedge funds hungry for high returns were often purchasers of such mortgage backed securities. In spring of 2007, in the midst of rising defaults in the sub-prime sector and a steep increase in foreclosures, the demand for non agency asset back securities abruptly dried up. Countrywide Financial found itself unable to resell a large section of its loan portfolio. The firm was forced to draw upon a \$11.5 billion credit facility in mid August 2007 to stay in operation. Additionally on August 22, 2007 the firm availed itself of \$2 billion in assistance from Bank of America. The market value of the stock reflected the firm's troubles. The stock which had traded as high as \$41.31 per share on May 17, 2007, traded at less than half that and well below its book value just three months later. Countrywide Financial stock had clearly succumbed to its own sub-prime lending practices.

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PAYDAY LENDING PRACTICES AND PUBLIC POLICY

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ABSTRACT

Payday loans are small, very short-term consumer loans that originate in a wide variety of storefront or pawnshop outlets. The fees charged by payday lenders imply extremely high annual percentage rates and the probability a borrower will default is equally high. Critics argue the fees charged are usurious and the borrowers are often trapped into renewing the loans for multiple terms. Lenders counter the fees charged and the repeat borrowers are necessary to sustain an industry which has no substitute in the financial services market. An earlier paper by Flannery and Samolyk examined these issues using proprietary store-specific data provided by two payday lenders [7]. They conclude that fixed operating costs and loan loss rates justify a large portion of the fees charged. This paper examines the same issues using industry data collected by the Commonwealth of Virginia State Corporation Committee and firm-specific data contained in the Form 10-K's filed by three large payday lenders. The conclusions are very similar.

INTRODUCTION

Payday loans are one example of a nonblank credit product that is intended to finance a short-term cash deficiency. Other examples include an American Express cash card, a consumer finance loan and an auto equity loan. Of these, payday loans and auto equity loans are the most recent entries into the market. Both are contentious.

Auto equity loans are only made to borrowers who can produce clear title to a vehicle that will be held as collateral by the lender. The term is usually one month and the vehicle may be repossessed upon default. The borrower retains possession of the vehicle during the term of the loan and deposits the title and sometimes a copy of the keys with the lender. The average title loan is \$350 and many of these loans are renewed for multiple terms [8].

The typical payday loan is for a term of two weeks or less for around \$250-\$300, and the typical fees/interest on these loans range from 15% to 20% of the amount borrowed. These fees translate into very high annualized rates of interest. More significantly, a large number of loan customers obtain many loans per year which to some observers implies these loans are used to finance and perpetuate chronic financial difficulties [1].

For example, in Virginia the maximum rate of interest for payday loans is 15% which translated to an average annual percentage rate of 386% in 2003 and 376% in 2004. Eighteen percent of the individuals to whom payday loans were made received thirteen or more loans in 2003 and twenty percent of the individuals to whom payday loans were made received 13 or more loans in 2004 [15] [16].

The loan product provides customers with cash in exchange for a promissory note, which is usually supported by a personal check for the amount of the advance plus a service fee. In order to be approved for a payday loan, new customers are required to have a current bank account and a regular source of income which may be, but is not required to be, a job. There is no evaluation of creditworthiness in determining approval of a loan other than identification, a bank account and a source of income. The customer is usually required to present a recent pay stub as one proof of identification. If approved, the customer enters into an agreement governing the terms of the loan. The customer then writes a personal check to cover the amount of the payday advance plus charges for applicable fees/interest, and makes an appointment to return to the payday cash center on a specified due date, usually his or her next payday, to repay the advance plus the applicable fees/interest. At the specified due date, the customer is required to pay off the payday cash advance in full, which is usually accomplished by the customer returning to the payday cash center with cash. Upon repayment in cash, the payday lender is obligated to return the customer's personal check. If the customer does not return on the specified date with cash, the lender will usually attempt to contact the customer and may deposit the customer's personal check for collection.

Payday cash advance services have grown steadily and rapidly since the early 1990's as a response to a shortage of alternative short-term credit lines from traditional and non-traditional banking institutions. Many banks and other traditional financial institutions have reduced or eliminated their provision of small-denomination short-term consumer loans, in part due to the costs associated with originating these loans. As a result, a large number of companies have begun to offer these loans to lower and middle income borrowers. Providers range from specialty offices, which provide only payday cash advances, to retail stores in other industries that offer these types of loans as ancillary services. For example, as of December 31, 2005 Advance America, one of the largest entries in the market, was making payday loans in 1,868 cash advance centers in 29 states and serving as the lending agent for the lending banks under the agency business model in 540 centers in five states.

The cost of entry into the payday cash advance business is relatively low and many state statutes offer a regulatory safe harbor for the industry. In Virginia an applicant must post a surety bond of \$10,000 and each office must possess \$25,000 of unencumbered liquid assets. As of 2004, 36 states and the District of Columbia had legislation permitting and regulating payday loans. Most of the cash centers are located in middle to low income shopping areas with high retail activity. Other tenants in the areas are typically grocery stores, discount retailers and video rental stores. Recently, businesses offering payday cash advances and short-term loans over the internet and the telephone have begun to appear.

Increases in the charges associated with insufficient funds, as well as late penalty fees and minimum payment requirements by financial institutions and merchants have also fueled demand for payday cash advances. Some studies indicate that a large percentage of payday cash advance customers do not regularly transact loan business with banks. A payday cash advance usually involves a single charge, unlike other alternatives that may require collateral, origination and administration fees, prepayment penalties and charges for other services such as credit life insurance, accident and health insurance or other incremental charges. Industry representative believe customers use short-term payday cash advances because they provide simple, quick, and confidential ways to meet short-term cash needs between paydays while avoiding potentially higher costs and negative credit consequences of other alternatives.

The industry maintains their sole market focus and competitive strength allows them to primarily reach and service middle income employed customers. For example, Table I is included in Advance America, Cash Advance Center Inc.'s 12/31/2004 Form 10-K as a description of it's customer base. The table

implies the average household which obtains a payday loan is somewhat similar to the average household in United States [1].

Table I

	Customers	U.S. Census 2000
Average Age	38.4	35.8
Percentage between 18-44	64%	40%
Median household income	\$40,125	\$41,994
Percentage homeowners	42%	66%
Percentage with high school degree	84%	80%

PUBLIC POLICY CONCERNS

Some consumer advocate groups and state legislators are not as sanguine. Critics wonder why most payday loan centers are located in low-income neighborhoods, near military bases or near neighborhoods populated by illegal immigrants. The Center for Responsible Lending and The Consumer Federation of America has stated payday advances are “marketed as small emergency loans, but in reality these loans trap borrowers into a cycle of debt”. “Because the loans are typically made without regard to the borrower’s ability to pay and because they are structured to be repaid as a single balloon payment after a very short term, borrowers frequently cannot pay the full amount on the maturity date and instead find themselves extending or rolling over the loan repeatedly. In this way, borrowers may pay fees well in excess of the amount they originally borrowed [8].” In response to these concerns, several states do not permit payday lending. However, the legislative trend has been permissive with regard to allowance but restrictive with regard to maximum fees and effective annual percentage rates.

Despite the controversy there is relatively little evidence, other than antidotal, regarding the relative profitability of payday loans. The most recent and rigorous study by Mark Flannery and Katherine Aomolyk of the FDIC Center For Financial Research concludes, “To a great extent, the high APR’s implied by payday loan fees can be justified by the fixed costs of keeping stores open and the relatively high default losses suffered on these loans.” Their results also show the industry “could survive with fewer high-frequency borrowers, but its long-term scale would be smaller”.

In this paper I take a different approach. Rather than attempting to explain store-level APR’s based on the fixed cost of operations and loan loss ratios, I compare the rates of return in the payday loan industry to the rates of return in other more traditional banking institutions. To achieve these comparisons on a national basis, I employ the 10-K’s of the largest payday lenders. To achieve these comparisons on a local basis, I employ the operating data reported by banks, credit unions, and payday lenders to the Commonwealth of Virginia State Corporation Commission.

COMPARATIVE DATA

Table II describes the growth and characteristics of payday lenders in Virginia. The “Payday Loan Act” became effective July 1, 2002. As of December 31, 2002, the Bureau of Financial Institutions regulated 60 payday lenders operating 596 offices and acted on 251 applications for licensees, additional offices

and relocations of existing offices. By December 31, 2005 the number of lenders had grown by 38% and the number of offices had increased by 27%’

The average rate is 15% of the loan made however some introductory rates are as low as 0%. Loans turn approximately twenty-four times each year so the average rate translates to about a 360% annual percentage rate. Since 90,859 of the 445,891 borrowers obtained at least 13 loans in 2005, approximately 35% of the loans were made to the same individuals. This validates the main concerns of industry critics. The effective interest rate is extremely high and approximately 20% of the borrowers rely on payday loans as a continual source of cash [15] [16] [17]. Surprisingly, despite intense legislative pressure to cap the annual number of loans to a borrower, the average loans per borrower rose substantially from 2005 to 2006.

Table II

Payday Lending Activity in Virginia

	2004	2005	2006
Number of payday lenders	78	83	84
Number of payday locations	696	756	791
Number of loans made	2,898,934	3,372,103	3,593,401
Loans made	\$988,135,464	\$1,197,105,829	\$1,311,902,305
Number of borrowers	387,686	445,891	433,537
Borrowers who received 13 or more loans	76,068	90,859	96,831
Average annual percentage rate	373%	386%	378%
Average term in days	19	15	15
Avg. number loans per borrower	7.5	7.6	8.3

Table III

Payday Lenders and State Chartered Bank and Credit Unions
Net Income as a Percent of Gross Income

Lender	2004	2005	2006
State Chartered Banks in Virginia	34.4	36.3	35.9
State Chartered Credit Unions in Virginia	14.8	12.8	46.9
Cash America Form 10-K	12.1	7.6	7.5
Advance America Form 10-K	14.6	10.0	10.4
QC Holdings Form 10-K	14.8	3.5	5.3

Table III compares the operating ratios of the three largest payday lenders in America to those of state-chartered credit unions and banks in Virginia [1] [2] [3] [4] [5] [6] [9] [10] [11] [12] [13] [14] [15] [16] [17]. While the absolute ratios are somewhat smaller for the payday lenders the comparative results are not unfavorable. The payday lender’s claim that their profit margins are not inflated beyond those of traditional lenders by the relatively high APR on loans made is supported by the data. Net income as percent of gross income is only one possible comparison. Since the total assets of banks and credit unions

far exceed the total assets of payday lenders a comparison of net income as a percent of average assets would yield a much different result.

Table IV
Payday Lenders
Loan Loss Expense as a Percent of Loans Made

Lender	2004	2005	2006
State Chartered Banks in Virginia	1.3	1.5	1.6
State Chartered Credit Unions in Virginia	.5	.5	.3
Payday Lenders in Virginia	2.8	2.4	2.1

Table IV provides one possible explanation for the favorable comparison in Table III [12] [13] [14] [15] [16] [17]. The loan loss expense is extremely high for payday loans. However it unclear if this expense is a function of the creditworthiness of the borrower or weak collection procedures and the absence of any credit checks by the lender.

Table V
Payday Lenders
Market Share

Lender	2004	2005	2006
State Chartered Banks in Virginia	93.4%	92.7%	91.2%
State Chartered Credit Unions in Virginia	4.67%	5.10%	6.10%
Payday Lenders in Virginia	1.9%	2.2%	2.7%

Table V demonstrates the relative and growing importance of payday lending in the state-regulated marketplace. While the Virginia General Assembly is actively pursuing restrictive legislation the industry is actively pursuing expansion [12] [13] [14] [15] [16] [17].

CONCLUSION AND POLICY RECOMMENDATIONS

The payday firm data and payday state level data is not directly comparable. The loan loss ratios and the income ratios for payday licensees are not compiled by the Virginia Bureau of Financial Institutions. However, the micro data is reported by each licensee to the Bureau and the data is not yet accessible. When it is available I plan to use the micro data in a future paper to determine store level profitability.

The industry data reported in this paper implies policy recommendations similar to those made by Flannery and Samolyk as a result of their store-specific analysis. High payday loan APRs are somewhat justified to cover unusually high default rates as the rates of return on income reported by payday lenders

are significantly below the rates of return reported by more traditional lenders. The proportion of rollover loans is an important source of revenue as these borrowers encompass one-third of the customer base. It is uncertain the industry could survive if rollovers were severely limited by legislators.

The state level comparisons in this paper may also overstate the long-term profitability of the industry. Payday lending is an immature industry in Virginia. The "Payday Loan Act" was effective on July 1, 2002 and the number of participants and locations is still growing rapidly. Market share and the number of loans per borrower is rising, losses as percentage of revenue is falling and the effective APR has not been reduced. In the equilibrium state rates may fall below 15% as new entries offer more attractive products. But there is no short-term evidence of this effect. That said, it also clear payday lenders continue to provide short-term solutions to many borrowers and may also continue to provide a mechanism for short-term cash requirement to migrate to long-term and chronic borrowing.

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Ellwood Approach: Applied to the Subprime Residential Market

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Abstract

The Ellwood appraisal method is applied to the residential subprime lending market. Loan-to-value ratios and income levels have a significant and direct influence on existing housing prices. As the level of subprime lending increases housing price movements simultaneously seem to rise. Location is an important factor to consider when determining property values. A regional factor was included in the analysis as a proxy for location.

Key Words: Ellwood Approach, Mortgage-Equity Capitalization, Subprime Lending

Introduction

The Ellwood method also known as the mortgage-equity capitalization approach is used to appraise commercial properties. The mortgage-equity capitalization method as the name suggests explicitly considers financing to be a major factor when determining a property's value. This method is used to appraise real estate investments which are highly leveraged, but this method can be used for unleveraged properties as well. A paper discussing income-appraisal models, and which present value model is best to use under certain situations was published in 1991. The Ellwood approach was one of the methods listed (Kane, 1991). This method calculates the value of a property on the basis of an available loan-to-value ratio (LTV) which is added to the present value of the expected income stream. The model is specified as:

$$\text{Value} = \text{Loan/Value} + \text{present value of income over a specified time period.}$$

Published papers have utilized this approach when estimating the value of equity interest given leverage (Ollman and Traham, 1991), and when estimating the loss of value associated with contaminated properties (Jackson, 1998). Other articles have considered default risk and the lack of liquidity associated with owner-financed residential mortgages (Finch and Rudolph, 1993). Another possible application of the Ellwood model is to the residential real estate market. It can be used to explain price movements of existing single-family houses. Our paper seeks to answer

the question: Do substantial increases in the loan/value (LTV) ratio, and relative median income levels translated into higher residential prices? The mortgage-equity approach suggests that whenever indebtedness levels rise, then the appraised value of the subject property should respond by increasing in value.

Subprime Market

Loans are classified as prime or subprime. Subprime loans when originated have an interest rate that is 3 percent above a contemporaneous long-term, time-matched Treasury security.

A 30-year mortgage would be matched with a Treasury note with a matched maturity date. The use of subprime refinance lending varies by location. In 2005 the city of San Francisco, California reported a 5.16 percent rate while Brownsville, Texas had a subprime refinance rate of 57.3 percent. The market share of subprime loans has grown from \$35 billion in 1994 to \$665 billion in 2005. Subprime lending has grown rapidly, and in the year 2005 was 20 percent of the conventional mortgage market. The subprime refinancing share of the market when examined on a State basis during the year 2005 had a median level of 26.6 percent. Oregon reported the lowest level at 17.8 percent and Mississippi reported the highest rate at 51.8 percent.

Subprime loans are characterized by high LTV ratios and low down payments. Many of these loans are adjustable rate mortgages with low introductory rates and prepayment penalties. These loans are commonly listed as 2/28. The loan has an introductory interest rate that is below the market rate, and is fixed for two years; and then the loan becomes an adjustable rate mortgage (ARM) for 28 years. Interest rates on the ARM may adjust ever 6 months or once per year. Interest rates risk is passed from the lender to the borrower.

Many borrowers in this market provide limited income documentation and have blemished credit. The refinance market is characterized by high LTV ratios. Borrowers typically remove equity from the property being refinanced for the purpose of consolidating debt or to reduce other credit obligations. Households participating in the subprime refinancing market generally have low

credit scores. Participants are rated at an “A” level or lower and have credit scores below 680. Low personal credit scores are associated with increased default risk, lack of liquidity and wealth constraints.

Regions

There is no national standard for specifying regions or even which States fall within a given region. The United States is composed of many regions, and there is no official designation for a particular State. States located along the Atlantic Ocean are generally grouped in a consistent manner.

The regional divisions used by the National Association of Realtors specify 4 regions. They are the: Northeast, Midwest, South and West. Alaska and Hawaii are classified as located in the West. Other maps include 5 distinct regions. There are 9 regions according to the U. S. Census Bureau: New England, Mid-Atlantic, South Atlantic, East South Central, East North Central, West North Central, West South Central, Mountain and Pacific which includes Alaska and Hawaii. The website Geography.about publishes an e-map of the contiguous 48 states. There are 22 regions shown on this map, and many of the regions overlap with others. Even the language used to describe different regions varies from user to user. Terms like the Great Plains, Rocky Mountain States, Southwest and Great Basin are some of the descriptive terms used to describe regional areas.

Natural waterways and geographic characteristics form the basis for the regional assignment shown in Table 1. Hawaii and Alaska are not included in the west. They are considered a separate area referred to as Outside of the continental United States. Eleven regions are specified for the purpose of analyzing the impact of location on decision-making behavior. States are assigned to the regional categories: Northeast, Mid-Atlantic, Southeast, South Central, Gulf, Desert, Great Lakes, Midwest, Mountain, Pacific and Outside the United States. Table 1 shows which States are assigned to a particular Region.

Table 1: Regional Classification

Variable Dummy	States	Percentage Subprime Loans
Region 1	Northeast: CT, MA, ME, NH, RI, VT	26.05%
Region 2	Mid-Atlantic: DE, MD, NJ, NY PA	24.7%
Region 3	Southeast: FL, GA, NC, SC, VA	29%
Region 4	South Central: AR, KY, TN, WV	36.15%
Region 5	Gulf: LA, AL, MS	41.6%
Region 6	Desert: AZ, NM, OK, TX	36.25%
Region 7	Great Lakes: IL, IN, MI, OH, WI	35.8%
Region 8	Midwest: IA, KS, MN, MO, ND, SD, NE	36.6%
Region 9	Mountain: CO, ID, MT, NV, UT, WY	23.15%
Region 10	Pacific: CA, OR, WA	17.8%
Region 11	Outside: AK, HI	27.6%

Median Income and Housing Price Index

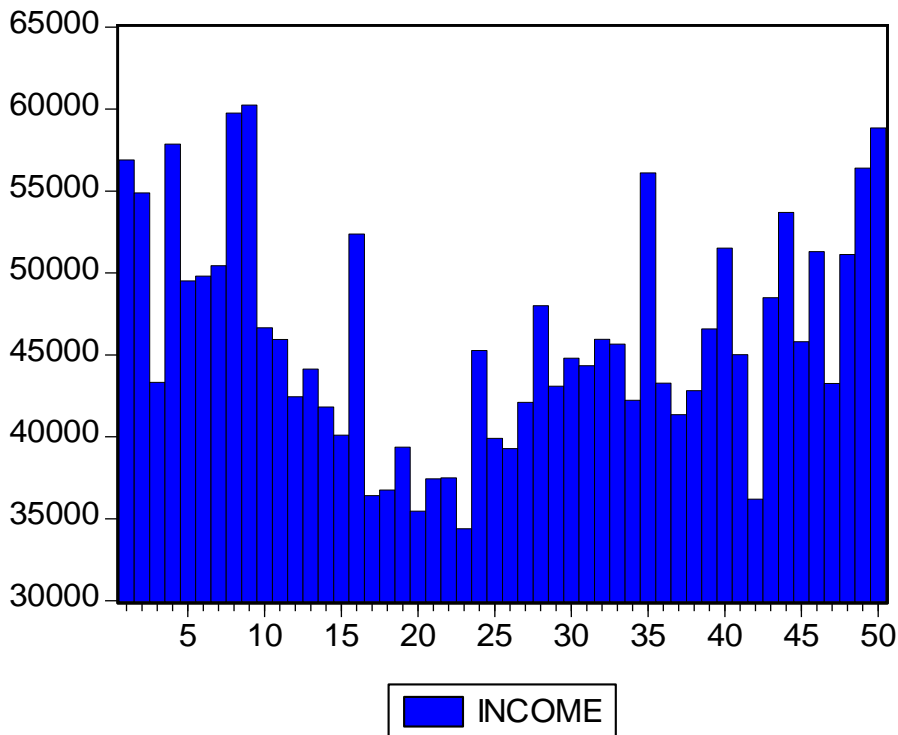
Median income is published by the U.S. Census Bureau in 2 and 3 year cycles. The two-year cycle was used in this paper. The median income for 2004-2005 ranged from a low of \$34,396 (Mississippi) to a high of \$60,246 (New Jersey). The price-adjusted median income for the United States during 2004-2005 was \$46,071, and was \$45,893 during 2003-2004. When comparing income changes by State the income trend was more complicated. Some States experience net losses in income in 2005 dollars while others experience net gains. Median income changes ranged from <5.6> percent to 5.5 percent. There were 24 States with negative median income changes and 26 States registering positive percentage changes. Graph 1 shows State median income. The far left on the graph shows information from Regions 1 and 2 and

Regions 10 and 11 are located on the far right. States are listed in regional groups in the order shown on Table 1.

A working paper written by Ira Goldstein which was published by The Joint Center for Housing Studies (2004) found that the market penetration of subprime mortgages is greater in low and moderate income area. Our study used median income to measure variations in moderate household earning power between States. Graphs 1 and 2 indicate that regions located along from the Atlantic and Pacific coasts generally have higher incomes and higher housing prices than those in the interior of the country.

**Graph 1: State Median Income
(by regional membership)**

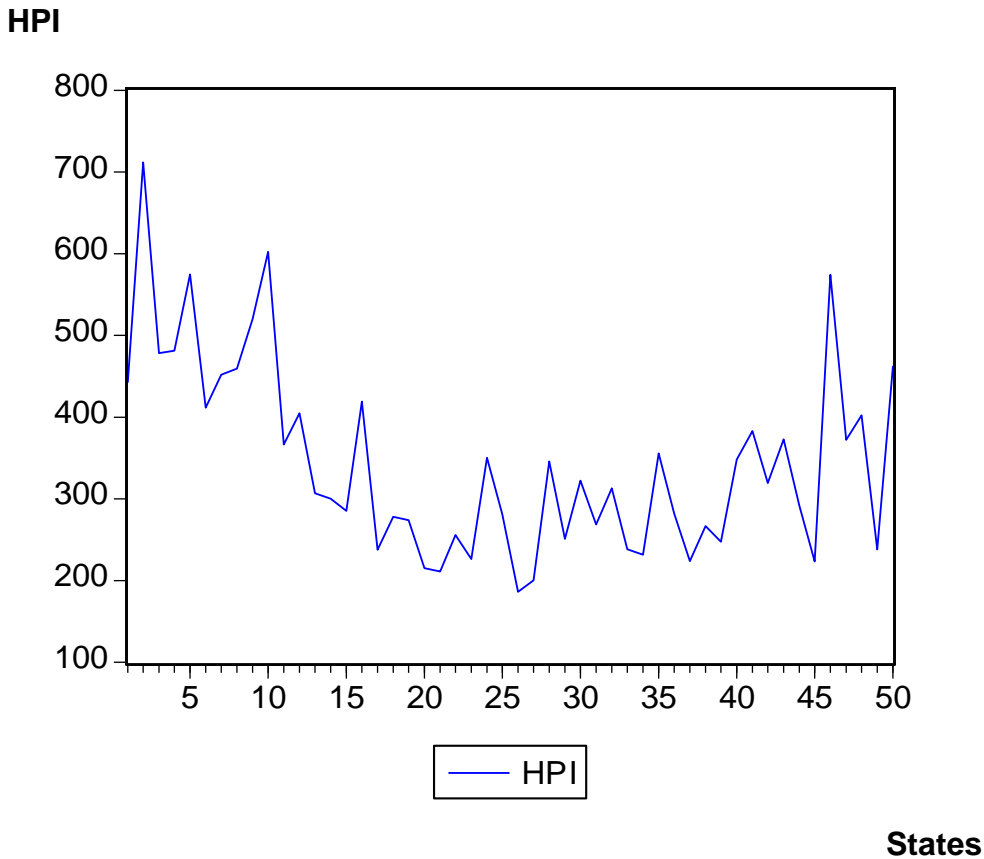
Dollars



States

The Housing Price Index (HPI) is published by the Office of Federal Housing Enterprise Oversight. Index numbers are used to gauge existing housing prices by State over time. The Average HPI during 2005 ranged from 186.323 (Oklahoma) compared to 602.458 (New York). Percentage changes in the HPI over 1 and 5 year periods prior to 2005 were positive for all States. Over a single year the appreciation rates ranged from 3.76 percent (Michigan) to 19.99 percent (Virginia). Graph 2 charts Average HPI per State.

**Graph 2: State Average Housing Price Index
(by regional membership)**



Results

The cross-section study used information from all 50 States, and the data was drawn from the calendar year 2005. Results shown on Table 2 indicate that a direct linkage exists between

Median Income and existing housing prices. Income and Subprime refinance lending levels are significant variables. They move directly with trends in the Average Housing Price Index. States with higher incomes demand more housing, and this causes higher average residential prices. The subprime refinance variable has a positive coefficient sign which indicates that when this lending market is healthy, then the average price of housing is higher. The converse also holds. Weakness in the subprime market would impact existing housing prices adversely. Tightening underwriting standards applied to subprime loan applications, or legislatively lowering allowable LTV ratios could result in declining residential property values for some categories of single-family housing.

Table 2: Regression Results

Dependent Variable: Average HPI
 Method: Least Squares
 Independent Variables: Median Income, Regions,
 Subprime Refinance Lending
 Sample: 50 states, Year 2005

$$y = c + b_1x_1 + b_2x_2 + b_3x_3 + e_i$$

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-54.41511	67.72413	-0.803482	0.4258
Median Income	0.010228	0.001606	6.367521	0.0000
Regions	-16.14533	4.378619	-3.687312	0.0006
Subprime	0.001147	0.000585	1.959467	0.0561
R-squared	0.631723	Mean dependent var		343.3427
Adjusted R-squared	0.607705	S.D. dependent var		118.0252
S.E. of regression	73.92325	Akaike info criterion		11.52055
Sum squared resid	251373.8	Schwarz criterion		11.67351
Log likelihood	-284.0138	F-statistic		26.30203
Durbin-Watson stat	2.396091	Probability (F-statistic)		0.000000

The location variable called Regions is significant. Real estate is very dependent on location.

The variables Median Income, Subprime and Regions explain 63 percent of the movements in the Average Housing Price Index variable.

Concluding Remarks

Housing prices increased in all States during 2005, and during prior 1 and 5 year periods.

The highest 5 year change in the Housing Price Index was 117.29 (California). Increasing prices over an extended period of time may condition households to expect that continuing price increases will occur uninterrupted into the future. The financial decisions to refinance a house using a high LTV ratio seems less risky when a household is conditioned to believe that property value appreciation is an ongoing event.

There are several factors that encourage households to participation in the subprime market. First, the equity withdrawn when refinancing occurs is expected to be recouped through a combination of future loan amortization and property appreciation. Second, whenever housing prices appreciate on a continuous basis, then households with a marginal ability to participate begin to think that homeownership opportunities are slipping away from them. Third, borrowers in this market often have blemished credit, and have experienced difficulties paying bills in the past. There is little wealth to lose or documented income to attach should they become delinquent. These circumstances encourage participation in the subprime market even when presented with expensive loans options. The above logic encourages households to participate in the subprime market, and might spur rapid growth in this type of borrowing.

An abrupt tightening of underwriting standards by either reducing allowable LTV ratios or tightening underwriting standards would result in lower demand. Fewer households participating in the subprime market would adversely impact some housing prices. Houses financed with high LTV ratios would potentially be worth less than the loan collateralizing them. Resale opportunities are limited when appraised value is less than the loan balance, and may result in more residential property foreclosures.

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RADIO FREQUENCY IDENTIFICATION TAGS: THEIR IMPACT IN TODAY'S WORLD

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New applications for RFID (radio frequency identification) tags are emerging in many industries. At first, tracking of inanimate items in the supply chain was sought to help decrease business costs, initially relating largely to inventory. In general, asset tracking with RFID tagging became the goal. Then RFID moved to tagging living creatures, namely animals that can also be regarded as assets. Some applications have now made the transition to people and with this their personal information became involved.

The facts and implications in the application of RFID tagging especially in the human arena are presented in this session. Discussion will include medical, employer, government, and people applications along with privacy concerns. The new e-passports and border program are explained, along with their advantages and disadvantages. Examples of failed RFID applications are also included.

Legislation is already appearing in many states regarding RFID usage. Knowing about the pros and cons of this technology can aid one in knowing how to respond to legislators on the issue. Some applications come with an option to choose RFID or not. Again, information helps one know what to do.

Over the next decade, RFID applications will surely become a more integral part of business processes, and this will by default invade the human sphere. Being informed about this technology, its implications, privacy concerns, and its potential is a must to make informed decisions about RFID for both business and personal applications.

This workshop session is for all those who want to have a clearer understanding of the applications and implications for RFID tags in today's world. It will also provide an overview of the privacy and security concerns that surround their usage.

FOLLOWUP SYSTEM

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ABSTRACT

The purpose of this paper is to present the design and implementation of the Followup System. This system provides information about students who have graduated from the department and their current status. Its primary purpose is to collect data on the graduates and to keep track of their progress in the real world. The data collected can be used for analysis purposes. The accreditation board requires data analysis on the graduates and this system is designed to fulfill that requirement. This system can also assist graduates in keeping touch with department by updating the records. The graduate data analysis is an important part of the accreditation report and the system will be useful in compiling such statistics. Thus the system will be useful for the department as well as graduates.

INTRODUCTION

The students are the most important asset and the true ambassadors of an institution. The success of an institution very much depends on the success of the students. In fact, the success of the students is the measure of the success of the institution. The students have been responsible for making institutions famous across the geopolitical boundaries. Traditionally, alumni associations have been keeping track of alumni for various academic and nonacademic reasons and they have been doing a wonderful job. However, recently accreditation boards have started asking questions to the departments about graduates and their success in the field of study. This is becoming one of the important criteria for the evaluation of the academic program. So it has become necessary to collect appropriate data on the alumni of the department for further analysis. The accreditation board requires department to collect data on graduates periodically to perform analysis and to keep track of the progress department is doing in educating students. The accreditation board also requires department to collect feedback from the graduates to make necessary corrections. So, data collection and analysis are becoming important activities for the accreditation. Thus, graduate statistics has become vital for the accreditation of the program. This system is designed to serve this purpose [1][2][3][7][11][12].

The Followup System presented in this paper is developed for the department to create a database of students who have graduated from the department. The system would allow displaying, adding, and modifying information of graduate students whenever necessary. The database created by the system can be used for further query or statistical analysis. Since the system is user friendly and menu driven, it is easy to use without any specific technical knowledge. The system can be used as a tool in tracking the progress of the departments regarding educating their students and the impact the departments have made in the students' careers. In this paper, the researcher explains the model, architecture, and implementation of the system, as well as gives examples of some outputs produced by the system.

SYSTEM MODEL

The system model is essentially composed of three modules: User Interface Module, Processing Module, and Output Module.

User Interface Module

The user interface module contains the mouse and keyboard event handlers to collect information from the graduates regarding their username and password in the login procedure and information they wish to share with the department.

Processing Module

The processing module consists of several submodules, each one responsible for processing specific tasks, such as performing the security check on the user's login name and password, accessing the data from the database, processing information entered by the users, constructing necessary queries from user inputs, processing queries on the database, and performing necessary updates for the databases.

Output Module

The output module is responsible for tasks such as displaying the results of the queries in the appropriate formats on the screen, providing warning or error messages, as well as saving the necessary user input, and the results created by the processing module [3] [7] [8] [10][11][14].

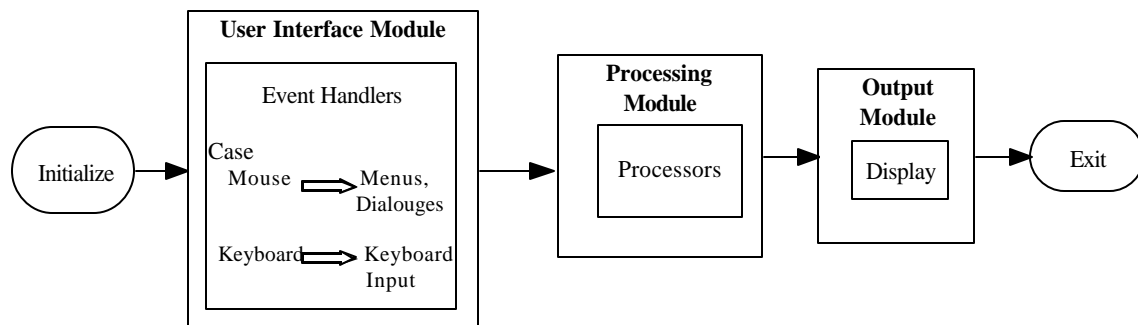


Figure 1. Procedural Architecture of the System Model

IMPLEMENTATION

A prototype of the system is implemented in the Windows environment. The graphic user interface is menu driven, and implemented as menus, using the current GUI techniques. User dialogues are implemented to collect user input as needed. The system has a login procedure as a security measure to prevent from unauthorized use.

The heart of the system is the processing module that is implemented by the main processor. The processor consists of several subprocessors that are responsible for specific tasks such as processing user inputs and performing necessary computations. Security check in login process is implemented using the table lookup procedure. Database processing is done to retrieve the required information about users. Query processing is implemented using the database query processing procedures.

Output module is implemented by the display procedures using data aware controls. It displays the appropriate user information in the user friendly format, which is generated by the main processor [2][4] [5] [6] [8] [9][11][12][13][14].

TESTING

The system can perform various tasks for users such as View the information, Add the information, and Edit the information. The system also allows the users to Search for graduates and View the contact information. The testing of this system was done on more than one data set. The following screen shots show a typical user session starting with the login menu followed by the Main Menu, View information, Add information, and the Search procedure containing the user dialogue for the search criteria and the results of the search.

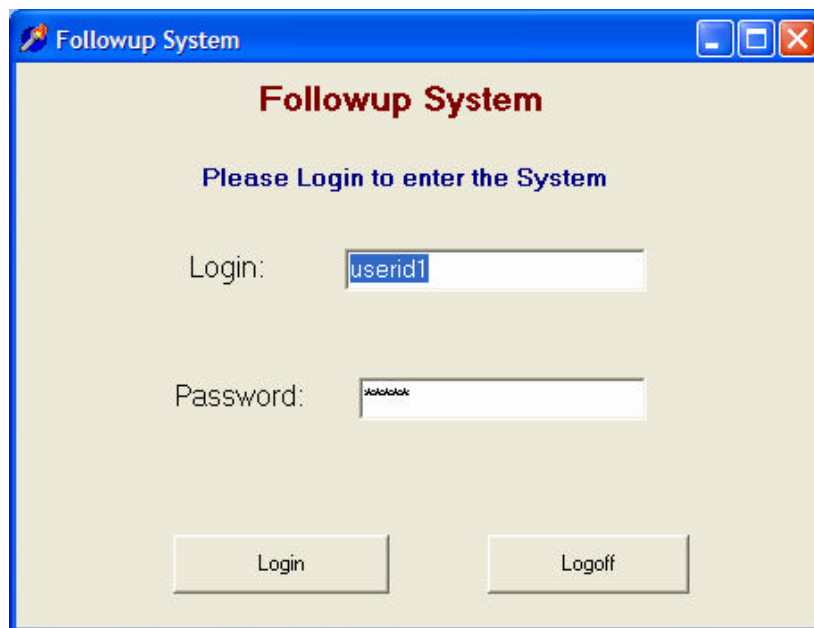


Figure 2. Screen Shot of “System Login”

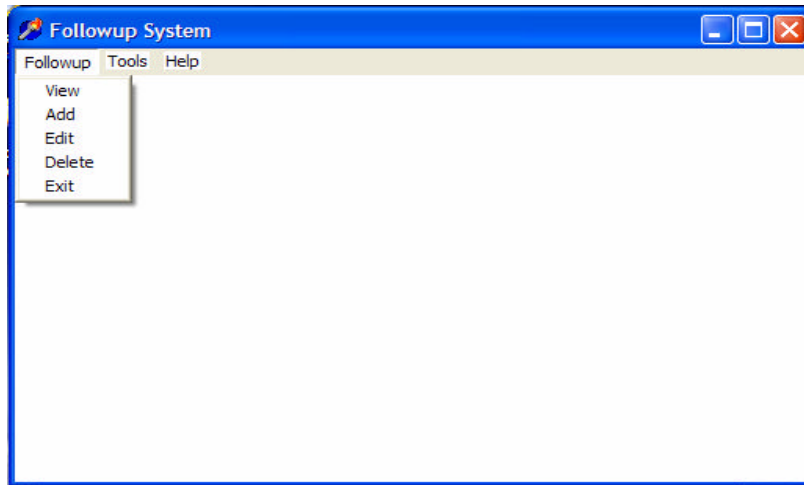


Figure 3. Screen Shot of “Main Menu”

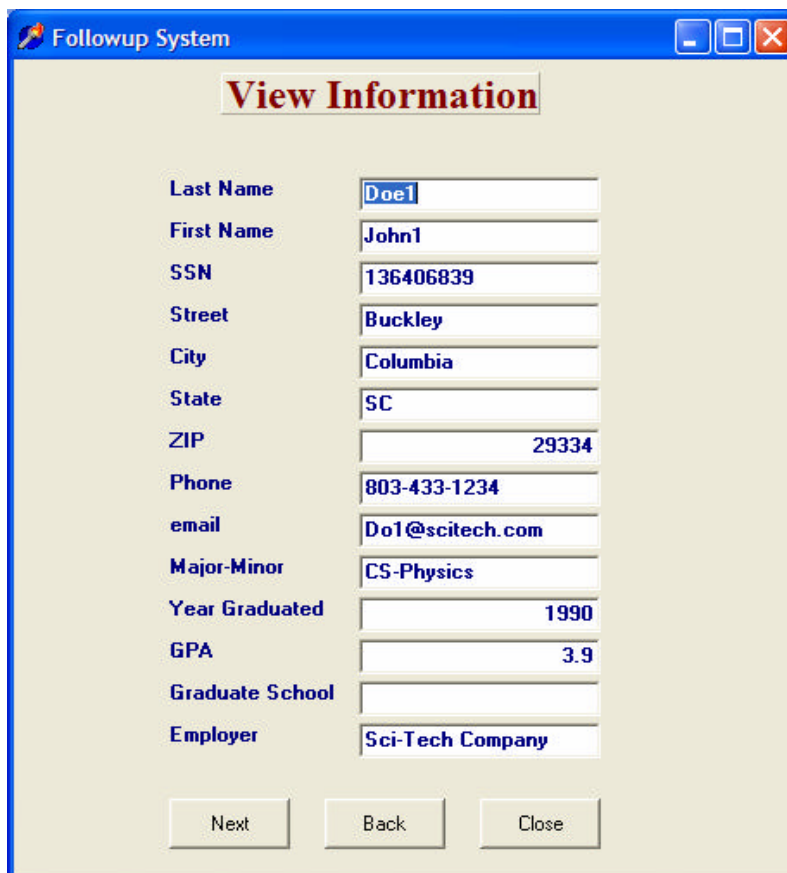


Figure 4. Screen Shot of “View Information”

The screenshot shows a window titled "Followup System" with a sub-dialog titled "Add Information". The dialog contains a form with the following fields and values:

Last Name	Doe11
First Name	John11
SSN	083584465
Street	
City	
State	
ZIP	
Phone	612-344-7892
email	doe11@doe.com
Major-Minor	CS-Math
Year Graduated	2000
GPA	3.8
Graduate School	
Employer	Doe's Company

At the bottom of the dialog are three buttons: "Save Information", "New Record", and "Close".

Figure 5. Screen Shot of “Add Information”

The screenshot shows a small dialog box titled "To Search for Graduate". It contains a text input field with the label "Enter Last Name" and the text "doe7" entered. Below the input field are two buttons: "OK" and "Cancel".

Figure 6. Screen Shot of “User Dialogue in Search Procedure”

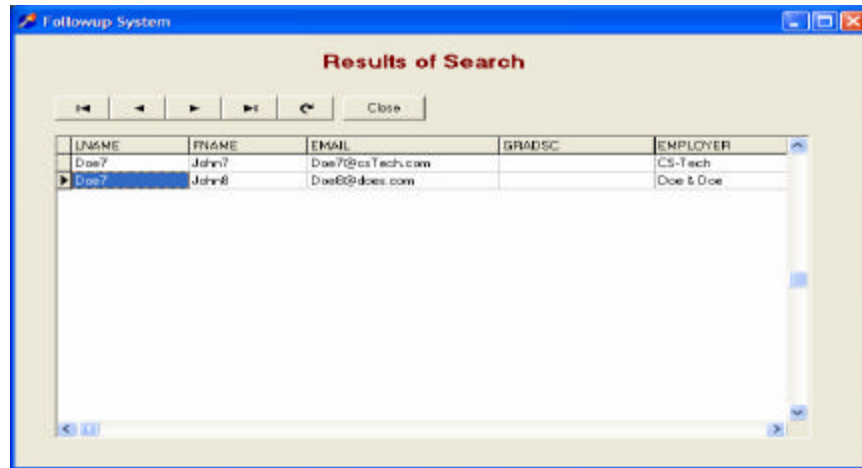


Figure 7. Screen Shot of “Results of Search Procedure”

CONCLUSION

The Followup system is useful for both department and graduates in keeping track of the progress of the graduates. The system can provide useful information about graduates for presentation and analysis purposes. The database created by the system can be used for further query or statistical analysis. The system is standalone, user friendly, menu driven and easy to use without any specific technical knowledge. The system is going to be an invaluable tool for the department and graduates.

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A Longitudinal Study on the Number of Graduates from U.S. Colleges and University IT Programs.

by

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ABSTRACT

This paper examines the graduation rates for all types of degrees earned by students majoring in information technologies at U.S. colleges and universities. The numbers used in this report are based on graduation numbers reported to the U.S. Department of Education. These numbers show a growth in the total number of graduates between 1995 and 2005 from 103,039 to 187,237 with a peak in 2003 of 240,862. There is a sharp decline between 2003 and 2005. This decline can be linked to major events: the burst of the IT bubble and the terrorist attacks of September 11, 2001. And there is a lag between graduations (completions) and initial enrollments based on the length of time required to complete a program. For a bachelor's degree the lag is between 4 to 6 years.

INTRODUCTION

The demand for IT professionals has had its up and down in the past ten years. At the turn of the century demand was at an all time high. New graduates had several positions to choose from with record high starting salaries and great sign-on incentives such as new cars and cash. With the hope of a great job with a high salary and even the chance to become a quick millionaire on the Internet, students were flocking to IT programs. The findings of this study show this large increase. But the old adage, "what goes up, must come down" applies to the enrollment and graduation rate of IT students.

What a difference a few years can make. For the past three years the number of IT graduates has fallen by more than 22% from the 2003 high of 240,862 to 2005's 187,237. This is still a significant increase over 103,039 graduates in 1995. Between 1995 and 2003, the number of IT graduates grew by more than 133%. Information technology is taking an ever more important role in the economy of today and tomorrow. The demand for IT professionals is again on the rise [12, 13, 14]. With this rise in demand for IT professionals, it is important to make every effort to boost the enrollment in IT programs today to meet the growing needs of tomorrow. If this issue is not addressed, the U.S. will lose its place as the world technology leader.

DATA COLLECTION

The data used in this study was obtained from the US Department of Education. The Department of Education collects various types of data about educational programs in the US. The data for this study comes from IPEDS, Integrated Postsecondary Education Data System.

"The US Department of Education was created in 1980 by combining offices from several federal agencies. Its original directive remains its mission today — to ensure equal access to education and to promote educational excellence throughout the nation. The US Department of Education is dedicated to:

- Establishing policies on federal financial aid for education, and distributing as well as monitoring those funds.

- Collecting data on America's schools and disseminating research.
- Focusing national attention on key educational issues.
Prohibiting discrimination and ensuring equal access to education.”[7]

Under this mission the Department of Education collects statistics on most educational programs in the U.S. The department charged with statistical collection and analysis is the National Center for Education Statistics (NCES).

TECHNOLOGY STUDENT GRADUATION NUMBERS

“One of the National Center for Education Statistics programs is the Integrated Postsecondary Education Data System (IPEDS). IPEDS, established as the core postsecondary education data collection program for NCES, is a system of surveys designed to collect data from all primary providers of postsecondary education. IPEDS is a single, comprehensive system designed to encompass all institutions and educational organizations whose primary purpose is to provide postsecondary education. The IPEDS system is built around a series of interrelated surveys to collect institution-level data in such areas as enrollments, program completions, faculty, staff, and finances.”[2]

IPEDS data is available for download at <http://nces.ed.gov/ipedspas/index.asp>. [9] This research will examine 11 years of program completions data for the academic years between 1994-95 and 2005-06. 2005-06 is the latest data available. Program completion records are reports from postsecondary schools listing the number of students completing each program the school offers. The programs are coded using CIP (Classification of Instructional Programs) codes. CIP codes were created in 1980 with updates in 1985, 1990 and 2000. When updates occur, a 3 year conversion period is permitted before reporting using the new codes is mandatory [8]. Goto <http://nces.ed.gov/pubs2002/cip2000/index.asp> to see 2000 CIP codes.

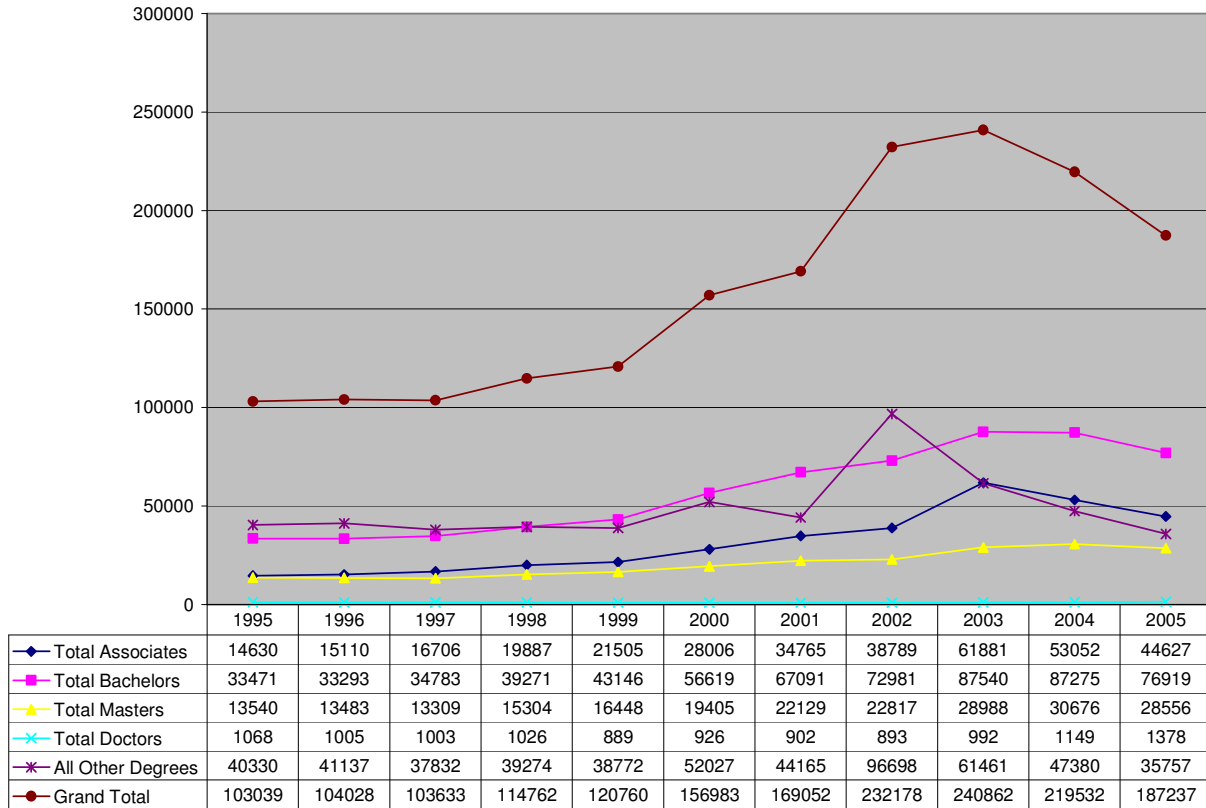
RESEARCH QUESTIONS

What has been happening to the graduation rates in IT programs? What has been happening to the graduation rates in IT programs by degree level? By major? By region of the country? In public versus private schools? In different types of schools based on the Carnegie classification system? By gender? By location? Each questions is investigated.

ANALYSIS

What has been happening to the graduation rates in IT programs? Table 1 shows what has been happening in graduation totals in all types of it programs in all types of schools.

Table 1 – Total IT Program Completions



What does Table 1 show? These numbers and the associated graph show a strong upward trend until 2003, when the trend starts down in all degree areas, except doctorates, which maintains its slow upward movement. Between 2003 and 2005 the total number of degrees issued declined by 53,625 from 240,862 in 2003 to 187,237 in 2005, a 22.26% decline. Associate degree programs have declined the most, by almost 29%, followed by bachelor degree programs declining by 12%, with master degree programs losing 7%. The decline has implications for capacity as programs reduce staff to meet lower enrollments needs.

TYPES OF DEGREES BY IT PROGRAMS

The IPEDS data contains 11 different possible degree levels. Only five are reported in this research, associate's, bachelor's, master's, doctorate's, and all others combined. All others include these classifications: less than 1 year; more than 1 year, but less than 2 years; between 2 and 4 years; post-bachelor's certificate; post-master's certificate; first-professional degree. These five degree levels are presented in the following tables.

IT PROGRAMS

IPEDS data is reported using cipcodes – Classification of Instructional Programs Codes. These codes are divided into a two digit general area code. Computer science is 11, followed by up to 4 decimal places to subdivide programs. At the 6 digit level 39 IT (computer related) majors were identified. These are listed in Table 2.

Table 2 – IT CIPCodes and Descriptions

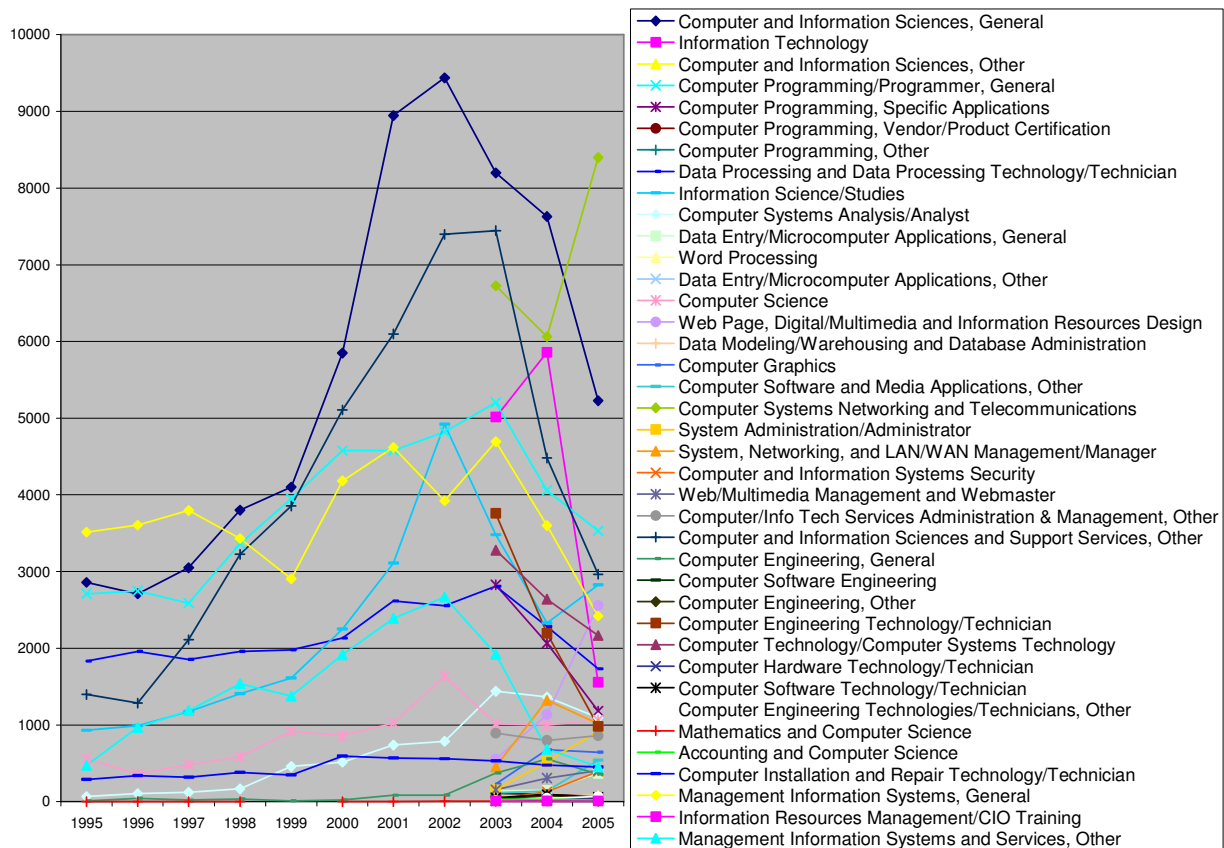
11.0101	Computer and Information Sciences, General
11.0103	Information Technology
11.0199	Computer and Information Sciences, Other
11.0201	Computer Programming/Programmer, General
11.0202	Computer Programming, Specific Applications
11.0203	Computer Programming, Vendor/Product Certification
11.0299	Computer Programming, Other
11.0301	Data Processing and Data Processing Technology/Technician
11.0401	Information Science/Studies
11.0501	Computer Systems Analysis/Analyst
11.0601	Data Entry/Microcomputer Applications, General
11.0602	Word Processing
11.0699	Data Entry/Microcomputer Applications, Other
11.0701	Computer Science
11.0801	Web Page, Digital/Multimedia and Information Resources Design
11.0802	Data Modeling/Warehousing and Database Administration
11.0803	Computer Graphics
11.0899	Computer Software and Media Applications, Other
11.0901	Computer Systems Networking and Telecommunications
11.1001	System Administration/Administrator
11.1002	System, Networking, and LAN/WAN Management/Manager
11.1003	Computer and Information Systems Security
11.1004	Web/Multimedia Management and Webmaster
11.1099	Computer/Info Tech Services Administration & Management, Other
11.9999	Computer and Information Sciences and Support Services, Other
14.0901	Computer Engineering, General
14.0903	Computer Software Engineering
14.0999	Computer Engineering, Other
15.1201	Computer Engineering Technology/Technician
15.1202	Computer Technology/Computer Systems Technology
15.1203	Computer Hardware Technology/Technician
15.1204	Computer Software Technology/Technician
15.1299	Computer Engineering Technologies/Technicians, Other
30.0801	Mathematics and Computer Science
30.1601	Accounting and Computer Science
47.0104	Computer Installation and Repair Technology/Technician
52.1201	Management Information Systems, General
52.1206	Information Resources Management/CIO Training
52.1299	Management Information Systems and Services, Other

In Table 2, six 2 digit cipcode academic areas are included, 11 – computer science, 14 & 15 – computer engineering, 30 – mathematics and computer science, and 52 – management information systems. This list was created based on the author’s judgment of what cipcodes to include. Excluded IT cipcodes included clerk-type programs. Not all IT programs have graduates in each type of degrees. Each degree type and the IT program will now be presented.

ASSOCIATE’S DEGREES BY IT PROGRAMS

Associate’s degrees are conferred in all 39 IT program areas shown in Table 3. In Table 1, the granting of associate’s degrees shows an upward trend until 2003. In Table 3, the trend seems to end earlier in 2002. Several new programs appear in 2003 and keep the trend upward, although most programs peaked in 2002. It would be expected that associate’s degree programs would lead the change in all programs because they are the shortest.

Table 3 – Associate’s Degrees Programs by IT Program

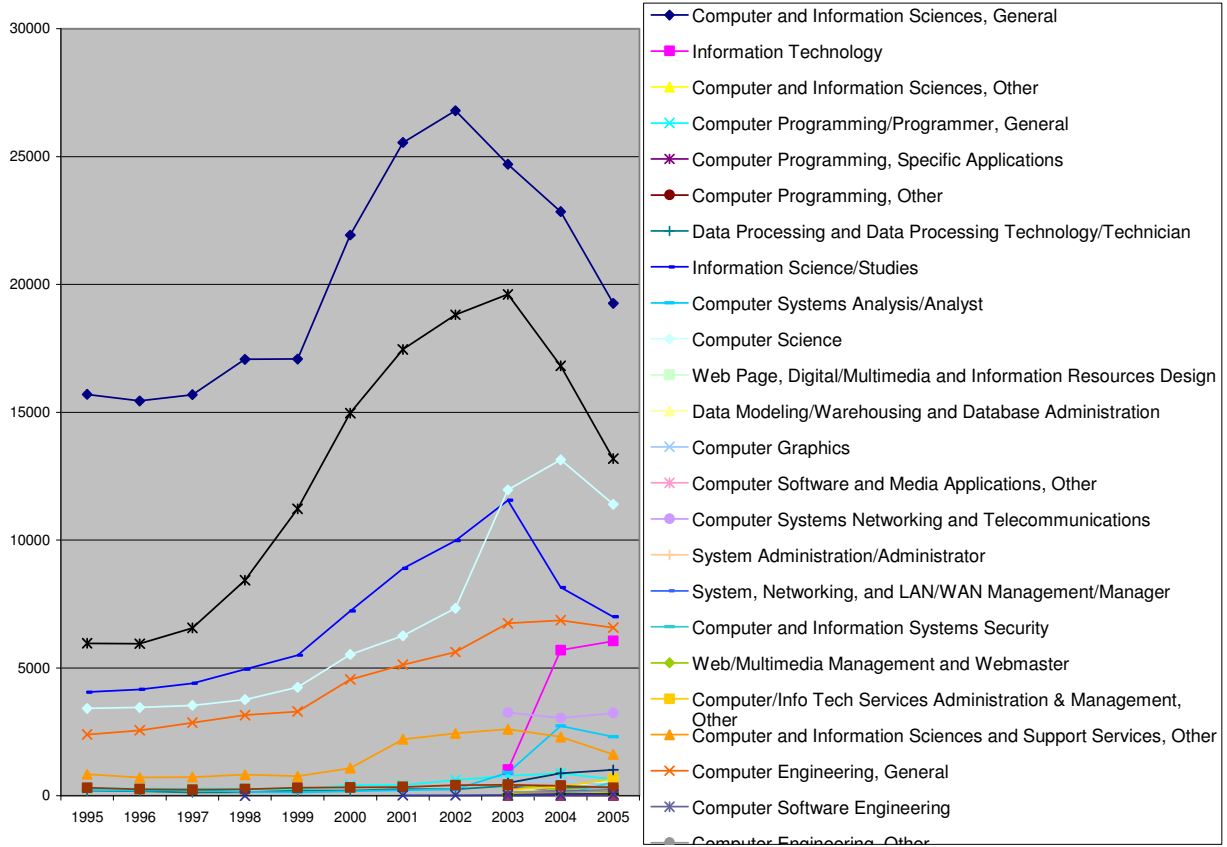


BACHELOR’S DEGREES BY IT PROGRAMS

Bachelor’s degrees are conferred in all 35 IT program areas as shown in Table 4. In Table 1, bachelor’s degrees peak in 2004, showing a very slight increase from 2002. In Table 4, the peak seems to begin in

2002, the same as with associates degrees. But again, the total trend is boosted by the addition or reclassification of cipcodes in new programs.

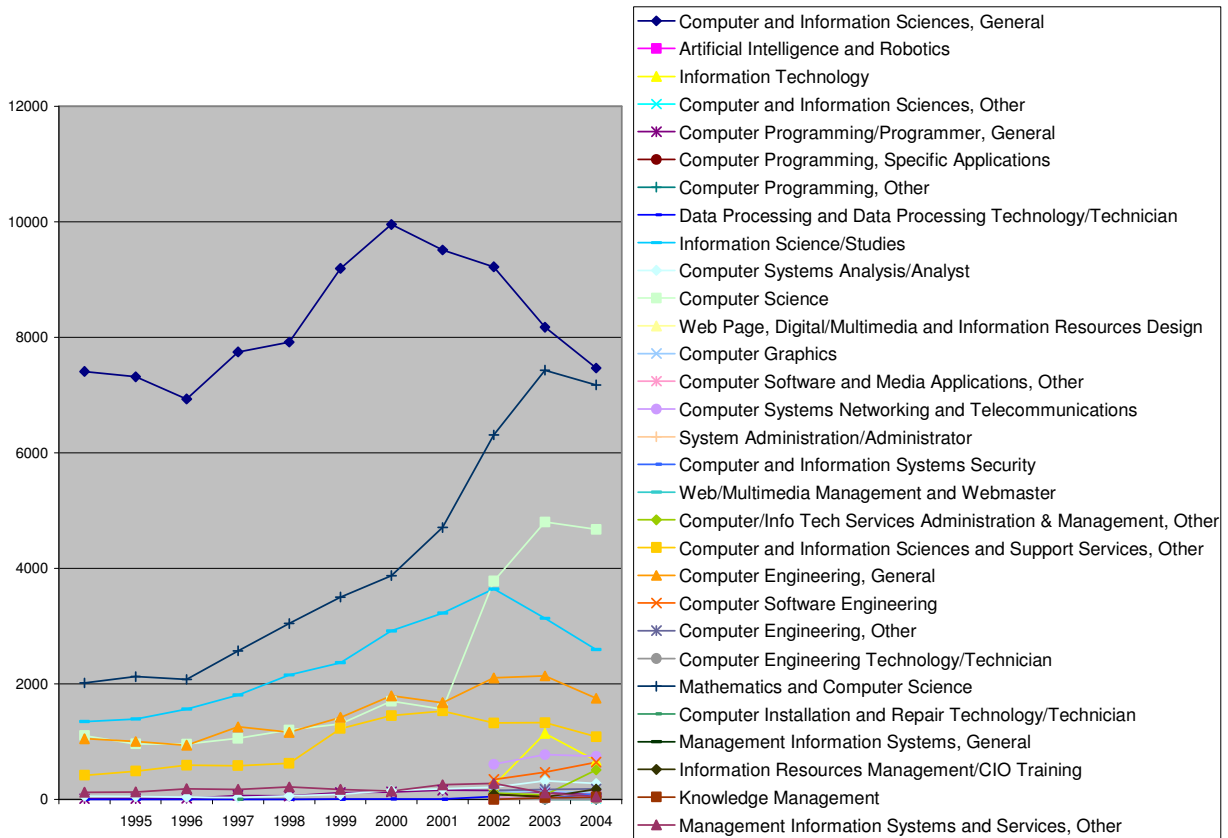
Table 4 – Bachelor’s Degrees Programs by IT Program



MASTER’S DEGREES BY IT PROGRAMS

Master’s degrees are conferred in all 30 IT program areas as shown in Table 5. Table 5 shows a peak occurring in 2002 followed by a decline. This trend is moderated by the addition or reclassification of cipcodes in new programs.

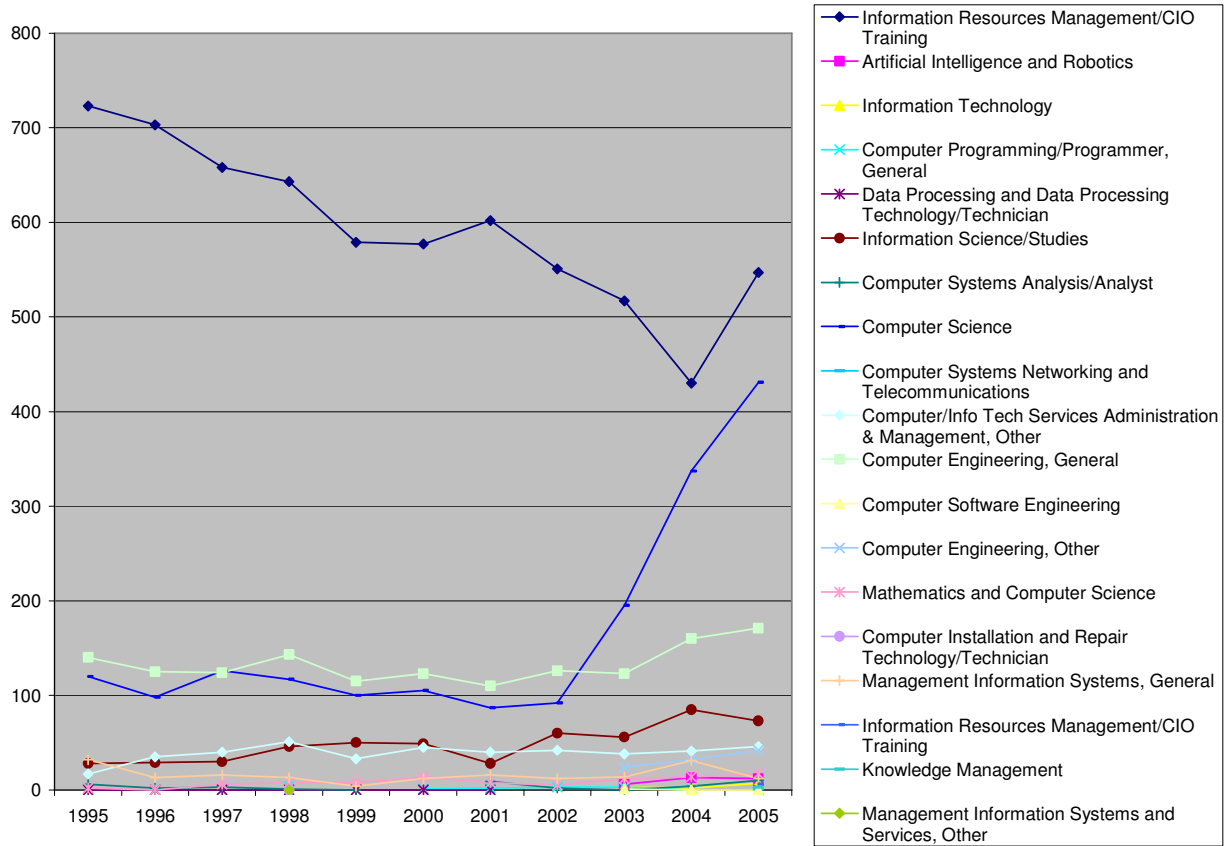
Table 5 – Master’s Degrees Programs by IT Program



DOCTORATE DEGREES BY IT PROGRAM

Doctorate degrees are conferred in all 19 IT program areas as shown in Table 6. In Table 1 it is difficult to determine what is happening in doctorate degrees. The raw numbers show a general decline in the number of IT doctorates between 1995 – 1068 degrees, and 2002 – 893 degrees. The numbers then begin to rise quickly through 2005, 2003 – 992, 2004 – 1149, 2005 – 1378.

Table 6 – Doctorate Degrees Programs by IT Program



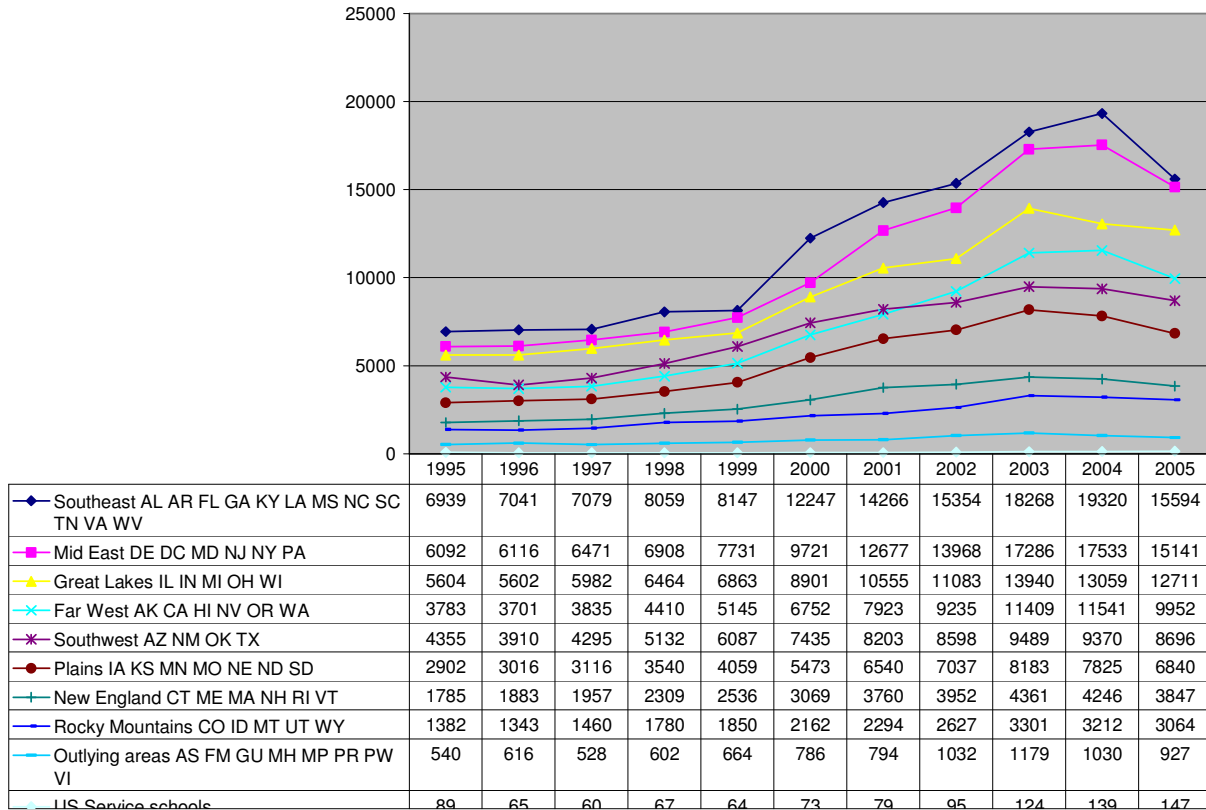
Now that an analysis of the degree programs by majors has been completed, a look at other factors will be performed.

BY REGION OF THE COUNTRY

The IPEDS data divides the country into 10 regions as follows and shown in Table 7.

- U.S. Service schools
- New England which includes: CT ME MA NH RI VT
- Mid East which includes: DE DC MD NJ NY PA
- Great Lakes which includes: IL IN MI OH WI
- Plain which includes: IA KS MN MO NE ND SD
- Southeast which includes: AL AR FL GA KY LA MS NC SC TN VA WV
- Southwest which includes: AZ NM OK TX
- Rocky Mountains which includes: CO ID MT UT WY
- Far West which includes: AK CA HI NV OR WA
- Outlying areas which includes: AS FM GU MH MP PR PW VI
- Not available

Table 7 – Bachelor Degree Completions by Region

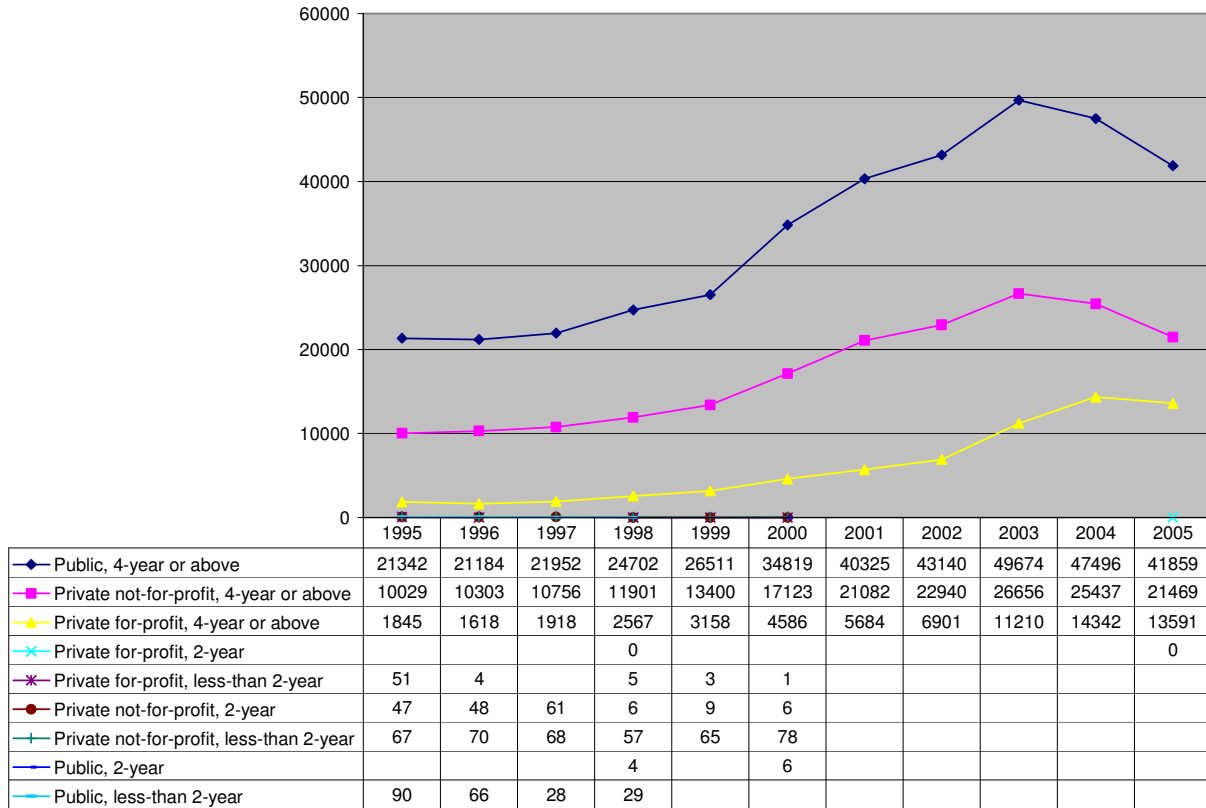


The Southeast has the highest number of IT graduates followed by the Mid-East and the Great Lakes.

PUBLIC VERSUS PRIVATE SCHOOLS

IPEDS divides colleges and universities into 3 categories: public, private, not-for-profit and private for-profit. Table 8 shows the same decline as is seen the other data for public and private, not-for-profit school completions, but shows private for-profit schools, although a small portion of the total completions has not suffered with this decline.

Table 8- Public versus Private School Completions

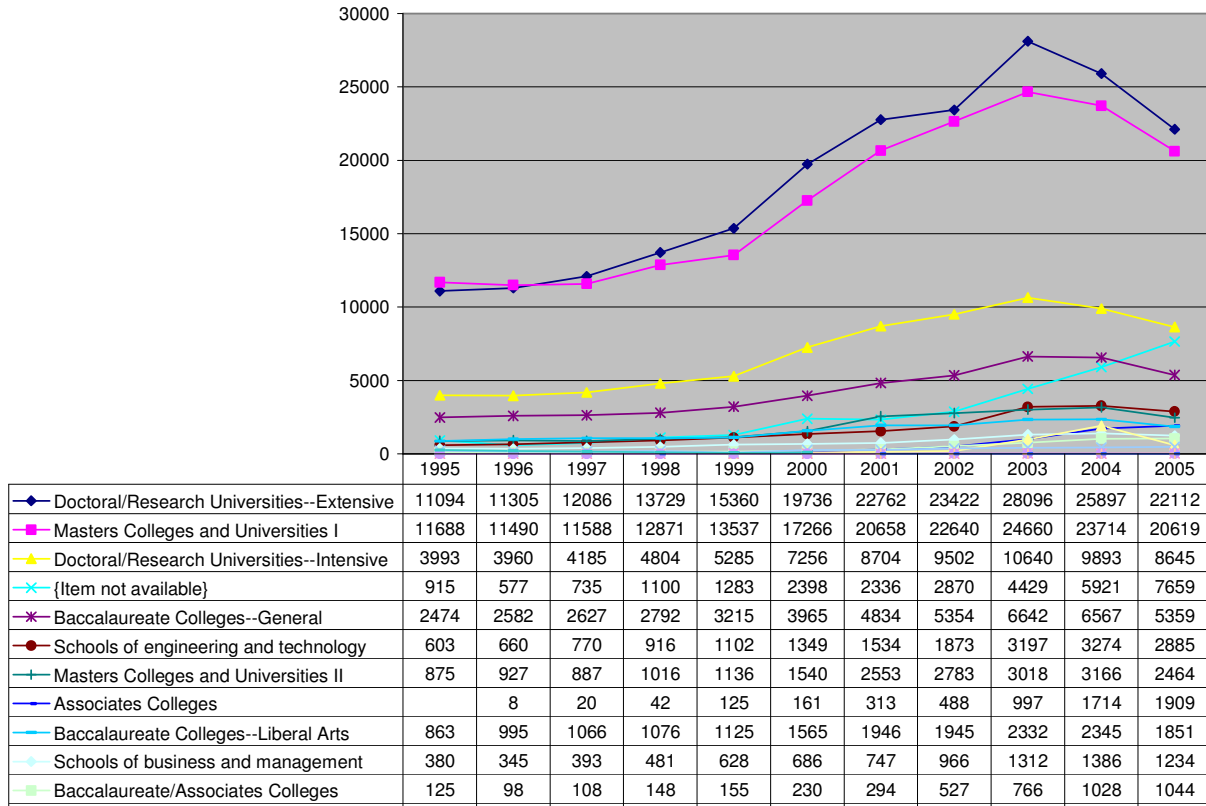


The rise in completions for private, for-profit schools may show a shift in how college degrees will be earned in the future.

CARNEGIE CLASSIFICATION SYSTEM

IPEDS used the standard 2000 Carnegie Classifications. This “includes all colleges and universities in the United States that are degree-granting and accredited by an agency recognized by the U.S. Secretary of Education. The 2000 edition classifies institutions based on their degree-granting activities from 1995-96 through 1997-98.

Table 9 – Completions by Carnegie Classifications

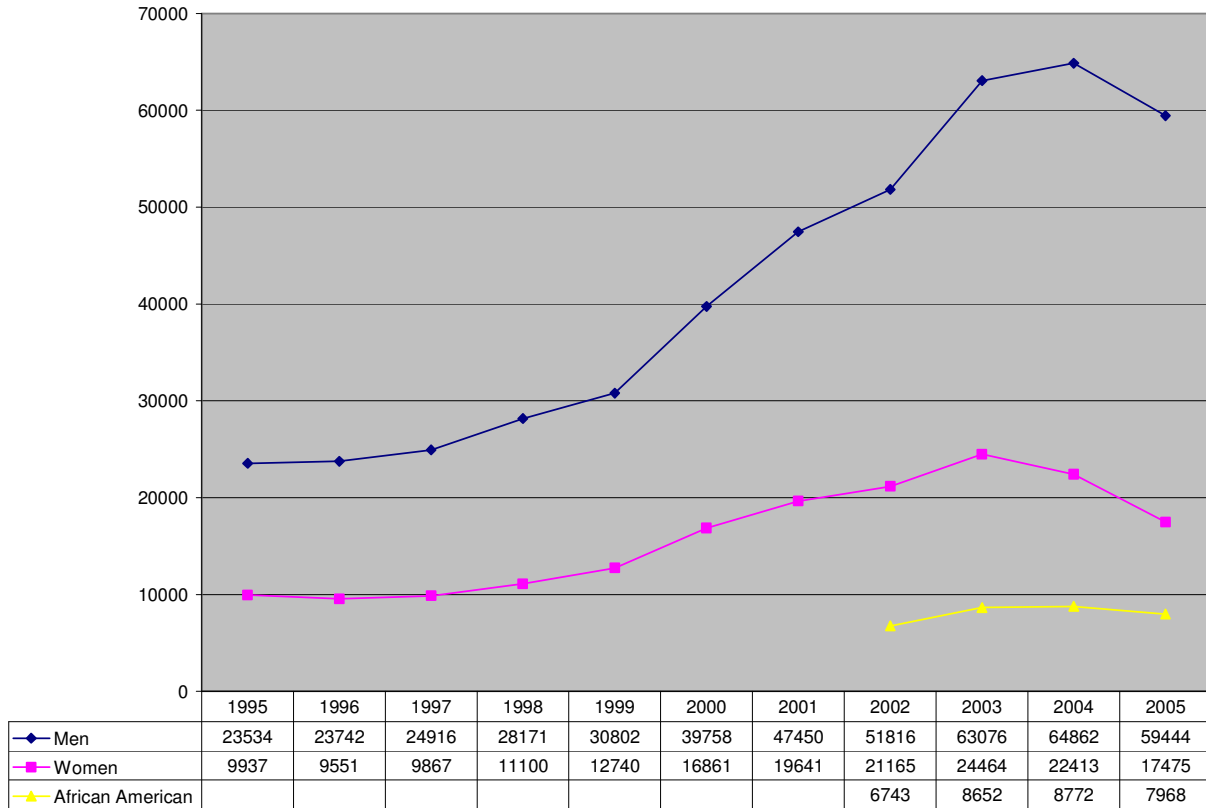


There are not major surprises in this data.

GENDER AND RACE

What has been happening to completions based on gender? Table 10 shows that the completions of women exceeded men for the first time in 2002.

Table 10 – Gender and African Americans Completion Counts



The surprise in this data is the slow growth in the number of women in IT programs. While male enrollment grew dramatically between 1995 and 2003, the number of women enrolled showed more modest gains.

There is only limited data on African-American completions beginning in 2002. But it shows positive growth.

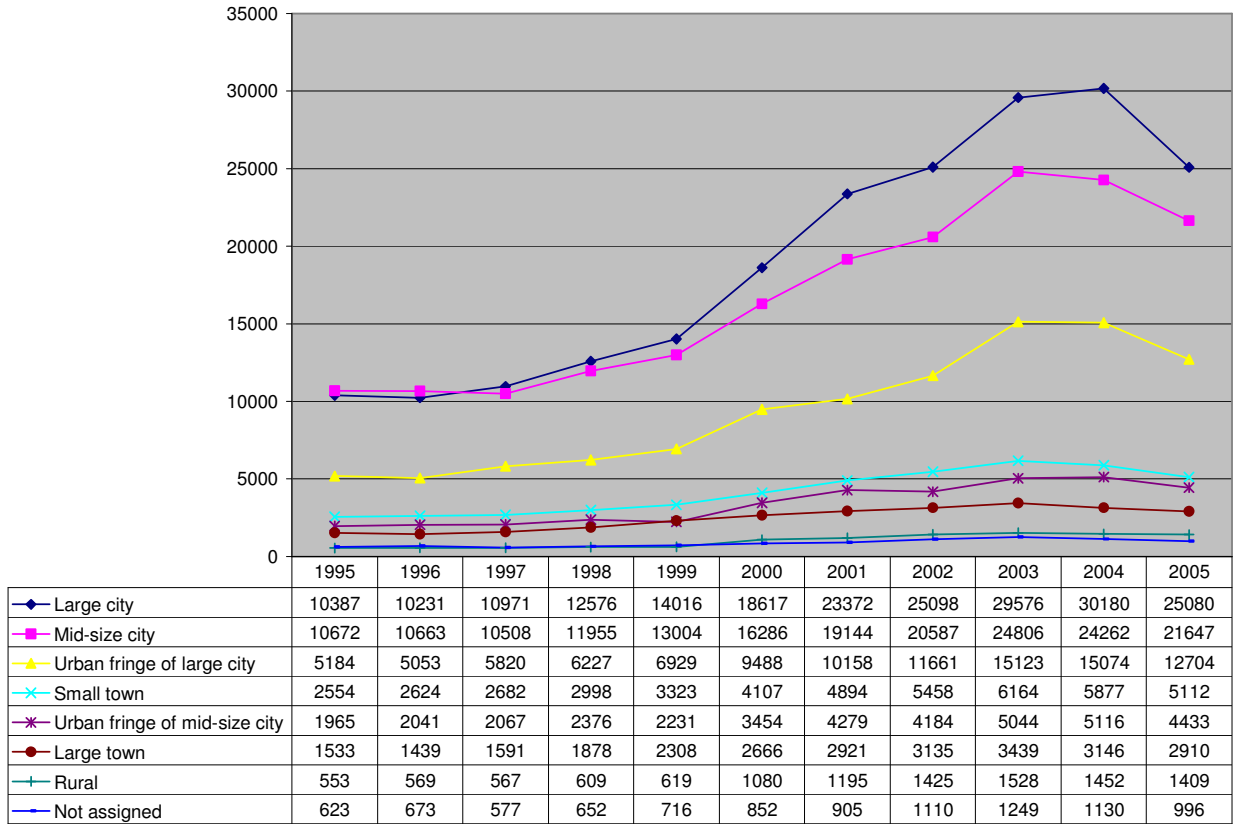
SCHOOL LOCATION

IPEDS classifies the location of school on local population into 7 categories of degrees of urbanization.

- Large City - A central city of a CMSA or MSA with the city having a population greater than or equal to 250,000.
- Mid-size City - A central city of a CMSA or MSA, with the city having a population less than 250,000.
- Urban Fringe of Large City - Any incorporated place, CDP, or non-place territory within a CMSA or MSA of a large city and defined as urban by the Census Bureau.
- Urban Fringe of Mid-size City - Any incorporated place, CDP, or non-place territory within a CMSA or MSA of a Large City of a Mid-size City and defined as urban by the Census Bureau
- Large Town - An incorporated place or CDP with a population greater than or equal to 25,000 and located outside a CMSA or MSA.
- Small Town - An incorporated place or CDP with a population less than 25,000 and greater than or equal to 2,500 and located outside a CMSA or MSA.

- Rural - Any incorporated place, CDP, or non-place territory designated as rural by the Census Bureau.

Table 11 – Degree of Urbanization in School location.



The data shows the same general trend in all settings.

CONCLUSIONS

The surprising revelation in this review is the steep slope of decline in completion rates. Analysis of the data does not show major deviations no matter how the data are analyzed. Completion rates by major, region, location, type of school, etc. all remain in the same general relationship to one another.

This decline is a significant issue. Employment demands are on the rise again. With the lag between starting a program and completion, and a decline in capacity, it will be years before the market demand for IT professionals can be met. This could have implications for the whole economy. Technology has driven the productivity gains for the last two decades. The U.S. is the world leader in technology, but we could quickly lose that position. Other countries, particularly China and India, are graduating IT professionals in record numbers. With the large populations of these countries, even a small percentage increase is greater than the total number of U.S. completions.

As a nation we must increase the emphasis on technology in all of educational systems. Starting in elementary school, more women should be steered towards IT professionals. The future of the U.S. economy and our place as world leader may be at stake. Now is the time for action.

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Appendix A - Standard 2000 Carnegie Classifications (leading number are the code)

“15 Doctoral/Research Universities--Extensive: These institutions typically offer a wide range of baccalaureate programs, and they are committed to graduate education through the doctorate. They award 50 or more doctoral degrees per year across at least 15 disciplines (see note 2).

16 Doctoral/Research Universities--Intensive: These institutions typically offer a wide range of baccalaureate programs, and they are committed to graduate education through the doctorate. They award at least ten doctoral degrees (see note 1) per year across three or more disciplines, (see note 2) or at least 20 doctoral degrees per year overall.

21 Master's Colleges and Universities I: These institutions typically offer a wide range of baccalaureate programs, and they are committed to graduate education through the master's degree. They award 40 or more master's degrees per year across three or more disciplines (see note 2).

22 Master's (Comprehensive) Colleges and Universities II: These institutions typically offer a wide range of baccalaureate programs, and they are committed to graduate education through the master's degree. They award 20 or more master's degrees per year.

31 Baccalaureate Colleges--Liberal Arts: These institutions are primarily undergraduate colleges with major emphasis on baccalaureate programs. They award at least half of their baccalaureate degrees in liberal arts fields (see note 3).

32 Baccalaureate Colleges--General: These institutions are primarily undergraduate colleges with major emphasis on baccalaureate programs. They award less than half of their baccalaureate degrees in liberal arts fields (see note 3).

33 Baccalaureate/Associate's Colleges: These institutions are undergraduate colleges where the majority of conferrals are at the subbaccalaureate level (associate's degrees and certificates), but bachelor's degrees account for at least ten percent of undergraduate awards.

40 Associate's Colleges: These institutions offer associate's degree and certificate programs but, with few exceptions, award no baccalaureate degrees (see note 4). Specialized Institutions - These institutions offer degrees ranging from the bachelor's to the doctorate, and typically award a majority of degrees in a single field. The list includes only institutions that are listed as separate campuses in the Higher Education Directory. Specialized institutions include:

51 Theological seminaries and other specialized faith-related institutions: These institutions primarily offer religious instruction or train members of the clergy.

52 Medical schools and medical centers: These institutions award most of their professional degrees in medicine. In some instances, they include other health professions programs, such as dentistry, pharmacy, or nursing.

53 Other separate health profession schools: These institutions award most of their degrees in such fields as chiropractic, nursing, pharmacy, or podiatry.

54 Schools of engineering and technology: These institutions award most of their bachelor's or graduate degrees in technical fields of study.

55 Schools of business and management: These institutions award most of their bachelor's or graduate degrees in business or business-related programs.

56 Schools of art, music, and design: These institutions award most of their bachelor's or graduate degrees in art, music, design, architecture, or some combination of such fields.

57 Schools of law: These institutions award most of their degrees in law.

58 Teachers colleges: These institutions award most of their bachelor's or graduate degrees in education or education-related fields.

59 Other specialized institutions: Institutions in this category include graduate centers, maritime academies, military institutes, and institutions that do not fit any other classification category.

60 Tribal Colleges and Universities: These colleges are, with few exceptions, tribally controlled and located on reservations. They are all members of the American Indian Higher Education Consortium.

NOTES ON DEFINITIONS 1. Doctoral degrees are as defined in the Integrated Postsecondary Education Data System (IPEDS) of the U.S. Department of Education's National Center for Education Statistics (NCES). This includes the Ph.D. in any field as well as other doctoral-level degrees such as the Doctor of Education, Doctor of Juridical Science, and Doctor of Public Health. It excludes doctoral-level degrees defined as first-professional degrees in IPEDS. For more information, see <http://nces.ed.gov/ipeds>. 2. Distinct disciplines are determined by the 4-digit series of the Classification of Instructional Programs published by NCES. For more information, see <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=91396>. 3. Liberal arts fields include the following fields (as listed in the Classification of Instructional Programs): English language and literature/letters; foreign languages and literatures; biological sciences/life sciences; mathematics; philosophy and religion; physical sciences; psychology ; social sciences and history; visual and performing arts; area, ethnic, and cultural studies; liberal arts and sciences, general studies, and humanities; and multi/interdisciplinary studies. 4. This group includes community, junior, and technical colleges. “

Source: Carnegie Foundation [2, see institution data definitions].

METHODOLOGY FOR EDUCATING INFORMATION SYSTEMS STUDENTS ON THE NEW PARADIGM OF SERVICE-ORIENTED ARCHITECTURE (SOA) TECHNOLOGY

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ABSTRACT

Service-Oriented Architecture (SOA) is being adopted aggressively by business firms. SOA is defined as an enabling framework for improving business processes for competitive advantage. This paper analyzes the challenges of deploying SOA through an experiment of case studies in industry and discloses that firms that lead projects of SOA with business and procedural dimensions have more success with SOA than those that lead projects with technical functionality. The paper posits a technology agnostic program management methodology on SOA that is adaptable in the curricula of information systems students. This paper will benefit schools of information systems attempting to educate students on SOA as a new paradigm of 21st century technology.

Keywords: Information Systems Curricula, Program Management Methodology, Project Management Methodologies, Service-Oriented Architecture (SOA), Web Services

BACKGROUND

Our research into a methodology for educating information systems students on service-oriented architecture (SOA) began with an analysis of web services in 2003 – 2004 (Anderson, Howell-Barber, Hill, Javed, Lawler and Li, 2005). In that analysis, we found that firms which led projects in services with business factors, especially business benefit, customer demand and focus on process integration, had more success with web services than firms which led with the functionality of platform technology. Business strategy defined by business departments in the firms, not technology, was considered to be crucial in a web services strategy. These results, presented by us at conferences in 2004 and published in 2005, were beneficial for firms considering an approach to application automation and information architecture founded on web services. Since the completion of our analysis, we continued our research of services in 2005 - 2007, as SOA was and is being adopted by firms on actual applications.

The best of the adoptions of SOA appears, as in web services, to be based on business considerations, not on applications and technology. Consulting firms disclose constant adoption of SOA projects in industry (Daniel, 2006). Gartner Inc. forecasts 80% of development to be on an SOA model by 2008 (Gruman, 2006). Despite a current absence of firms completing a composite of all processes of a business as services, composed in a *fully deployed SOA* in a service-oriented enterprise (SOE) idealized by consultants, firms in the software industry continue to develop and extend service solutions as tactics in an assumed strategy. SOA is not considered a fad but a development as consequential to industry as the Internet (Hurwitz, 2006). Because of the hype on services technology, we decided to expand our studies to SOA. Further study is appropriate, as business firms are beginning to achieve benefits of agility and flexibility in business processes. SOA, as applications exposing functionality and information as services accessible by different business client or “consumer” departments in a firm, is a concept defined extensively now in the literature of practitioners. The distinction of SOA, in contrast to earlier

hyped technologies, is in the actual benefits now being achieved by firms. SOA is clearly a new paradigm that educators in information systems have to introduce into their curricula.

INTRODUCTION

To achieve the benefits of SOA in a competitive differentiation strategy, technology managers and business managers in firms are confronted with a decision as to the best approach to deployment. Deploying to SOA is more complex in concept than deploying to client/server technology from legacy technology or deploying to web from client/server technology. Consideration of deployment of SOA as a first mover, fast follower, or follower firm is difficult for managers.

Hesitancy may be from a culture where the technology department is not collaborative with business departments on technical solutions, not focused on business design or process integration (Chang, 2006), or not knowledgeable in the methodology of object orientation and service orientation (Bloomberg and Schmelzer, 2006) on projects. Developmental methodology on SOA is distinct from non-SOA methodologies, in that process and project requirements of different departments and business units for services in firms, in response to competitive conditions, customer demands or regulatory needs, are not fixed and frequently incomplete on pre- or post-deployed SOA projects. Non-SOA methodologies that include older “waterfall” models contradict enterprise demands of firms to be fast, flexible, incremental, innovative and iterative in releases of services. Non-agile models are serial and slow in an SOA strategy.

The issues of SOA are not in the simple and tactical application and departmental deployment stages, but on the path of complex business unit and enterprise process deployment stages that lead to an SOE in an SOA strategy. As the path begins with a defined process in departments and embraces more processes in more business units on more projects in parallel with other projects and with more and more technical and business staff, and as competitive conditions, customer demands and regulatory scrutiny on the processes change concurrently for firms, control of the processes and the projects, and of the services technology, is complex but critical for ensuring an evolving strategy.

The complexity of SOA creates a challenge in methodology for firms attempting to define an approach to the deployment of SOA and for schools of information systems attempting to educate students on SOA.

FOCUS

In this study we define a practical *program management methodology that can be complimentary to project management methodologies already established in business firms*. Dimensions of service orientation and SOA are customizable in the project management methodologies by application of this program management methodology. Methodologies in the firms are assumed to be agile approaches (Beck and Andres, 2005), or characteristics of agile methods enhanced for control of complex systems, that are complimentary to our program management methodology.

This methodology assumes flexibility for changing process requirements of SOA, because of external competitive conditions, customer demands or regulatory needs or due to internal technical or business needs. It advocates delivery of frequent benefits and releases of services on an incremental and iterative project path that leads to an enterprise or full firm SOE. It consists of frequent interaction of the technology department and the business departments and business units in the migration to full SOE. It includes diversely skilled technical and business staff on smaller teams. This methodology is a hybrid approach, which is top-down in design from

business management models and bottom-up in design from operations and platform technologies, and is appropriate for tactical and strategic SOA.

The program management methodology is an agile approach to an SOA strategy that contributes the benefits of flexibility, efficiency and agility to firms on the path to the idealized SOE, as depicted in Figure 1 in the Appendix.

The intent of the study is to define a comprehensive and disciplined *Methodology for Enabling Service-Oriented Architecture (MESOA)* program management methodology, by which instructors can educate information systems students on SOA. The intent is not to define a new methodology for SOA project management but to clarify aspects of service oriented projects that can complement already chosen project management methodologies that instructors include in their curricula.

The assumption, as in frequent literature on SOA (Krafzig, Banke and Slama, 2005), is that instructors can enhance elements of existing methodologies to integrate service orientation. Another assumption and distinction is that the *methodology is technology neutral*. The final assumption is that the students are already cognizant of concepts of service orientation and SOA, web services and Extensible Markup Language (XML) technologies, from earlier courses in their curricula.

PROGRAM MANAGEMENT METHODOLOGY

The program management methodology is described in frameworks of best practices for participant technical, business and corporate staff on projects of SOA. The frameworks of this methodology, displayed in Figure 2, consist of governance, communications, product realization, project management, architecture, data management, service management, human resource management, and post implementation. These frameworks are coupled or related tasks for managing a program or a project of SOA.

The frameworks evolve as the programs evolve in iterative phasing and in incremental steps towards an SOE. The frameworks are flexible for changing process requirements and technologies and for further releases of services. For a firm beyond exploration and deployment of pilot projects of web services, the formalization of the frameworks enables evolution of SOA in a fulfillment strategy towards SOE.

FRAMEWORK OF GOVERNANCE

Governance enables the alignment of processes and services with business strategy and results in evolution towards SOE. Governance on projects of SOA ensures that the services conform to a consistent corporate SOA strategy that supports the *business strategy* of the firm. Because of the evolution in the maturity of projects of SOA, business and technical staff on a project have to learn new project management methods, if not unlearn old methods (Murch, 2000), and governance facilitates learning of program management methodology.

FRAMEWORK OF COMMUNICATIONS

Communications enables emphasis on the *business criticality* of SOA in the firm, which is articulated by the chief information officer (CIO), if not the chief executive officer (CEO). Communications on a project of SOA ensures collaboration of business and technical staff in a continued plan on the endeavor, coupled with the other frameworks. Common reference of technical and business terminology in the firm is critical on projects of SOA.

FRAMEWORK OF PRODUCT REALIZATION

Product realization enables the analysis and design, development, integration and testing, and deployment and implementation of SOA and is the core of established project management methodology. Product realization on a project of SOA is coupled with the other frameworks and ensures the focus of the projects is on *business processes* to be evolved into SOA and not on technology. The program to be realized may be implemented in interlinked iterations of internal department application projects to external firm process integration projects, but the iterations may or may not be sequential.

FRAMEWORK OF PROJECT MANAGEMENT

Project management as a framework enables delivery of projects of SOA. This framework ensures that changes in business strategy are applied as appropriate on a project of SOA. Project management further ensures that processes and services are functioning and implemented as planned in the strategy.

FRAMEWORK OF ARCHITECTURE

Architecture as a framework enables compliance of business processes with an SOA model. Architecture on a project of SOA ensures evolution from conversion of functions into services, creation of component services and integration into composite services, integration of internal applications, internal services and external services, to on-demand services in a gradual SOE. This framework ensures *seamless integration* of hardware and software that conform to service standards and technology.

FRAMEWORK OF DATA MANAGEMENT

The framework of data management enables *behaved SOA data services* that do not disrupt applications of the firm. Data management on a project of SOA enables implementation of the services, based on access, availability, breadth and accuracy of data already in the databases of the applications. This framework ensures consistency of data and control of data redundancy and fractal data replication (Fuller and Morgan, 2006).

FRAMEWORK OF SERVICE MANAGEMENT

Service management enables continued conformity and *coordination of processes and services to the business strategy* defined in the above framework of governance. This framework is coupled with product realization on a new project of SOA. This ensures that requirements for new processes and new services or revisions to them are not redundant with existing processes or services and ensures reusability of services.

FRAMEWORK OF HUMAN RESOURCE MANAGEMENT

Human resource management enables identification of new and revised *responsibilities and roles* of business and technical staff on SOA. This framework on a project of SOA is also coupled with the other frameworks. This ensures that education of the business and technical staff on the change in culture of service orientation, and of the technical staff on the technology of SOA, is furnished throughout the projects of SOA.

FRAMEWORK OF POST IMPLEMENTATION

Post implementation enables service and process life cycle tasks following product realization. The framework ensures availability of the applications and services and of the technologies, tools and utilities of SOA. These are formulated in service level agreements (SLA) between the technology department, the internal business departments and the business units.

These frameworks furnish the principles of service orientation and SOA in the methodology for an evolutionary SOE.

EXPERIMENT WITH PROGRAM MANAGEMENT METHODOLOGY

From January 2005 to March 2007, an analysis was conducted of 15 Fortune 10 – 1000 firms, based on available information on each of the firms in generic industry literature and on specific interaction with staff in a limited number of the firms.

Firms were chosen from evidence of deployment of web services based on SOA (5 firms), deployment of services, integration of process and services architecture and restructuring of organizations and staff (8), and deployment of services based on SOE (2). Deployments in the firms were examples of commonly encountered practices in industry that were evaluated by us with the methodology. Firms covered the automobile (1 firm), banking (3), energy (1), health (1), insurance (2), manufacturing (1), technology (2), telecommunications (2), training (1), and travel and leisure (1) industries. These firms were headquartered in the United States.

We analyzed the deployment projects on services in each of the firms with each of the frameworks of our methodology. To the frameworks were applied an evaluation by us of each of the *projects* perceived by us to be *effectively enabled at a high, intermediate or low level of the methodology* or not enabled at all. The evaluation highlighted *key business, procedural and technical factors on the projects* that were perceived by us as having contributed most effectively to SOA strategy.

EXPERIMENT FINDINGS WITH PROGRAM MANAGEMENT METHODOLOGY

FRAMEWORKS

The frameworks of the methodology for SOA demonstrated enablement for the projects in our studies. The projects are enabled *at a high level of methodology* (29.6%), *at an intermediate level* (34.8%), *at a low level* (20%), and *not at all* (15.6%). Table 1 in the Appendix displays the findings on the frameworks.

Architecture, service management, post implementation, data management and product realization are cited as enabled more frequently at a *high level* than governance, human resource management, communications and project management, on the projects. Encouraging is the higher frequency of enablement at *high* (29.6%) or *intermediate* (34.8%) levels than at *low* (20%)

or *not at all* (15.6%) levels, as most of the business firms continue to evolve on their projects to deployment and exploitation of services based on SOE, as further displayed in Figure 3. Findings are clear that business firms in our recent studies continue to evolve in the methodology of SOA strategy.

ENABLING FACTORS OF FRAMEWORKS

Key business factors (70.7%) in Table 2.1 continued to be more enabling than key technical factors (55.3%) in Table 2.3 in the frameworks of the methodology on the projects of our studies of SOA. Procedural factors (68.4%) in Table 2.2 are also more enabling than technical factors. Findings confirmed the results of our study of web services, in which business factors were found to be more important than technical factors of services in firms.

BUSINESS ENABLING FACTORS

Service orientation, agility, efficiency and flexibility benefits, reusability of assets, financial benefits and executive technology leadership are cited frequently on the projects in the studies. *Strategic planning and focus on improvement of process* are cited as drivers on the projects. *Business client participation, competitive, market and regulatory differentials, customer demand and culture of innovation* are cited frequently as enablers of the projects.

PROCEDURAL ENABLING FACTORS

Infrastructure architecture, process and service deployment techniques, control of program, risk management, and security management are cited frequently on the projects. *Responsibilities and roles, change management, information management, process and service deployment environment and service management and support* are also cited frequently on the projects. *Knowledge exchange, common reference and standards management* are cited as enabling in formalizing the methodology on the projects.

TECHNICAL ENABLING FACTORS

Business process management product software, platforms of key technology firms, XML standard and messaging standards are cited frequently as enabling technical factors. *External SOA domain on project and middleware* are cited frequently on the projects. *Internal SOA domain and platform specialty tools from platform technology firms* are cited often on the projects.

These findings of business factors (70.7%), and also procedural factors (68.4%), as more enabling than technical factors (55.3%), in fulfilling SOA, may be encouraging for business managerial staff that might be currently hesitant in pursuing SOA as a strategy.

From the bulk of the projects of SOA in our studies, lessons learned are indicated to be the following:

Close collaboration of the technology department with the business departments and business units on business requirements can contribute to fast deployment of an SOA solution;
Enterprise governance of services based on strategic planning can ensure effective and economical reusability of services in an SOA;

Evolution of functionality on incremental projects contributing immediate benefits, in contrast to investment on “big bang” projects contributing elusively later benefits, can be a prudent SOA strategy;

Focus on service standards at the beginning of a project on SOA can help in creating a solid foundation of SOA solutions and SOA strategy; and

Focus on service orientation training of internal technical and business staff from the beginning of a project, and continuous technical training during the projects, is crucial for deployment of an SOA strategy.

Finally, few of the firms (2) in our studies are close to highest maturity of deployment and exploitation of enterprise services based on SOE. Half (8) are experimenting in integration of process and services architecture and in restructuring of organizations and teams. Several of the firms (5) are at a low maturity of department deployment and business unit expansion of web services based on principles of SOA. Almost all of these firms (13) are achieving competitive equivalency service solutions or competitive continuous improvement service solutions, but the few firms (2) at a high maturity are achieving the *beginning* of competitive differentiation service solutions. Figure 3 displays the maturity levels of SOA in the firms of our studies.

IMPLICATIONS OF STUDY

From the results of the experiment with the case studies, we believe that educators in information systems introducing SOA in the curricula in their schools may benefit from the emphasis on the business and procedural dimensions of SOA. Information on the technology of SOA is essential, but is not as important as business and procedural fundamentals. Educators may be guided by the findings of the studies.

Collaboration of the technology department with business departments on business process improvement projects and requirements is critical to SOA. Collaboration on process improvement requirements if not SOA may not be effective enough in firms, contributing to the technology department becoming *the* expert on changing processes that are inherently business oriented not technical (Alter, 2006). This difficulty can cloud delineation of core enterprise goals and processes and deployed services, and current and future requirements and determination of technologies, in a competitive strategy.

Enterprise governance of services based on strategic planning and initiated by the CIO in cooperation with the business units of the firm can ensure reusability of services in an SOA. To do this, the CIO cannot be perceived as a pure technologist, as that contributes to the perception of the technology department and him as not a strategic function nor a strategic player or partner in the firm (Alter, 2006). The CIO who can contribute to business strategy is one who can continue educating and engaging proactively the sponsors in the executive suite and those in the business units (Smith, 2006) on the importance of SOA and the impact of new SOA technologies. This CIO can be a leader (Hugos, 2006) in the improvement of enterprise processes and instrumental in strategy.

Evolution of functionality on incremental projects of SOA contributing immediate benefits can be a prudent SOA strategy, and focus on service standards at the beginning of programs and projects of SOA can help in the foundation of an SOA strategy.

Focus on service orientation training of technical staff and business staff and continuous technical training of technical staff are crucial for implementation of SOA strategy.

For technical staff, substantial training in business process and firm and industry strategy is as important if not more important as technology training, in order for this staff to optimize processes with SOA technology. Training may include integration of SOA centers of excellence and communities of practice of technical and business staff, and councils of expertise of the

technical staff (Alter, 2006), for improving synchronization of technology strategy with business strategy.

Finally, *SOA is a feasibly strong proposition for a business firm*. Firms that hesitate in investing adequately in an SOA program may be hindered by not having competitive processes that might furnish an improved proposition of service to their customers and trusted partners. Managers might evaluate processes in their firms for future competitive advantage in their proposition and focus investment in SOA technology towards those processes.

Because of the continued hype on service technology, the findings of the study are helpful in the extension of SOA in industry and in the introduction of SOA as a technical topic and as procedural and business topics in information systems schools. Together with the posited program management methodology, they are essentially a snapshot of SOA today that can be helpful to information systems students. These findings and implications convey the proposition that the excitement of SOA technology must be balanced with the prudence of SOA business strategy when introduced to information systems students.

LIMITATIONS AND OPPORTUNITIES FOR RESEARCH

This study is positioned as a proposition for a new program management methodology to be included in the curricula for educating information systems students on the evolving paradigm of SOA technology. The findings of the studies in industry indicate that a new methodology that integrates procedural and business fundamentals of projects of SOA is more important than functionality of technology. These findings have to be extended in a further study of the methodology in the curricula with instructors and students and of the outcomes. The next step is to integrate the program management methodology of the study into the advanced curricula of the Ivan G. Seidenberg School of Computer Science and Information Systems of Pace University. The success or non-success of the integration will be the foundation of the next study.

CONCLUSION

This paper analyzed the challenges of deploying service-oriented architecture (SOA) through case studies in industry. Findings indicated that firms that lead projects of SOA with business and procedural factors have more success than those that lead with the functionality and hype of technology. The paper posited a program management methodology on SOA that may be integrated into the curricula of schools of information systems, so that students may be up-to-date with the practice and theory of SOA.

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APPENDIX

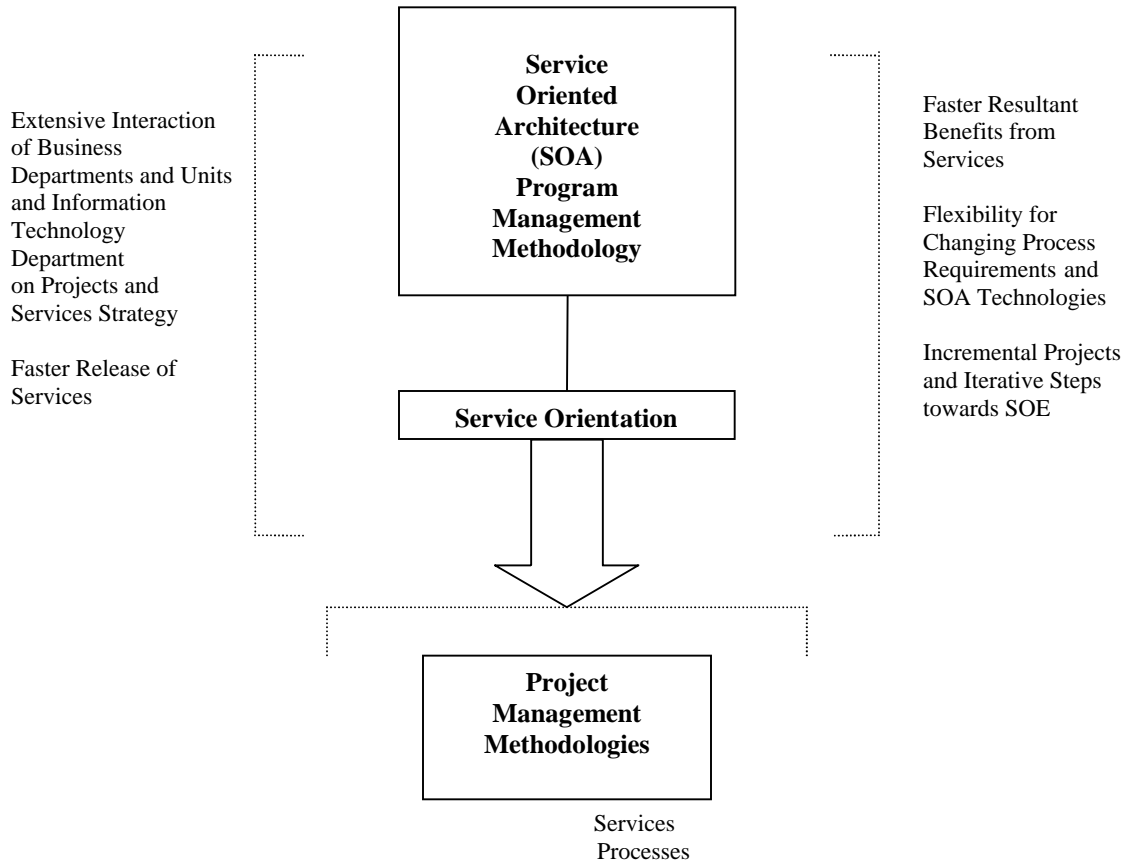


Figure 1: SOA Program Management Methodology

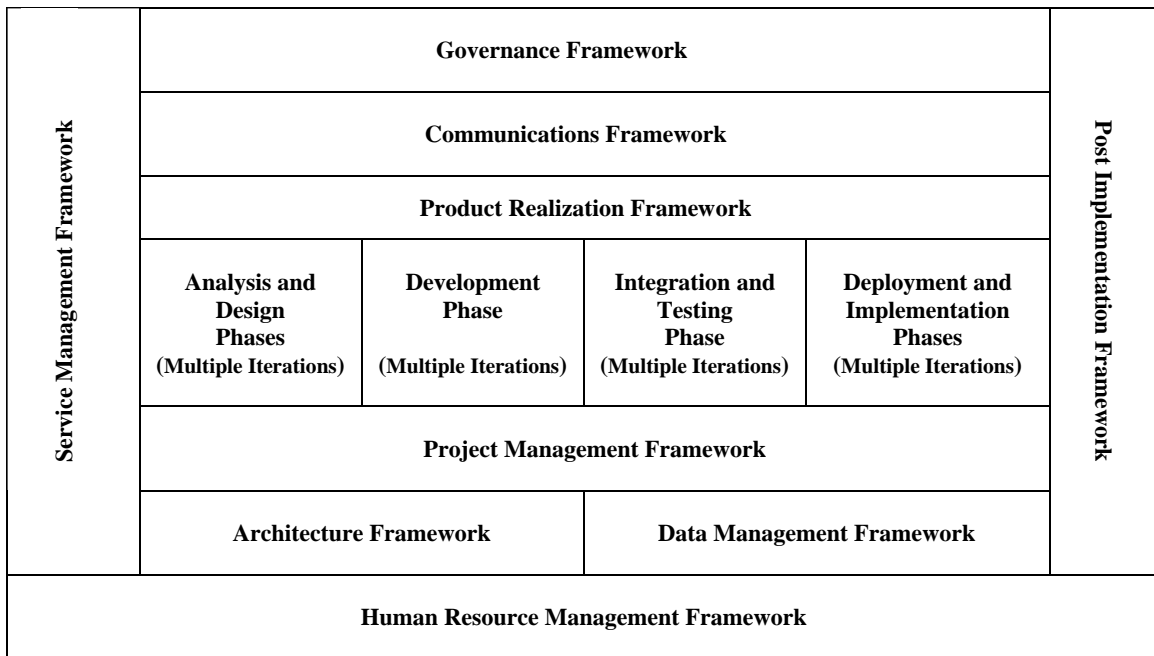


Figure 2: Methodology for Enabling Service-Oriented Architecture (MESOA)

Table 1: Frameworks of Methodology for SOA

Frameworks of Methodology	High Citation	Intermediate Citation	Low Citation	Not at All Citation
Governance	4	8	3	0
Communications	3	7	3	2
Product Realization	5	5	4	1
Project Management	1	4	4	6
Architecture	7	7	1	0
Data Management	5	1	6	3
Service Management	6	6	1	2
Human Resource Management	4	4	3	4
Post Implementation	5	5	2	3
	40	47	27	21
	29.6%	34.8%	20%	15.6%

Table 2.1: Key Business Factors for Enabling Frameworks of Methodology

Business Factors	Citation Frequency
Agility, efficiency and flexibility benefits	14
Financial benefits	13
Business client participation	11
Competitive, market and regulatory differentials	11
Customer demand	11
Culture of innovation	11
Organizational change management	8
Executive sponsorship	6
Executive business leadership	4
Executive technology leadership	13
Strategic planning	12
Enterprise architecture	4
Focus on improvement of process	12
Service orientation	15
Reusability of assets	14
	70.7%

Table 2.2: Key Procedural Factors for Enabling Frameworks of Methodology

Procedural Factors	Citation Frequency
Control of program	14
SOA center of competency	6
Responsibilities and roles	12
Education and training	8
Knowledge exchange	11
Change management	12
Information management	12
Common reference	11
Naming conventions	9
Procurement of technology	9
Technology firm knowledge capture	2
Risk management	14
Standards management	10
Infrastructure architecture	15
Process and service deployment environment	12
Process and service deployment techniques	15
Service catalog management	6
Service management and support	12
Security management	14
Continuous process improvement	9
Costing techniques	8
Strategy management	5
	68.4%

Table 2.3: Key Technical Factors for Enabling Frameworks of Methodology

Technical Factors	Citation Frequency
Internal web services on project	1
Internal process domain on project	4
Internal SOA domain on project	11
External process domain on project	5
External SOA domain on project	12
Business process management product software	13
Data tools	6
Middleware	12
Platform of key technology firms	13
Platform specialty tools from platform technology firm	11
Proprietary technologies	9
Best-of-class tools	7
XML standard	13
Messaging standards	13
Service description and discovery standards	9
Transaction standards	3
Security standards	9
User interface standards	3
Web services best practices	9
Web services management standards	3
	55.3%

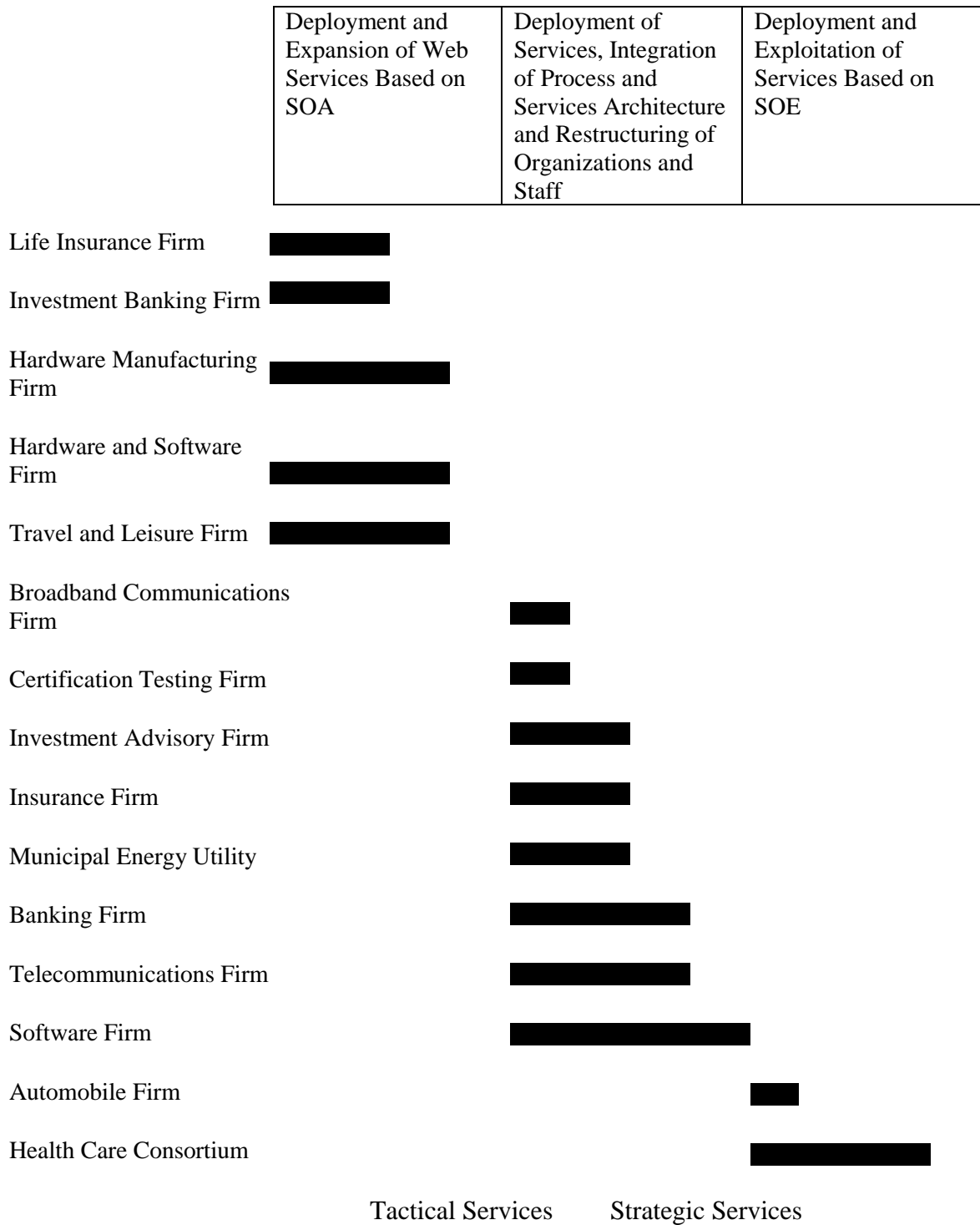


Figure 3: Maturity Levels of SOA in Firms of the Studies

Information Systems and Electronic Communications in Logistics Management

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ABSTRACT

Telecommunications and Networking Technologies have enjoyed massive investments from the industry and government – resulting into an unparalleled rapid growth in the transmission of voice, video, and data over wired and wireless media. In spite of the advancements made, telecommunications and networking had experienced security problems which had led to the development of various approaches to protect information. This paper proposes to present trends in telecommunications and networking technologies. In addition, it will discuss major applications in Logistics Management.

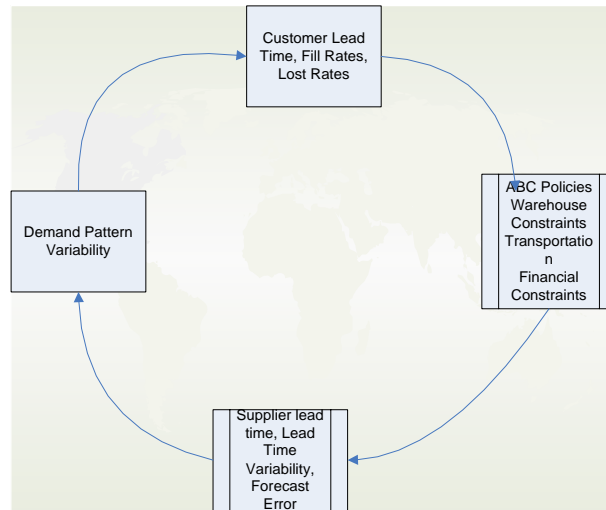
INTRODUCTION

In the evolution of information systems and communication technologies (ICT), the Internet has played a primary role in the explosive growth of the information systems logistics applications [3]. New innovative application such as Voice over IP (VoIP) has played disruptive role to many telecommunication firms' business models that depended on public switched telephone networks (PSTN). The constant reduction of costs for hardware, software, and operating costs have made VoIP, IPTV, videoconferencing, IP multimedia systems as technology of choice to many business including the logistics industry [2]. Additionally new Intelligent Multimedia Knowledge Applications (IMKA) [1] provides new techniques in discovering knowledge from these rich multi-media tools. Both perceptual and semantic multimedia contents are being developed for all types of applications including in logistics operations. Efficient techniques in data mining of these contents are constantly developed. This brief paper will try to ponder on issues related to VoIP and IPTV uses in logistics and the security infrastructure vulnerability and strategies to mitigate such threats.

BACKGROUND

For many decades PSTN has played the role as the backbone for reliable communication technology for many organizations. However, PSTN is now a matured declining technology with the advent of cellular telephony and VoIP. VoIP as a growth technology has not yet attained the technological maturity in

terms of quality, security, and compatibility compared to PSTN. VoIP's infrastructure is based on the Internet and is vulnerable to security threats.



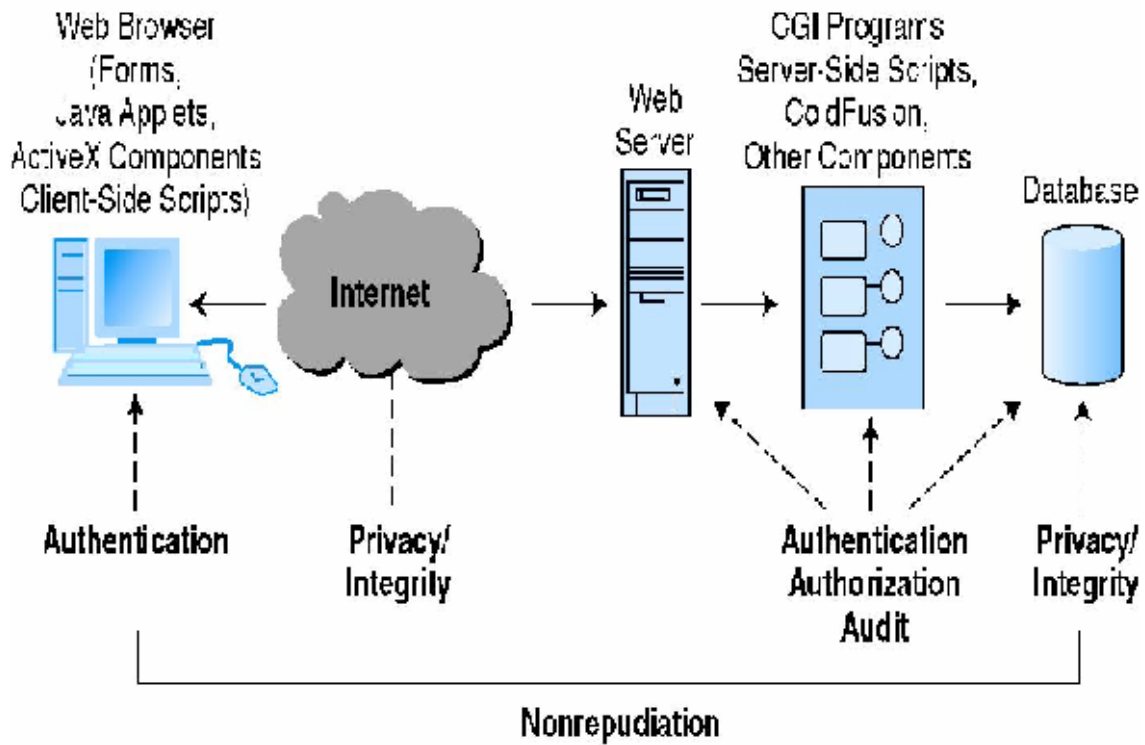
**Adapted from APICS, Production and Inventory Management Journal Vol. 1, No. 1, 1999.*

Wireless cellular telephony with text, video, and voice features is spreading and is being adapted quickly because of the cost and strategic advantages in quickly putting these infrastructures as compared to old online cable based connections of PSTN. Internet based voice applications are becoming a strategic competitive tools in being integrated for electronic commerce such as business to business (B2B), business to commerce (B2C), business to government (B2G), customer relations management (CRM), and logistics applications with features of converting voice into text and text to voice [6, pg 563, 2006] . These types of systems are useful in finding information easily as they are searchable for text based information. Logistics related applications can integrate such features to make the system more effective and can also add language translations capacity that can include global related logistics when the language of operations is different. Intelligent Multimedia Knowledge Application (IMKA) represents the effort to search knowledge from multimedia contents in voice, video, static pictures, and text [2, 4]. It is a promising area that can advance the formation of knowledge from and help business run their operations efficiently.

SECURITY ISSUES in TELECOMMUNICATION

Security is a broad problem in information technology including telecommunication applications. Major security issues in logistics applications include: Authentication, authorization, auditing, privacy, integrity, availability, and non repudiation. The schematic relationships of these factors are shown in Figure 1 [7].

Figure 1 Security Issue in a Network



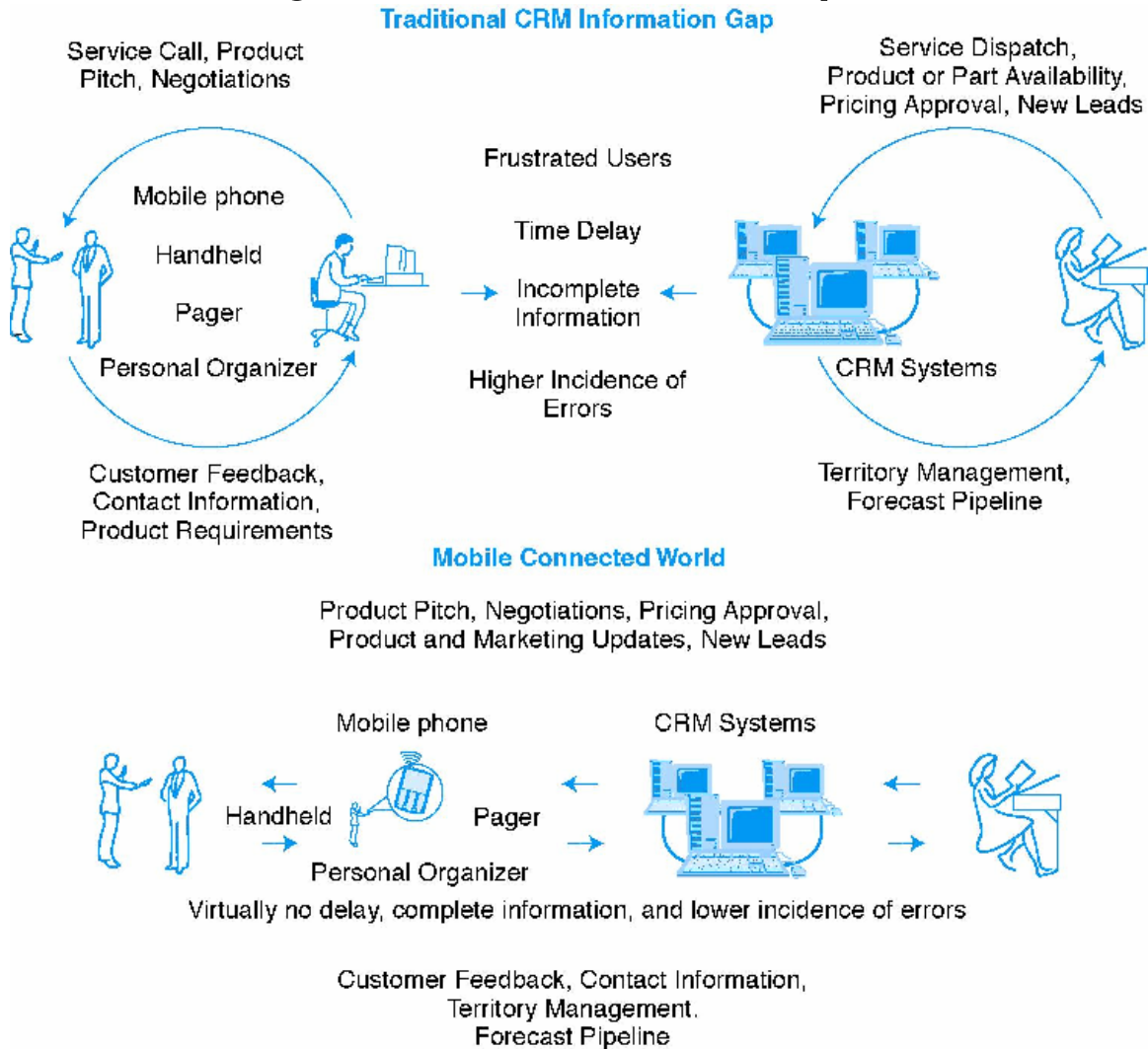
Adapted Scambray, J. e al. Hacking Exposed 2nd New York: McGraw Hill, 2000

The discussion that follows will focus on security issues to VoIP only. Telecommunication infrastructure include hardware, software, supporting services such as Transmission Control Protocol (TCP), Dynamic Host Configuration Protocol (DHCP), Domain Name System (DNS), Internet Protocol (IP) and VoIP protocols [1]. Any of these protocols can be maliciously attacked to disrupt the system by compromising the authentication, privacy or simply make the server unavailable by overwhelming with bogus page requests. For example, one recent common application that is widely being used is the VoIP networks. The attacks on VoIP can range from disruption, malicious attacks to degrade its integrity, spamming and eavesdropping. Any or all of these disruptions can make VoIP ineffective, since Internet telephone connectivity should be instantaneous to compete with switched telephone network. A few milliseconds delay in the connection can heavily degrade the suitability of using VoIP or IPTV for voice or video supported communications. Quality of service (QoS) and reliability of these systems is in the order of 99.999 percent. System wide strategies to minimize any sort of disruptions have to be developed, if VoIP is to be the choice of technology for customers and compete with legacy systems.

FUTURE TRENDS

The telecommunication community is constantly looking for ways to develop new technology that will allow the integration of multimedia contents and develop tools for example, sensor generated data such as from GPS, RFID and other telemetric sources, Intelligent Multimedia Knowledge Application (IMKA), that search knowledge from multimedia contents. This is a very difficult problem since voice, video, and other similar content media are not easily searchable their original contents based on a specific data or information as it would to text based. Future research in this rich field is to incorporate multimedia contents from different sources and use context to improve application performance of logistics and supply chain information exchanges in the network [5]. New application on the Internet provides voice to text and text to voice conversion. This medium will enhance in information search tremendously [6].

Figure 2 Traditional CRM Information Gap*[6]



- Adapted from Turban pg. 564

Current trends as shown in Figure 3, is to connect logistics application, CRM, customers, manufacturing, sales force marketing and demand estimates using mobile connected tools. The mobile phone, hand held RFI readers, palm systems, personal organizers, pagers, etc., are directly connected with the CRM with virtually no delay. These efficiencies bring complete and accurate information in real-time to make necessary inventory and manufacturing schedules adjustments. Older systems were not accurate and speedy due to the necessity to re-enter data at a later time because the CRM system was not compatible or not seamlessly integrated with the various productivity devices such as hand held organizers, pagers and other devices.

CONCLUSION

This paper briefly touched issues related to telecommunication applications specifically VoIP use in logistics and supply chain and associated risks in security loopholes. Applications that are easily hacked and disrupted are not only risky to the organization but may increase its liability to customers whose personal information was compromised. Recent examples that made headlines such as hacking data bases with millions of credit cards account information, Veterans Affairs personnel social security numbers and other personal information, make the security threats of VoIP based systems more daunting. Software designers should make great efforts to mitigate and control such threats if VoiP technology is to be embraced for sensitive business applications such as logistics.

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DoD ARCHITECTURAL FRAMEWORK AS A BUSINESS PLANNING TOOL

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ABSTRACT

The Department of Defense Architectural Framework is the agency's implementation of an Enterprise Architecture as required by the Office of Management and Budget. It is geared towards adequately modeling military systems, and is required by the department when purchasing or developing new major military systems. It is emphasized for that use and its potential as an organizational planning, and organizational change management tool is minimized. This paper discusses its applicability and usefulness for organizational design, business process re-engineering and organizational change management purposes.

BACKGROUND

The Federal Enterprise Architecture (FEA) is required by the Office of Management and Budget (OMB) which requires that all government agencies use it to model their business lines and justify their activities and how they support legitimate citizen needs. Enterprise Architectures are often used particularly for organization change management and IT investment decisions.

The Department of Defense has implemented its own DoD Architectural Framework as the agency's implementation of a Federal Enterprise Architecture as required by OMB.[1,2] The DoD requires all major Defense acquisitions to have a minimal set of Framework products developed before proceeding to final design and large-scale procurements. The DoD Architectural Framework is recommended for a number of particular activities during major system acquisition. It is tailored to adequately model deployable systems and is not emphasized for application to the acquisition process or acquisition organizations for organization planning or organizational change management.

DISCUSSION

While the DoD Architectural Framework was developed with deployable systems in mind it is quite capable of modeling civilian acquisition organizations and should be used as such. Some may suggest that the OMB's government wide standard be used for this purpose within the Department of Defense. However since the department has already adopted it's own Framework and standard set of views compatible with the OMB standard; maintaining a single common standard within the department is most efficient and provides intuitive transition between views of acquisition and support organizations and the activities or systems they are supporting or developing. A manager of a major system acquisition can easily look at the Framework products describing the system being developed and look at the Framework products for the organization he is managing to do the development without unneeded potential for confusion.

The DoD Architectural Framework Version 1.0[1] is full of examples of potential uses, most focused on deployable systems or military operations. Within the section on

recommended uses of the DoD Architectural Framework products there are at least nineteen examples of activities where DoDAF products are recommended. Only one example addresses Organizational Design, and one Business Process Re-engineering and Functional Process Improvement; the first is 4 sentences long the second 5. Several other examples are pages long and provide discussion on how to use the products for that activity. The recently released v1.5 is similarly focused while it does expand on some of the other uses somewhat it is primarily focused on adding net centric concepts.[2] The potential application to the organizations within the DoD components that are responsible for managing purchasing or supporting DoD systems are never explicitly mentioned. Within the Navy's Naval Sea System Command (NAVSEA) these organizations are Program Executive Offices (PEOs), which are comprised of Program Management Shops (PMSs), who are supported by various contractors and field activities. A major acquisition program's organization can often be just as complicated as the system to be fielded, and needs to be set up to smoothly transition into (or hand off to) a support organization to support the system(s) once fielded.

In the DoDAF there are four sets of views that describe the architecture; the All Views, the Operational Views, the System Views, and the Technical Views. The All views are overviews that provide general information about the architecture; timeframe covered, purpose of architecture, key conclusions (if any), and definition of terms are some of the key components of the two All Views. The Operational Views (OVs) describe what needs to happen "the tasks and activities, operational elements, and information exchanges required to conduct operations." [3] The system views (SVs) expand on what role hardware or software systems play and how those systems need to behave. The two technical standards views (TVs) delve into more detail on what standards are used by the systems in the architecture to help facilitate interoperability. Views are referred to by the type of the view followed by a number. So for example the second Operational view is referred to as OV-2.

Applicable Architecture Product Data																								
Uses of Architecture Data	All View		Operational View (OV)					Systems and Services View (SV)						Tech Stds View										
	1	2	1	2	3	4	5	6	7	1	2	3	4	5	6	7	8	9	10	11	1	2		
Analysis & Assessment																								
Capabilities																								
- Gaps/Shortfalls						⊙	●							●	●									
- Mission Effects & Outcomes, Operational Task Performance	●	●	●	●	●	⊙	●			●	●				●	●				●	⊙			
- Trade-Offs	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	⊙	●	⊙
- Functional Solutions	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	⊙	●	⊙
Operations																								
- Process Re-engineering	●	●	●	●	●	●	●	●	●															
- Personnel & Organizational Design	●	●	●	●	●	●	●	●	●	⊙	⊙	⊙	⊙			⊙								
- Doctrine Development/Validation	●	●	●	●	●	●	●	●	●															
- Operational Planning (CONOPS and TTPs)	●	●	●	●	●	●	●	●	●	●	⊙	⊙	⊙	⊙									⊙	
Systems/Services																								
- Communications	●	●													●	●	●					⊙	●	⊙
- Interoperability and Supportability	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
- Evolution/Dependencies	●	●													●	●	●	●	●	●	●	●	●	●
- Material Solutions Design & Development	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
- Facilities Packaging	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
- Performance															●	●	●	●	●	●	●	●	●	●
Socialization/Awareness/Discovery																								
- Training	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
- Leadership Development	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
- Metadata (for federation)	●	⊙																					⊙	⊙

Figure 2-2: Architecture Products by Use

The DoDAF version 1.5 Figure 2-2 [4] indicates that the framework can be used for Personnel and Organizational Design. It recommends the All Views and Operational views as relevant to such efforts and that some of the system views may be applicable for that purpose.

There are two All Views. AV-1, the “Overview and Summary Information”, “provides executive-level summary information in a consistent form that allows quick reference and comparison among architectures”[5] for purchasing or supporting organizations this view would help provide easy reference between organizations that have developed similar systems to determine if another organization’s architecture is worth further investigation when designing a new organization or seeking to improve an existing organization. The AV-2, the “Integrated Dictionary”, provides definitions of terms to see if the meanings used in the architecture are the same, or as often is the case are different, than the meanings the reader associates with the terms. This view is particularly critical since names and Acronyms often have very different meaning even within related portions of the DoD.

Several of the Operational Views have sub-views or require multiple instances of the view for a complete picture of the architecture. There are seven views within the Operational Views, OV-6 has three subviews, the views and subviews describe different aspects or views of the system so that together they provide a comprehensive picture of the operation of the architecture.

OV-1 “High-Level Operational Concept Graphic”
 OV-1 is essentially a visual executive summary. “The purpose of OV-1 is to provide a quick, high-level description of what the architecture is supposed to do, and how it is

supposed to do it.” [6] When used for organizational design it would help aid people’s comprehension of the organizations function and what/who it interacts with. This would help both when trying to evaluate architecture for incorporation into your own organization, and when trying to implement an architecture.

OV-2 “Operational Node Connectivity Description”

OV-2 “depicts the operational nodes (or organizations) with needlines between those nodes that indicate a need to exchange information”. (DoDAF V1.5 Volume 2, p4-10) It essentially shows who needs information from whom, both internal to the architecture and to or from external organizations. Depending on the complexity or level of abstraction that is acceptable, multiple instances of the view may be necessary to depict all the required data needs. This view is not intended to show the details of all the information only that organization X needs some type of information from organization Y. When used for organizational design this view aids both with comprehension of the architecture and as a guide to implementing an architecture as designed. This view also helps ensure that organizations will receive all the types of information needed to perform their assigned activities. Figure 4-5 from DoDAF v1.5 (Volume II page 4-12) provides a template for this view that is annotated with what activities the organizations perform.

OV-3 “Operational Information Exchange Matrix”

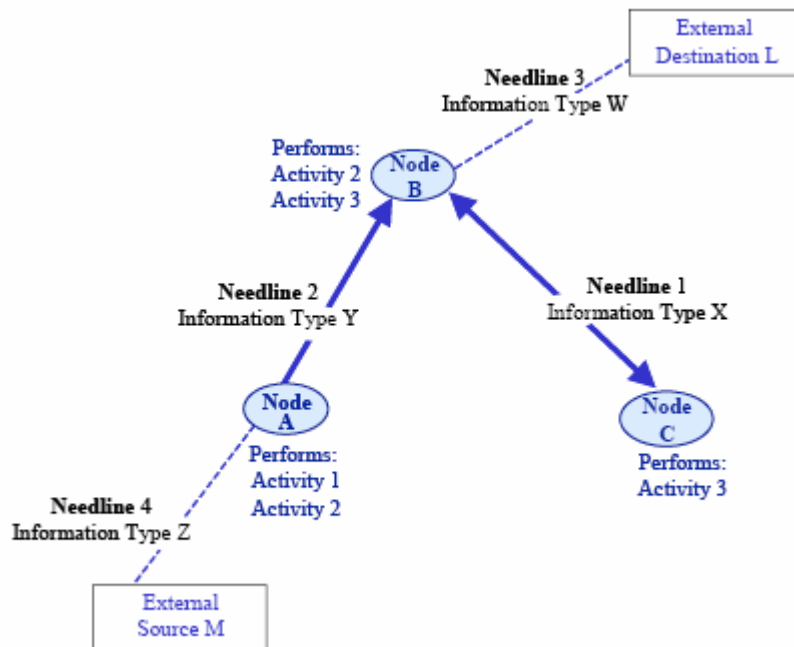


Figure 4-5: OV-2 Template

OV-3 provides more detailed information on the data exchanges in the architecture. It “details information exchanges and identifies “*who* exchanges *what* information, with *whom*, *why* the information is necessary, and *how* the information exchange must occur.” [CJCSI 6212.01D, 2006] There is not a one-to-one mapping of OV-3 information exchanges to OV-2 needlines; rather, many individual information exchanges may

be associated with one headline.” (DoDAF 1.5 Volume II, p4-24) When used for organizational design this helps the architect ensure that organizations receive all the information needed to perform their functions.

OV-4 “Organizational Relationships Chart”

“The OV-4 illustrates the command structure or relationships (as opposed to relationships with respect to a business process flow) among human roles, organizations, or organization types that are the key players in an architecture.” (DoDAF 1.5 Volume II, p4-34) When used for organizational design this view helps define decision authorities and characterize relative roles between organizations.

OV-5 “Operational Activity Model”

“The OV-5 describes the operations that are normally conducted in the course of achieving a mission or a business capability. It describes capabilities, operational activities (or tasks), input and output (I/O) flows between activities, and I/O flows to/from activities that are outside the scope of the architecture. High-level operational activities should trace to (and are decompositions of) a Business Area, an Internal Line of Business, and/or a Business Sub-Function as published in OMB’s Business Reference Model [OMB, 2003].”[7] This view describes the crucial who does what, and is needed for static analysis of an architecture to ensure that all required operations are being performed.

OV-6 “Operational Rules Model, State Transition Description, and Event-Trace Description”

The OV-6 subviews provide simulatable descriptions of the behavior of the architecture so that dynamic aspects of the architecture can be analyzed. There is no single simulation paradigm or language prescribed although some are suggested.[8] These views are key for in depth analysis to ensure that an architecture will work given the dynamic interactions between activities, whether the intent of the architecture is for organizational design or a deployable system.

OV-6a is the “Operational Rules Model”, which “specifies operational or business rules that are constraints on an enterprise, a mission, operation, business, or an architecture.”[9] It expresses what must or cannot be done.

OV-6b, the “Operational State Transition Diagram” is essentially a traditional state transition diagram that describes the states, actions in a state, events that trigger changes in states and any actions taken during state transitions in a visual format.

OV-6c “Operational Event-Trace Description” “provides a time-ordered examination of the information exchanges between participating operational nodes as a result of a particular scenario.”[10] Typically multiple instances of this view will be needed to adequately describe an architecture. It can be used to describe a critical sequence of events, or define a set of responses to particular scenario(s).

OV-7 “Logical Data Model”

“The OV-7 describes the structure of an architecture domain’s system data types and the structural business process rules (defined in the architecture’s OV) that govern the system data. It provides a definition of architecture domain data types, their attributes or

characteristics, and their interrelationships.”[11] This View is not always effective for use in an organization design or organizational change exercise, since how the data is logically organized often only has secondary impact on the organization unless there is a specific technology centered change or organization being contemplated.

SVs

There are 11 system views that can be used to expand on the “systems, services and interconnections”[12] in the architecture. While these may be of use in some organizational design or organizational change efforts where particular systems play a particularly prominent role in how the organization is structured defining them to the level required for these products is not generally necessary. For reference the 11 System Views are:

- *Systems/Services Interface Description (SV-1)*
- *Systems/Services Communications Description (SV-2)*
- *Systems-Systems, Services-Systems, Services-Services Matrices (SV-3)*
- *Systems/Services Functionality Description (SV-4a and SV-4b)*
- *Operational Activity to Systems Function, Operational Activity to Systems and Services Traceability Matrices (SV-5a, SV-5b, SV-5c)*
- *Systems/Services Data Exchange Matrix (SV-6)*
- *Systems/Services Performance Parameters Matrix (SV-7)*
- *Systems/Services Evolution Description (SV-8)*
- *Systems/Services Technology Forecasts (SV-9)*
- *Systems/Services Rules Model, State Transition Description, and Event-Trace Description (SV-10a, 10b, and 10c)*
- *Physical Schema (SV-11)*

To see how these views can be used for organizational design a quick and simple example may be helpful. If an architect wished to set up a simple organization, to procure a fictional system “POD” that is urgently needed by the Navy to carry business cards. This example shows how they might use some of the views to develop an architecture that had the necessary information to guide the setup of an organization to successfully procure the system. To simplify things a few Major assumptions are made; among others no logistics support is needed (since the system will work forever once purchased), only a fixed number need to be purchased, no major at sea test events are required, and ...

The architect would set-up an AV-1 that pictorially described Navy purchasing PODs for personnel to store business cards for later retrieval. AV-2 would be populated with any terms that had specific meaning for this architecture (POD would be the first one). OV-1 would pictorially describe the concept of how the PODs are envisioned to be purchased. We will assume that the Navy will design them and will use a detailed procurement package to have a contractor build them. OV-2 would have the organizations involved. Given the concept for design and procurement we will assume there is a program office in charge of contracting for and procuring PODs, and a field activity within the Navy that is designing the PODs. There will also be one or more contractors that build the PODs. These activities will have various types of information that needs to be exchanged. Since we have said the Program office will be doing the contracting the information need lines

will be between the requiring agency and the program office, the program office and the field activity, and the program office and the contractor. Since information is needed both ways on all of these the need lines will be bi-directional. The OV-4 for this architecture would have the Program Office as the command authority in a collaborative relationship with the requiring activity, and with the field activity and the contractor as subordinates to the program office. For the OV-5, without trying to establish the trace to an OMB business line the operational activities of the program office would be to manage the acquisition (and all that entails), the field activity to design the PODs and report to the program office. The contractor's activity would be to build and deliver the PODs and report performance data to the program office. This example is abstract and simple enough that the OVs-6 and 7 would not be worth the effort to produce. If this were more complicated then they would be produced and if it were a major acquisition using a particular set of software for the design and management then many of the SVs might be developed as well.

If the purpose of the architecture were to identify redundancies to try to cut back on costs then the OV-5 and OV-6 would be particularly useful to help identify different organizations that performed the same or similar functions. The OV-2, OV-3 or SV-6 that describe data exchanges might be useful as well to determine if the same or similar data is generated in multiple places.

Conclusion

The DoDAF can be used to architect civilian acquisition organizations and can be a useful tool in setting up and managing these organization in addition to managing the acquisition of the system.

References

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- [11] DoDAF v1.5 Volume 2, p. 4-76
- [12] DoDAF v1.5 Volume 2, p. 5-1

Related Documents

FEA reference models – available at:
<http://www.whitehouse.gov/omb/egov/a-1-fea.html>

INTEGRATING SERVICE-ORIENTED ARCHITECTURE (SOA) METHODOLOGY INTO INFORMATION SYSTEMS CURRICULA

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Service-Oriented Architecture (SOA) is being adopted aggressively by business firms. SOA is defined as an enabling framework for improving business processes for competitive advantage. The complexity of SOA as a technology creates however a challenge in attempting to define an approach to deployment in firms. This workshop defines a practical program management methodology to address the complexity and the frequent hype of SOA. The methodology is defined in frameworks of best practices for participants on projects of SOA, which distinguish the methodology from established project management methodology, and is discussed from lessons learned in case studies in industry. This workshop will benefit instructors attempting to educate students on the complexity of the technology behind SOA and will introduce a foundation for syllabi on SOA that can be integrated into an information systems curriculum.

EXPLORING INDIVIDUAL DIFFERENCES AND SPONTANEOUS CHANGES IN JOBS

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ABSTRACT

This paper explores the concept of spontaneous, unsupervised changes in jobs (job crafting), in general, and the relationship of the qualities and magnitude of the changes to the individual characteristics of: cognitive ability, self-image, perceived control, and readiness to change. Job crafting relates to individuals at work, in any level of an organization, who knowingly make unsupervised changes in their jobs. This study adds to the research base of what is called job crafting as examined in the seminal work of Wrzesniewski and Dutton (2001). In this exploratory study of 58 outside salespersons we find that more than 75 per cent report engaging in job crafting in various forms. Positive, significant correlations are found between episodes of work modification and the variables of self-image, perceived control, and readiness to change.

INTRODUCTION

This study seeks to augment the developing body of research regarding what is known about individuals at work, at virtually any level of an organization, who make unsupervised, spontaneous changes in their jobs. The actions, processes and outcomes pursuant to the behavior are contained as an *episode* and the episode is labeled job crafting. Changes made in jobs are not uncommon, however, the changes, or job crafting, that are the subject of this paper are spontaneous changes made by individuals to satisfy their own, personal needs and not necessarily the needs of the organization.

As presented in this study, job crafting represents work and job change that is largely hidden from management and does not include management in decision making. That is, employees are choosing to engage in shadow job re-design that may or may not run counter to what management desires. The job changes employees make are initiated solely for their own purposes. More information about the characteristics and dynamics of job crafting will help managers learn about behavior that might either advantage or disadvantage the organization as well as other employees.

FOCUS OF THE STUDY

The seminal work of Wrzesniewski and Dutton (2001) did much to define and examine job crafting behavior. Their work offered many examples of job crafting from their own experience and the experiences of others as represented in the literature. Little empirical evidence has been associated with job crafting with regard to its frequency, and magnitude; the forms that it takes, and the individual needs and motivations that may propel this behavior. The important questions or issues that this study addresses are: (1) what are some of the quantitative and qualitative dimensions of job crafting activity in a sample of outside salespersons; (2) what forms does job crafting take in the particular context studied, (3) and, do certain individual characteristics, in this case the four variables of cognitive ability, self-image, perceived control, and readiness to change, demonstrate some relationship with actual job crafting behavior? The four variables are derived or interpreted from the work of Wrzesniewski and Dutton (2001) and the work of others (see below) that help to explain the motivations or antecedents of individuals engaged in actual job crafting behavior. In this exploratory study the variables serve as a starting place to examine the dynamics of job shaping.

From the point of view of a manager, it would seem that employees who possess the individual characteristics of positive self-image, demonstrate substantial cognitive ability, believe they have control over their work and jobs, and who demonstrate a readiness to embrace change, are normally regarded as valued human assets in the organization. At the same time, the characteristics may be regarded as possible antecedents of job crafting behavior. For example, employees with positive self-image, substantial readiness for change, and so forth, may be more predisposed to engage in job crafting behavior. As mentioned above, there is very little empirical evidence available regarding samples of employees that offers information on the dynamics of job shaping, hence the motivation for this paper.

Expressed in detail later in this work are the hypotheses of the study. We desire to demonstrate that job crafting, as defined, does occur and in a sample of employees the quantity, forms, magnitude and dynamics of the behavior can be demonstrated in meaningful ways.

There are several practical implications of this research. First, it is helpful to examine, empirically, the notion that job crafting behavior does, in fact, take place. Second, it is desirable to have some indication of the quantity and characteristics of the behavior as well as information concerning the forms the behavior takes as this information would likely add credibility to the concept and support theory-building. Finally, it should be valuable to assist managers to learn if employees are likely to engage in this somewhat creative behavior. Many managers desire that employees be creative, receptive to changes, and the like, however, it is unlikely that managers desire that creative changes in jobs and work activity be enacted without their knowledge or approval.

BACKGROUND

In their work, Wrzesniewski & Dutton (2001, p. 179) define job crafting as, ". . .the physical and cognitive changes individuals make in the task or relational boundaries of their work" There is the aspect of modifying the cognitive, relationship 'doing' part of a job purely for affecting performance and results. There is also the component that relates to one's identity with the job, that is, the relationship of one's self with the job. Part of a person's social identity is shaped by work (Brief & Nord, 1990; Ashforth & Kreiner, 1999; and Tausky, 1995). Modifications in the work may be initiated so that the individual's perception of work may be changed. Hence, the presumed identity of self may also be changed.

Work and job design are part of the responsibilities of management. Job crafting, as presented in this study, represents work and job design that is largely hidden from management and does not include managers in decision making. If management becomes sensitized to job crafting behavior the knowledge attained may lead to more efforts to control employee behavior. In some work environments additional control may lead to employee perceptions of being micro-managed, closely supervised, and so forth. Among some employees, these perceptions lead to decreased morale and lower job satisfaction (Manz & Sims, Jr., 1987).

The study of job crafting is beset with definitional and methodological challenges. On the definitional side, it is important to develop some boundaries regarding what behavior qualifies as job crafting. A useful definition or classification system would contain some objective means of discriminating among numerous behaviors so that different observers could agree on what was included as job crafting and what was not included. This may assume that some general or universal definitions or classes of the behavior could become understood and known. In the Procedures section of this paper is the presentation of a classification of the behavior, bounded by the actual work content of the study participants. The procedures used in this study to attach characteristics, bounds, and ultimately, definition, to the behavior-in-practice help establish both content and context validity for the behavior called job crafting.

We then have the issue of context or place. Some types of jobs, some job venues, and some organizations, other things being equal (e.g., interpersonal dynamics), will offer opportunities, invitations, and incentives to employees to modify their jobs. For example, the very nature of the job and the level and amount of direction and/or supervision received may influence the likelihood of job crafting activity taking place as employees perceive opportunities to make changes.

There is considerable evidence to demonstrate that job crafting does occur (Amabile, et al., 1994; Ilgen & Hollenbeck, 1992; Wrzesniewski & Dutton, 2001). While a general definition of the concept is understood, there are few known particulars regarding frequency, type, and motivation regarding the activity. In general, the same thing can be said about the effects of the job changes, that is, little is known regarding the consequences or effects of the changes. There is some information available to suggest that job crafting behavior is often thwarted by managers (see Schmoker, 2004). In a recent, exploratory study, Lyons (2006) examined self-reports of a sample of employees in the same job classification. He found that 74 per cent of the employees studied engaged in job crafting episodes. In addition, the episodes could be categorized into several discrete forms, and that 79 per cent of the sample believed they had the opportunity to modify their jobs in substantive ways. The same study reported that a measure (Krishnan, et al. 2002) of individual competitiveness correlated .53 (p value .001) with quantity of job crafting episodes.

THE IMPORTANCE OF SELF-INITIATED CHANGES IN JOB

If positive outcomes are achieved as a result of job crafting, then the encouragement and/or reinforcement of job crafting could be desirable. There is some research supportive of this idea. For example, Conti & Warner (2002) propose a model that encourages work that maximizes the use of the worker's judgment, knowledge, creativity, intelligence and initiative so that customer's needs are best served. Some of the studies of the concept of empowerment of employees such as those of Wellins, et al. (1991); and Pearson (1992); are supportive of these ideas.

However, if changes in jobs were not aligned with organizational objectives or were hostile to organizational objectives and manager needs, then the job crafting activity could become a problem for the organization, work groups, and other employees. Wrzesniewski and Dutton (2001) repeatedly state that job crafting is not necessarily performed in the service of the goals of the organization. Yet, virtually all of the examples of job crafting they cite make it clear that positive changes in performance, and other benefits to the organization accrue. They cite studies of several different occupational groups (hospital cleaners, hairdressers, design engineers, nurses, information technicians, and professional restaurant cooks) whose changed jobs benefited not only the employee by way of job satisfaction, work identity, or relationship-building, but benefited the organization as well through the provision of better services (quality & quantity), enhanced process improvements, and/or products. The exploratory study of Lyons (2006) reinforces these findings. In that study, all job crafting episodes reported were in the service of job or organizational goals and values. This is not surprising for obvious reasons.

This last point demonstrates one of the substantive difficulties of research of the type done in this study. It seems reasonable to assume that as employees self-report their experiences regarding the modification of their jobs, it is not likely that they are going to report how they shaped their job in ways that benefit them, personally, but that diminished their productivity or performance in terms of what management and the organization expects.

Adjunct to these interpretations and depending on intention and/or outcomes of job crafting, the result of the behavior could represent organizational citizenship as exemplified in the work of Podsakoff, et al. (2000). Further, behavior that leads to some work/job modifications may help an individual to accept other, or cope better with less desirable aspects of their work activities that are not readily open to job

crafting. If enhanced self-efficacy (see Bandura 1986; 1997) is part of the result or payoff of job crafting, then individual motivation may be improved. This relates especially to intrinsic motivation such as feelings of greater responsibility, achievement, or competence, as the individual believes that they are more capable, competent, or skilled, and have greater value as an employee and as an organizational participant.

Previous Research

In practical terms, there has been little empirical research directed at the crafting of jobs or work by employees. Of the research that does exist, much of it is of the observational - anecdotal variety where individuals in different organizations in various jobs were observed as they went about their normal job duties. Other research has relied on interviews of employees where specific questions were asked about job duties, changes in duties, and special initiatives to change work practices. This research is represented in the work of Benner, et al. (1996); Cohen & Sutton, (1998); Fine (1996); Fletcher (1996); Jacques (1993); and Morrison and Phelps (1999).

These studies have clearly demonstrated that job crafting does, indeed, take place and it usually takes place without the knowledge of managers or others. What has not been given much attention in the literature is the extent to which job crafting takes place in terms of frequency, type, magnitude of changes in work, and the like. Empirical research regarding the antecedents and/or individual personality characteristics relating to job crafting is practically non-existent. Further, research that has examined employee-initiated job crafting normally assumes that only employees in jobs that offer them substantial autonomy will be able to make job modifications (Ilgen & Hollenbeck, 1992; Staw & Boettger, 1990).

There is research on job design and work design and that research is focused on the actions of managers who initiate task and job changes to meet some particular need or deficiency (see, for example, Hackman & Oldham, 1980; Lyons, 2005). This research views the employee primarily as one who is acted upon and stimulated by management to work in different ways. Job crafting takes the point of view that it is the employee who is the primary actor who decides to make changes in work. In essence, the employee re-frames the job (Tausky, 1995; Ashforth & Kreiner, 1999). And, as Wrzesniewski et al.(2003) point out, this may be only part of the picture as nearly every person engaged in work is interacting with other people (e.g., customers, subordinates, co-workers) and the relationships help to form the social fabric, context, and content of the job. The interpersonal relationships help to mediate the individual's meanings of work.

As mentioned earlier in this paper, through the analysis of the literature of change at work represented in the research of Bandura, 1997; Benner et al., 1996; Fine, 1996; Ilgen and Hollenbeck, 1992; Lyons, 2006; Morrison and Phelps, 1999; Tausky, 1995; and Wrzesniewski and Dutton (2001), four forms of individual behavior seem to have particular relevance for job crafting activity. They are the four characteristics of cognitive ability, self-image, perceived control, and readiness to change. Analysis indicates that these characteristics of individual behavior may demonstrate some relationship with actual job crafting behavior and may help to explain some of the motivations of the actual job shaping behavior. In this exploratory study the characteristics serve as a starting place to examine the dynamics of job shaping.

Hypotheses

In the following paragraphs we attempt to do two things: (1) examine the self-reports of a sample of employees to help create baseline information regarding the existence, frequency, type, and other characteristics of job crafting activity; and (2) examine relationships among employees' job crafting activities and measures of the four variables of interest (see above). The following six hypotheses are examined:

- (1) In the context and position (job) selected for study, most employees will report initiation of job crafting behavior.
- (2) More than one form or type of job crafting behavior will be evidenced.
- (3) The greater the amount of job crafting behavior/activity, the greater one's cognitive ability.
- (4) The greater the amount of job crafting behavior/activity, the more positive the expression of one's self-image.
- (5) The greater the amount of job crafting behavior/activity, the greater the expression of perceived control over one's work.
- (6) The greater the amount of job crafting behavior/activity, the greater the expression of one's readiness to change.

METHOD

Interview surveys of job holders will ascertain: (1) if they engage in job crafting behavior that is self-initiated and not related to any direction from management, (2) how frequently such behavior occurs, (3) what forms the actual behavior takes; and (4) how participants perceive their opportunities to engage in such behavior. Regarding the interviews, a "scoring" template was created to quantify and categorize various behaviors that, taken together, represent job crafting.

Participants

The participants in this study are 58 sales representatives of a large, consumer products firm. These participants are outside sales representatives who work in various districts in a seven-state area in the Northeast and Middle Atlantic sections of the U.S. Most of their time is spent making sales calls on business, government, and other organizations. For the most part, they work with little direct contact with other organization employees. The original sample size of participants was 63; however, owing to special assignment and training, illness and other factors, complete data was available for 58 members of the group.

These particular employees were selected for this study for several reasons: (1) they all do the same, general type of work, (2) they work for the same firm and are subject to the same job requirements and conditions, (3) they were available as they are participants in a larger, longitudinal study about motivation and performance, and (4) they were selected for this study because it is assumed that as independent, outside salespersons they would have considerable opportunity to modify their jobs.

Details of the group: Men 47 (81%), Women 11 (19%); Racial composition: Asian 2 (3%), African American 6 (11%), White 50 (86%); average age of the entire group was 32 years, and average number of years working with the organization was 6.8 years. All of the participants held a college degree with 6 of the group of 58 with a community college degree; the majority had a B.A. or B.S. degree.

Procedure

Each member of the study group was interviewed, individually, using a structured interview format. None of the interviews lasted more than 75 minutes. Each member interviewed agreed to participate in the study and completed (executed) a consent form to that effect. Study group participants were assured that data analysis would consider the information they provided in aggregate only and that no individual's information would be revealed in the study's findings or results. All of the interviews took place in the spring and summer of 2005.

The same, trained interviewer conducted all of the interview sessions. A set of questions was used in a sequence of events methodological approach. This is the general approach taken by Herzberg (1957) and his associates in the research that demonstrated the two-factor theory of job satisfaction. The interviewer was trained to take notes of the interviews. Tape recording of interviews was completed as well. The notes of the interviewer were copied; the tape recorded interviews were transcribed. Once data analysis was completed, the tape recording and a copy of the recorded notes were given to each study participant. The details of the procedure are expressed in the following paragraphs.

Each one of the study participants was asked to tell a brief story of a time, within the past year, when:

(1) They initiated and made some adjustment, change, modification in their work activity that was not part of any formal specification or prescription of how their work should be done nor part of any training or from any direct supervision received regarding work performance. The change could be of any type, size, scope, and so forth, however, in their minds the change should represent a substantial influence on their work activities.

(2) Assuming the positing of substantial influence (above), participants were asked what form did the change take, that is, what actually took place in the change? What was done and why was it done? and, continuing,

(3) When having made such a change, how much effort went into the change; how long did it take; what was the level of interest in doing this; in personal terms, how do they evaluate or rate the interest they had in making the change; and how did they perceive the value or importance of the change in adjusting their work? and, continuing,

(4) Finally, whether any changes were made or not, how did they view or perceive their opportunity, their "chance" to make any changes at all in the work. Do they perceive some freedom or autonomy to engage in job change activity?

A team of two human resources professionals (team) that did not include the interviewer reviewed all of the transcribed content and written notes of the interviewer and identified each job crafting episode reported by each participant. A total of 11 participants (19 %) did not offer a single job crafting episode. The team segregated all interview material into job crafting episodes and applied ratings on several domains to each episode. This effort yielded information per each domain (a-g) that follows.

a. Individual, discrete episodes of job crafting with a particular focus or content that participants said were self-motivated and not stimulated by management;

b. A quantity of job crafting episodes,

c. A rating of the magnitude and/or complexity, or "reach" of the specific change. The rating would be low = 1, moderate = 3, or high = 5;

d. A rating of the employee's interest in making the specific change with ratings of low = 1, moderate = 3, or high = 5;

e. An estimate of how many hours it took to fully execute and evaluate or assess the efficacy of the change with ratings of 1 = less than 10 hours, 3 = 11 to 20 hours, and 5 = more than 20 hours;

f. A rating of the employee's perception of the value or importance of the change in relation to their work activities with ratings of low = 1, moderate = 3, or high = 5;

and

g. An estimate of the perceived opportunity to craft one's job represented as: no opportunity = 0, slight opportunity = 1, moderate opportunity = 2 and great opportunity to shape the job = 3.

For each employee in the sample we have evidence of job crafting activity or no activity, the nature of the change, the content or focus of the change, and ratings concerned with magnitude of, interest in, time to execute, and value of the specific change. Also, we have an estimate of one's opportunity to engage in the job crafting behavior. The ratings for items c, d, e, and f, above, are summed per each job crafting episode and we arrive at a "score" for the particular episode that may range from 4 to 20 points. An employee who reports three job crafting episodes may attain a combined score of from 12 to 63 points. Hereafter in this paper we refer to an individual's total score across all episodes they report as the *combined score*. Additionally, the team was required to achieve agreement on all episode classifications, ratings, and combined ratings. In essence, this scoring offers a quantitative and qualitative representation of the individual participant's job crafting effort. The team also classified each job crafting episode by general content area. This task required considerable time and effort. The codings of episodes by the team into content areas had average interrater reliability of .81.

Using a modified Q-Sort methodology (Brown, 1993), a different group of three individuals trained in Q-Sort methodology sorted the episodes by content type of each job crafting episode reported. This was a most important task as it identifies the specific content of the changes enacted by the participants, as well as their goals. This effort yielded interrater reliability of .89 per the original content classifications established (see paragraph above). No third-party effort was made to determine the effectiveness of the reported job crafting efforts for purposes of this study.

An earlier section of this paper (see, Previous Research) explained that an analysis of relevant literature suggested that four different individual characteristics were central to understanding some of the individual dynamics and motivation involved in decisions to modify one's job. They are: cognitive ability, self-image, perceived control, and readiness to change. Each study participant completed four measures representative of these characteristics. The details of the four measures follow.

COGNITIVE ABILITY - The Raven Advanced Progressive Matrices Test [APM] developed as a measure of Spearman's general intelligence factor *g* is a relatively efficient way to measure cognitive ability (see Paul, 1986). In this study we use a short form of the APM, found comparable to the long form, as developed by Arthur & Day (1994). Cronbach's alpha was .74.

SELF-IMAGE - We used the global self-image scale developed by Winstok & Enosh (2004). Usually, self-image as a global concept is a representation of self by oneself in terms of positive or negative quality. It is an attitude towards oneself that takes into account opinions, values, and facts, as well as unfavorable and favorable orientation. The scale prepared by Winstok & Enosh (2004) has a Cronbach's alpha of .80.

PERCEIVED CONTROL - With sample items such as: "How much control do you have over how your work is evaluated?", and "How much control do you have over the variety of methods you use in completing your work?", we used the 22-item instrument developed and validated by Dwyer & Ganster (1991). The items have a 7-point response scale that ranges from 1=very little to 7=very much. For this scale Cronbach's alpha was .92.

READINESS TO CHANGE - We used a scale developed by Frese & Pluddemann (1993) that measures

one's preference for jobs that allow or permit the change of routines. There are five items, such as "I like it when work changes often and quickly", and Cronbach's alpha, on average, is .69. All study participants completed the four measures.

RESULTS

Job Crafting

We identified a total of 86 separate and distinct job crafting episodes for the sample of 58 outside salesperson study participants. The total represents an average of 1.48 episodes per person. This is consistent with the findings of Lyons (2006). Of the episodes reported and classified, 12 participants (21 per cent) reported no episodes, 17 (29 per cent) reported one episode, 16 (28 per cent) reported two episodes, and 13 (22 per cent) of participants reported three or more episodes. Again, the participants were asked to recall episodes that had taken place over the past 12 months. In sum, 41 or 79 per cent of the participants report one or more job crafting episodes that were judged by the interviewers and classifiers as substantive and worthy of being identified in the study.

This provides both face and rational validity for the behavior. Inter-rater reliability for the interviewer and for classifier judgments of the episodes was at least .77. The self-reporting of episodes supports Hypothesis 1 as a majority (79 %) of study participants did report the initiation of at least one job crafting episode.

As mentioned above in the Procedures section, three individuals then used the Q-Sort method to place the episodes into categories. The task was performed twice to be sure that the consensus "votes" for category placement was accurate and complete. There were 86 distinct episodes to categorize and the episodes were finally categorized into five groups. The titles for the categories represent a consensus of the study author, the interviewers, and the individuals who performed the final sort of data. Below, in Table 1 we identify each category group, the number of episodes per category, and an example of an episode for each category.

Table 1
Categorizations of Job crafting Episodes

Category of Job crafting	Number per Category	Percent of Total	Examples of Behaviors
Personal Skill Develop. Development	24	28	Deciding to learn basic Spanish
Task Function	19	22	Expanding demo material on hand
Advancing Relationships	17	20	Visit more persons on site visits
Tactics Choices	16	19	Create reading program of books, magazines, etc. to locate novel sales methods
Maintaining Relationships	10	11	Guarantee contact with actual purchaser
86		100 %	

In viewing the overall content of the five categories, above, nearly all of the episodes focused on improving and increasing sales, gaining customer confidence and appreciation, and setting the stage for future sales and relationship building. There was some evidence of building personal relationships with those purchasers or potential purchasers with whom the study participants had built a relationship based on factors other than business matters (for example, vacation plans, the war in Iraq, sports). The categorization, above, supports Hypothesis 2 as distinct forms of job crafting behavior are identified by study participants and by independent raters.

Other than the four ratings areas (see, Procedures, above) that contribute to the combined score for each study participant engaged in job crafting, the remaining variable to receive attention in the job crafting component of the results was that of opportunity to engage in personally-initiated changes in the job. The stimulus questions asked of the study participants were: "Do you believe or perceive that you have had the opportunity to make some modifications in the work that you do?" "That is, if you decided that you could make improvements in what you do with regard to things like product knowledge, service to your customers, and such things, do you feel that you have the latitude to make changes in what you do, on your own, without anyone else's knowledge or approval?"

Responses to this line of questioning yielded results as: 12 (21 per cent) reported that they had virtually no such opportunity to modify their work. These subjects were all of the group that chose not to report any episodes; 12 (21 per cent) reported that they perceived they had a slight opportunity to make changes; 25 (44 per cent) reported that they believed they had moderate opportunity to make changes in their work, 9 (14 per cent) said they perceived great opportunity to modify their work, and many subjects in that group (n=6) said that they believed they had a responsibility to make positive changes in what they did on the job to improve sales, relationships with customers and their own income through sales commissions. We offer these details in Table 2.

Table 2

Perceived Opportunity to Shape One's Job

Perceived Opportunity to Shape Job	Number of Subjects	Percent of Total
No Such Opportunity	12	21
Slight Opportunity	12	21
Moderate Opportunity	25	44
Great Opportunity	9	14
	58	100 %

Relationships Among Variables

Intercorrelations were calculated among the variables: combined score and cognitive ability, self-image, perceived control, and readiness to change. These relationships are shown in Table 3.

Table 3

Intercorrelations Among Variables and Descriptive Statistics

VARIABLES	1	2	3	4	5	Descriptive Statistics	
						Mean	SD
1. Combined Score	1.00	.11	.31*	.38**	.41**	31.58	15.90
2. Cognitive Ability		1.00	.09	-.12	-.19	6.54	1.98
3. Self-Image			1.00	.42*	.13	35.11	12.98
4. Perceived Control				1.00	.17	88.12	36.29
5. Readiness to Change					1.00	16.84	6.02

* significant at the .01 level
** significant at the .05 level

Combined score is based on the amount of job crafting activity presented by the subject as well as the sum of the panelist's ratings of each of the subject's reported episodes on magnitude/complexity of job change, subject level of interest in making the change, time needed to execute/assess the change and perceived value of the change. Intercorrelations among these five ratings yielded no significant results.

As Table 3 demonstrates, combined score correlates significantly and positively with self-image, perceived control, and readiness to change. The correlation of cognitive ability and combined score is quite low thus hypothesis three is rejected. Hypotheses four, five, and six are supported as self-image, perceived control, and readiness to change are significantly and positively correlated with job crafting behavior/activity. Three of the four variables identified as generally representative of individual characteristics are positively related to job crafting behavior. This is encouraging for this exploratory work.

Regression analysis with combined score regressed on the four variables (cognitive ability, self-image, perceived control, and readiness to change) yielded an R² (adjusted) of 14.6 per cent, hence the prediction model does not account for a large amount of variance. The t-test for the variable, readiness to change, had a probability value of .01. None of the other variables reached this level or the .05 level. ANOVA results in an F of 5.12 and a p of .005.

DISCUSSION AND CONCLUSIONS

Within the context of a group of outside salespersons [n = 58] as the participants of this work, this study seeks to learn of: (1) the frequency of job crafting behavior over a 12-month period, (2) the forms that the job crafting behavior takes, (3) the perceived opportunity to job craft as reported by study participants, and (4) how four characteristics related to individual differences are related to job crafting activity. The paragraphs below address each of these areas. Earlier research (Amabile, et al.,1994; Ilgen & Hollenbeck, 1992; Wrzesniewski & Dutton, 2001) has demonstrated that job crafting does take place in some job categories and in some organizations.

Our study participants are assumed to have considerable control over their tasks, duties, and time owing to the nature of their jobs. Job crafting episodes arise from individual differences, needs and/or interests

of employees to make changes in their jobs (Wrzesniewski & Dutton, 2001). Although beyond the scope of this paper, the substantial question arises as to the precursors or dominant antecedents of job crafting behavior. This is a topic for future research. The present study is exploratory in nature and seeks to discover some fundamental or baseline information that helps define some of the parameters of job crafting behavior.

Several limitations characterize the study. The sample size is small, the data reported was entirely of the self-report type and there is no easy means to seek verification of the behavior reported unless a particular change has been documented or carefully observed in some way. The focus is on the individual's perspective and not on the perceptions of others (external) or on other, objective evidence. The approach may be regarded as somewhat open-ended and consistent with a grounded theory approach suggested by Strauss & Corbin (1998) whereby the study is concerned with generating as many categories of outcomes as possible. Finally, while we asked study participants to recall job crafting events of the past 12 months, it is likely that many potential events were lost to memory or could not be easily recalled; hence the self-report approach likely contains some recency errors.

The Q-Sort technique is subject to the limitations of the individuals sorting the data and the conventions they use. The translation of the interview information to data elements may contain some language, perception and/or assigned meanings vagaries. These matters reside in research of this type and are not easily controlled although significant efforts were made using redundant categorizations to control the variations. This methodological redundancy, while labor-intensive, adds to the credibility of episode discovery as well as categorizations of episodes. Hence, this particular approach is a strength of the research methodology, and, by itself, could be a suitable or desirable focus of future research.

The Occurrence of Job crafting Behavior

The data clearly signal that job crafting takes place in the sample chosen for this study. Seventy-nine per cent of the sample members report at least one job crafting attempt. And, of the members that reported 3 or more episodes, the average number was 3.2 episodes. This finding clearly supports other research (Amabile, et al.,1994; Ilgen & Hollenbeck, 1992; Lyons (2006); Wrzesniewski & Dutton, 2001) that reports the existence of job crafting behavior. Given that this finding is based on self-report data that covers a period of 12 months, it is likely that some sample members failed to remember some of the efforts they may have attempted in order to modify their jobs.

The Frequency of Job Crafting Behavior

With the instructions given the study participants that limit the reported episodes of job crafting to the last 12 months, we have a mean episode rate of about 1.5 episodes per the entire participant sample. This compares favorably to the research of Lyons (2006). Some participants report no episodes while others report several episodes. Some of the variability in response could be owing to the perception of the study participant with regard to the instructions (questions) that define and explain job crafting. Although the interviewers were trained to repeat, re-frame, explain, and reinforce the critical issues pursuant to the desired information, it may be that several participants did not perceive some of their job crafting behavior previously engaged in as significant or material enough to report.

Forms that Job Crafting Behavior Takes

The labeling of categories of forms that job crafting takes is supported by the interpretation and subsequent achievement of consensus by the team that performed the Q-Sort. Regardless, the actual titles used have some element of arbitrariness about them. For purposes of this research, we assert that the

categories of job crafting identified are reasonable given the nature of the work performed and the sample size.

Similar to the findings heretofore identified, we find that a considerable amount of the reported job crafting does occur in the functions and relationships domains. It may be very difficult to parse the task function behavior and the skill development behavior further. Skill development may enhance task functioning and vice-versa. It is interesting that the skill development category received the greatest response. This would seem to complement the idea that these sales representatives are nearly always left to their own devices to improve their skills and performance, although they do receive sales training frequently and have access to a large variety of on-line and other forms of sales training support and education. Taking initiative is required for success in this line of work. This assertion is reinforced in Lyons (2006) in which persons engaging in job crafting behavior were found to be highly competitive and aggressive.

Considering all job crafting episodes reported, the ones in the categories of relationships (advance, maintain) demonstrated the most consistency in definition and explanation. Task functions, skill development, and tactics episodes explanations were quite varied and showed little in the way of themes or patterns. The relationships definitions were much more highly focused on the details of visits and contacts. One interesting finding in this sample was that practically none of the examples in the category of skill development was related to skill development in the relationship-building domain.

In reviewing the range of job crafting episodes reported it is encouraging that virtually all of the episodes reported focused on performance improvements that seemed to benefit the customer, the sales representative, and/or the company. Not one, self-serving, contra-employer episode was offered by the study participants. This is encouraging. Of course, the study participants may simply have avoided telling stories that may have revealed a more self-serving nature. We may assume that job crafting episodes of the self-serving variety or those of a nature that do some level of harm to customers or the firm are clearly in the minority of all job crafting behaviors. If this is the case, then it might be in the interests of organizations to offer employees more latitude or opportunity to engage in job crafting behavior. These particular findings generally mirror the seminal work of Wrzesniewski and Dutton (2001) in which practically no self-serving or employer-damaging episodes were discovered.

Perceived Opportunity to Engage in Job Crafting

Findings in this area are somewhat confusing. An important assumption in this study was that outside sales representatives would be employees with great opportunity for job crafting owing to the fact that they received practically no direct supervision once they have received their initial training and moved beyond their probationary employment period. And, to add to this assumption, we believed that the individuals represented a relatively high level of entrepreneurial spirit; that is, commissioned sales staff who could benefit directly from efforts to improve their situation with customers. Yet, only 14 per cent of the sample reported that they had a substantial opportunity to make changes in their work (see Table 2). Another 42 per cent said that they had no opportunity or slight opportunity to make changes. In the future, we would need to find different means to assess the matter of opportunity as the gradations used in this study may be too coarse to render meaningful distinctions.

Relationships Among Variables and Job Crafting Behavior

Three of four characteristics selected for the study (self-image, perceived control, and readiness to change) correlated positively and significantly with amount and characteristics of job crafting behavior as the behavior is represented by the combined score (above). One characteristic, cognitive ability, presented

a weak correlation. With one exception (perceived control and self-image), the four variables do not correlate highly with one another. This is somewhat encouraging as the finding lends credence to the conclusion that these different aspects of individual differences are largely independent of one another and they are highly correlated with job crafting behavior. As mentioned earlier, there is scant empirical evidence to rely upon regarding which features of individual characteristics are closely linked with job crafting. This study provides some useful baseline information that heretofore has not been disclosed by the extant literature. The results of this study help to set the stage for further research regarding which additional predispositions, values, attitudes, and qualities may be substantially related to job crafting behavior.

The idea of what might serve as moderators of job crafting behavior is stimulated by these findings as well. For example, the relationship of job crafting behavior to different performance outcomes could be examined using many different characteristics such as organizational citizenship behavior (Podsakoff, et al. 2000), optimism, initiative, perceptions of self-efficacy, and locus of control as moderators. Study of whether job crafting behavior represents a coping behavior or a performance strategy could be helpful, also.

Implications for Management Practice

Aside from individual differences and interests, some jobs, tasks, and/or work contexts may tend to encourage job crafting behavior more than others. This study and others mentioned earlier in this article clearly demonstrate that job crafting does occur. It seems that job crafting as reported by participants in this study and others (Wrzesniewski & Dutton, 2001; Lyons, 2006) consistently results in improvements in work behavior and performance outcomes most of the time. It is reasonable to expect that many, if not most, workers that are not very closely monitored per human or electronic means, engage in job crafting of some type and that the results of these efforts, *as reported*, are positive.

Job crafting is a type of emergent behavior that may be the result of any of a variety of or combination of stimuli. In organizations that embrace low-hierarchy and have relatively flat structures, we may expect job crafting to take place. Managers in organizations such as these are thus forewarned to anticipate job crafting behavior.

Performance evaluations are often based, in part, on job functions being performed in specific, known ways. When jobs are secretly altered, the evaluation system is not as well matched or as synchronous with the expected work activities. A measurement gap has been created as the system is not likely sensitive to the changes. Individuals in similar jobs no longer may be subject to the same measurement yardsticks because some job holders have modified their work. Some employees may be personally advantaged by the changes they have wrought in their jobs in terms of results attained. By default, other employees may be somehow disadvantaged.

Managers and other employees may regard job crafting as a clandestine, end-run around the existing management system. Some managers may react negatively to such initiatives, regardless of outcomes if the activity is perceived as a challenge to authority, and is not perceived as a type of continuous improvement or personal initiative. Most experienced managers have probably engaged in job crafting of sorts themselves. It is not likely a foreign concept for many of them. Anecdotally, we learned that many managers can report on some employee they know who, on their own, found a way to make some substantive alteration in their work that resulted in efficiencies and/or other improvements for the organization, the boss, customers, and the individual, herself. Intuitively, we know that people do make adjustments in how a thing is done. Many firms and managers encourage and may expect such behavior so long as the results are positive for critical stakeholders.

Management and individual managers normally have responsibility for task and job design. The secretive modification of presumably standard work processes and procedures may deprive management of useful information that could serve the interests of the business. We have no information to suggest that at any of the firms in which job crafting activities were studied were direct incentives offered to employees for ideas, suggestions, and tips for work improvements. Providing such incentives, assuming the incentives are reasonably attractive to most employees, may be one way to encourage workers to share the results of their job crafting efforts, or their ideas about how to initiate useful changes.

In conclusion, this study provides some baseline information about job crafting that heretofore has been absent from the literature. Within the confines of the sales context chosen for this study, we have given some bounds to the concept of job crafting to include its occurrence, frequency, forms it takes, and perceived opportunity to engage in job crafting. Other research has pointed to the existence of these behaviors but has not provided much information to help with comparisons among employees, groups of employees, and comparisons among different job settings. Using the available literature on the job crafting concept we have isolated and examined four variables representing individual differences of employees and we have found that three of these variables, self-image, perceived control, and readiness for change are related to actual job crafting activity. These variables are important in the understanding of the impetus for engaging in the behavior. That is, job crafting seems to help individuals to feel better about themselves and to enable them to perceive they have more control over what they do on the job. Further, the activity offers individuals an outlet for their desire to make changes.

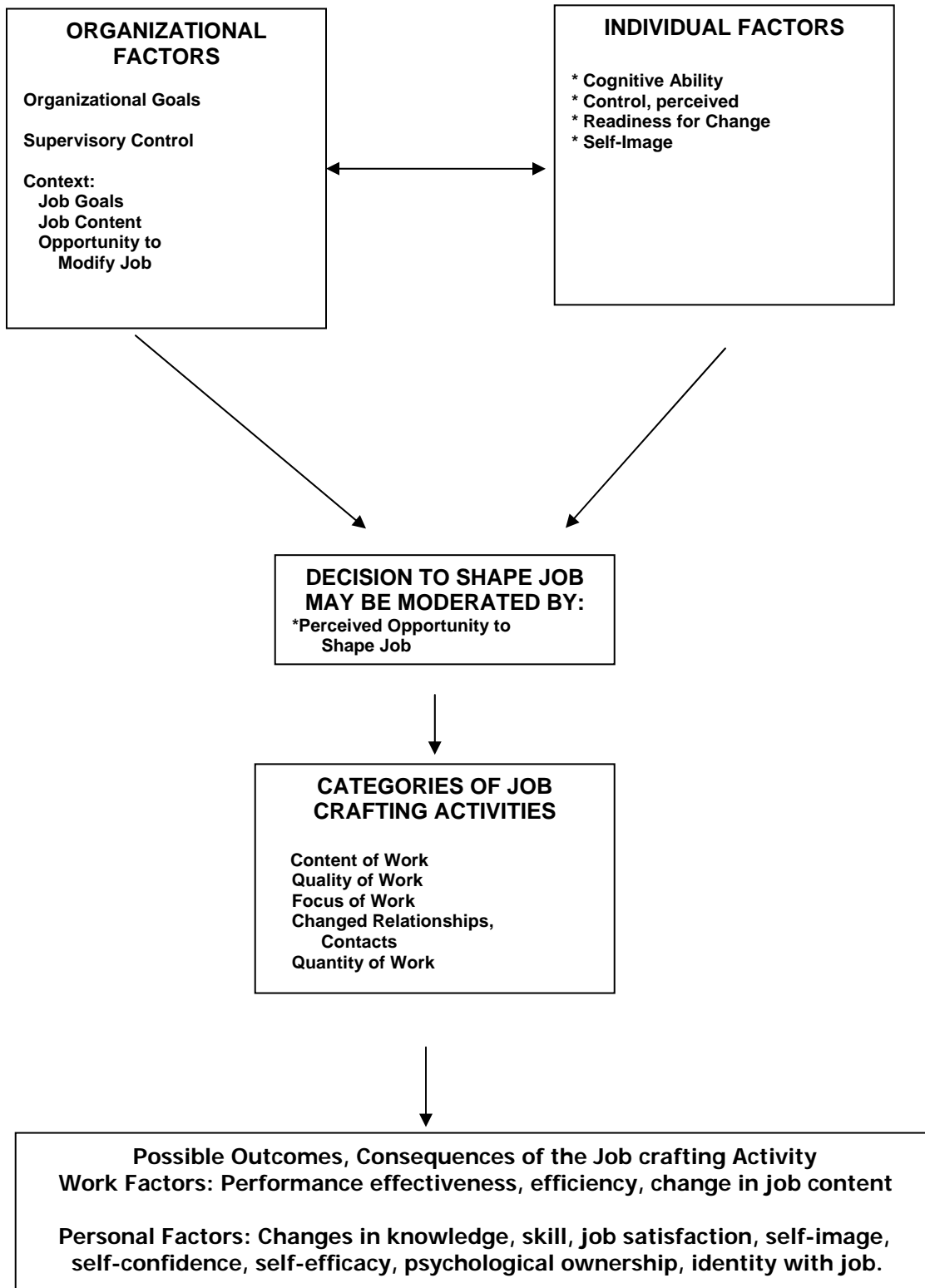
Much more work remains. Larger samples sizes are required for future research and refinements in methods to obtain information and data are needed. The matter of perceived opportunity needs more attention as the perception may condition the entire job crafting sequence of events. Future research should include multiple job classes or types over a variety of organizational (work) contexts to illuminate further the extent of job crafting behavior and the forms it takes.

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Figure 1
Job Crafting Process



NURSE RETENTION: IS THE HEALTHCARE INDUSTRY MEETING NURSING NEEDS?

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ABSTRACT

The nation's healthcare industry is currently faced with a nursing shortage more complex than any previous shortage, with the highest turnover rate in twenty years. Many organizations are trying to determine how to keep both the baby boomers with their institutional knowledge and the Generation X and Y employees with their technological expertise. Previous research has identified organizational culture, supervision, compensation, and work environment. Our research found organizations are not meeting nurses' needs. The respondents indicated their opinions were neither valued nor considered in the normal activity of daily life in a hospital.

INTRODUCTION

The nation's healthcare industry is currently faced with a nursing shortage more complex than any previous shortage. Retaining employees is a critical issue in today's business environment. Employee turnover is one of the most significant causes of declining productivity and sagging morale in both the public and private sectors. Excessive turnover often engenders far-reaching consequences and, at the extreme, may jeopardize the organization's objectives (Abbasi and Hollman, 2000). Research by Ernst and Young showed that attracting and retaining employees are two of the eight most important things investors use when judging the value of an organization (Michlitsch, 2000).

There have been many initiatives and programs created to address the current nursing shortage. Two major focus areas are the recruiting and the retention of nurses. While recruiting programs can be very effective, they are often only a short-term solution and can be expensive. Unless the healthcare industry is able to retain the nurses it recruits, then the recruiting efforts are wasted. This research focuses on the retention aspect, as it is a key factor in resolving the nursing shortage.

Unwanted employee turnover is one of the most costly problems that organizations face (Taylor, 2002). The cost of replacing employees continues to escalate, causing an undue hardship on many businesses (Steel, Griffith, and Horn, 2002). Losing employees can cost a company as much as eighteen (18) months salary for professionals and six (6) months salary for hourly employees (Thornton, 2001).

The cost to replace a nurse can be up to two times a nurse's salary (Atencio, Cohen, and Goren, 2003). At an average salary of \$51,090 (Department of Labor, 2004), the cost of replacing one nurse can cost over \$100,000. The cost of replacing a worker is often underestimated, because in addition to visible costs, there are many "hidden" costs and consequences of turnover. They include disruption of customer relations, costs resulting from disruption of workflow and the erosion of morale and stability of those who remain (Abbasi and Hollman, 2001). The present research seeks an understanding of what nurses want from their employers. Given today's employment relationships, it is important that a company determine how to influence the intent to stay and gain the commitment of the company's employees (Galunic and Anderson, 2000). Whatever the cost, managing employee turnover and focusing on retention are more important than ever especially in today's economy and business environment.

The current nursing shortage can be traced to the 1990's, when managed care companies became popular. In an effort to cut costs, many organizations were reorganizing and laying-off nurses or replacing them with lower skilled, assistive personnel. This left nurses feeling they were not valued and many became unhappy and left the profession completely (Erickson and Nevidjon, 2001; Donley, Flaherty, Flanagan, Maloni, Sarsfield, Taylor, 2002; Cummings and Estabrooks, 2003). Other factors that have contributed to the current shortage are a high turnover rate, aging population, low nursing school enrollments, an aging workforce of nurses, a shortage of nursing instructors and more and better career opportunities for women.

The current nursing shortage is different from previous nursing shortages. Some key differences are the aging workforce of nurses and the fact that the current shortage is widespread across nations. Some of the past solutions used to solve shortages included sign-on bonuses, relocation pay and premium benefit packages (Erickson and Nevidjon, 2001). The problem with these solutions is that they are primarily short term in nature. Given that one in five nurses intend to leave the nursing profession within the next five years (Atencio et al., 2003), a short-term solution is not the answer.

REVIEW OF LITERATURE

Nurse and employee retention has been the subject of much research literature. The general consensus is that the work environment is the most influential factor in determining a nurse's intention to leave a job or the profession altogether. One of the leading causes of turnover is job dissatisfaction (Atencio et al., 2003). Focusing on the retention aspect not only reduces turnover costs but also improves the quality of care a patient receives (Atencio et al., 2003).

The literature acknowledges that the current nursing shortage is different from any others experienced and more complex than previous shortages (Kimball and O'Neil, 2002; Erickson and Nevidjon, 2001; Auerbach, Buerhaus, Staiger, 2003; Given and Spetz, 2003; Patton and Warrino, 2004; Kimball, 2004). Research has shown that the past solutions, which were short-term and leaned toward financial incentives, will not be effective solution. If a nurse is dissatisfied with the overall work environment, it is unlikely that financial incentives alone will prevent the nurse from leaving (Brady, Geiger-Brown, Lirtmunlikaporn, Nielson, Trinkoff, Vasquez, 2004). The current nursing shortage needs to be solved with long-term solutions in mind. This means providing a care environment in which nurses feel they are part of the decision making process, are valued and receive equitable pay for their work.

Turnover Drivers

An employee's decision to resign from an organization is complex. Rarely does an employee leave because of a single event, such as being passed over for a promotion or a plum assignment. One such event may serve as a catalyst, but most employees leave because multiple factors—the turnover drivers—create an environment that is no longer desirable to them (Oh, 2001).

Numerous surveys have been conducted to determine what influences employee turnover, and the results have varied between surveys. (Amig and Jardine, 2001; Dixon-Kheir, 2005; Dobbs, 2001; Jordan-Evans and Kaye, 2001; Withers, 2001; Abbasi and Hollman, 2000;) Some factors identified as affecting turnover include organizational culture (Sheridan, 1992), supervisory relationships (Tepper, 2000), compensation (Burgess, 1998), and work environment (Guthrie, 2001; Bilson, Blum and Shalley, 2000; Huselid, 1995).

Sheridan (1992) observed that an organization's cultural values have an effect on all interactions with employees. Sheridan, (1992), noted that other researchers (Chatman, 1991; Schneider, 1987) have argued that the fit between an organization and an employee is important to retention. Schneider (1987) noted

that individuals are attracted to certain organizations, and when they do not “fit” an organization they will leave (Sheridan, 1992). Autry (2003) found a relationship between personal-organizational fit, job satisfaction and intent to stay. Sheridan (1992) found that professionals hired in the organizations emphasizing the interpersonal relationship values stayed 14 months longer than those hired in the organizations emphasizing the work task values. The magnitude of these differences raises important questions regarding the significance of person-organization fit and employee retention. Presumably new employees who fit the organization’s cultural values perform better. However, in this study, both strong and weak performers stayed much longer in the organizational culture that emphasized interpersonal relationships than in the work task culture (Sheridan, 1992; Mainiero, 1993).

Effective Communication

Communication means listening to employees and considering the information they may have, as well as, providing the training necessary for the employee to do a good informed job. Poor communication practices contribute to many of the problems that increase employee turnover. Thornton (2001) observed that when employees believe they do not receive enough information to do their job, they view their employer with a great deal of suspicion. They question all procedures and policies at the company.

Job satisfaction is associated with turnover. Overall job satisfaction can be defined as how an individual feels about their job after comparing actual outcomes with those that are expected (Lambert, Hogan, and Barton, 2001). An effective communicator may be able to change what the employee expects and thus increase job satisfaction and ultimately decrease employee turnover.

Supervisory Relationships

Studies show that managers and supervisors can have a significant impact on employee turnover. In a study of the consequences of abusive supervision, subordinates whose supervisors were more abusive reported higher turnover, less favorable attitudes toward job, life, and organization, greater conflict between work and family life, and greater psychological distress (Tepper, 2000). A Gallup Organization study based on queries of some two million workers at seven hundred companies found that the length of an employee’s stay is determined largely by his relationship with a manager (Dobbs, 2001). Eisenberger (2003) found supervisor support correlated with employees’ intent to stay. Ellickson (2002) found job satisfaction positively correlated with pay and benefits satisfaction, workload, supervisory and department relationships.

Compensation

A poorly designed wage policy where salaries and benefits are not competitive can lead to turnover. Workers expect tangible rewards for good work and they like to be paid or receive financial rewards commensurate with their worth to the organization (Abbasi and Hollman, 2000). Studies show that turnover is higher in plants with lower wages (Burgess, 1998). A survey reported in BNA Daily Labor Report (March, 2001) stated that fifty percent of part-time and full-time workers see salary increases as the best way to improve employee retention.

Work Environment

Employees want a feeling a belonging and security. Their decision to stay or leave may depend on working conditions and the “toxicity” of the work environment (Abbasi and Hollman, 2000). In a survey of 2,200 individuals, higher job satisfaction and lower intentions to leave were found for individuals whose work environments complemented the creative requirements of their jobs. Characteristics that enhance job satisfaction include having a sense of control or autonomy on the job, viewing the work as

important, challenging, and urgent, and receiving encouragement from supervisors. On the other hand, characteristics that diminished employee job satisfaction include the existence of rigid procedures, use of surveillance, lack of resources, and restricted control over work procedures (Blum, Gilson and Shalley, 2000).

Retention Factors

While it is important to understand what impacts employee turnover, it is also important to understand what work issues are important to employees. Research results varied in what employees identified as important for continuing their employment. A 1999 Hay Group study of more than 500,000 employees in 300 companies found that, of 50 retention factors, pay was the least important. The three top retention factors in this study included career growth, learning and development; exciting work and challenge; and meaningful work (Jordan-Evans and Kaye, 2001). Mulvey, (2002), found that even though pay is important to an employee, if an employee understands how their pay was determined and how their performance was rated, they would be better satisfied with what previously was unacceptable. Mulvey, (2002), concluded that an organization should determine employees' knowledge on pay and then communicate the pay processes.

Reasons for Nurse Dissatisfaction

One comprehensive study used focus groups to examine 15 of the country's healthcare markets. The largest concern reported by the nurses in all the focus groups was the increase in their daily workload (Kimball, 2004). In a cooperative summit study (A Call to the Nation, 2002), other sources of career dissatisfaction among nurses were identified as constant changes to healthcare systems, stressful work environments, and rigorous paperwork requirements. A 2006 report stated that 74% of nurses would like to see the staff to patient ratios improve, reduced paperwork and less administrative duties (Joint Commission on Accreditation of Healthcare Organizations, 2006). Some registered nurses have voiced frustration in their ability to advocate for their patients, their ability to maintain professional integrity and their physical well being (Peterson, 2001). All of these concerns are related to the work environment and therefore should be addressed by employers.

Around one third of the current nurses are over 50 years old (Erickson and Nevidjon, 2001; Atencio et al., 2003). It is predicted that by the year 2010, 40 % of nurses will be 50 years or older (Erickson, 2001). In a study of 257 nurses surveyed, the older nurses with more years of experience reported feeling more work pressure and did not feel they had as much input as some of the less experienced nurses (Athencio et al., 2003). Given the aging workforce of nurses, and the survey responses of the older nurses, the authors of this study suggest more research be done on the retention of older nurses.

In another study, which focused on nurses' comments to open ended questions asked, nurses expressed their frustration about the excessive demands of the job and their feelings of injustice about their work environment (Brady et al., 2004). The study shared the actual comments that were made by the nurses. In regards to the excessive demands, the nurses commented about the daily pain and injuries they were suffering as a result of the physical demands of the job. In addition to the injuries being sustained, many commented on the amount of overtime they worked and the inadequate staffing. The study's authors make special note of the fact that when staffing issues were the main cause of dissatisfaction, the nurses almost always indicated a desire to leave. The other areas of excessive demands did not seem to have as much of an impact on the nurse's desire to leave (Brady et al., 2004). The feelings of injustice were a result of little or no professional advancement being available, a disparity in pay raises between management and themselves and being devalued at work.

What Is Currently Being Done

One of the biggest complaints from nurses is inadequate staffing (Cline, Moore, Riley, 2004). While some states are considering mandating patient-to-nurse ratios, California is the only state that has actually passed minimum staffing ratios (Auerbach et al., 2003). Therefore, this continues to be an ongoing problem for many hospitals. Some hospitals are making an effort to better manage their capacity by monitoring bed use and availability, as well as tracking their patient flow (Bazzoli, Brewster, Liu, Kuo, 2003). This can be effective in understanding the hospital's staffing needs. The growing movement of registered nurse unions being formed is also being counted on to bargain for better staffing levels as well (Given and Spetz, 2003).

Retired nurses are being recognized as a valuable resource in retention efforts. In order to reduce some of the paperwork requirements hospitals are hiring retired nurses for the sole purpose of completing paperwork and performing other administrative functions (Bazzoli et al., 2003). This enables the nurses to focus more on the patient and provide the needed care. Retired nurses are also being recruited in an effort to create programs of professional mentoring (A Call to the Nation, 2002). In the past many programs such as orientation and mentoring (commonly called preceptor programs) were previously eliminated in an effort to reduce costs during reorganizations. The elimination of these programs ultimately ended up costing more because many organizations are now returning to these programs once again (Peterson, 2001). Because of their experience, older nurses are a valuable resource in developing mentor programs and can be of much help to the younger nurses (Auerbach, et al., 2003). The need for training and mentoring is evident in research findings where nurses are unable to pursue what would be perceived as the correct action, due to practice constraints (Andrews, 2004).

Hospitals are starting to provide more flexible scheduling in an effort to retain nurses who are working mothers or closer to retirement age (Bazzoli et al., 2003). A specific strategy was employed in Belgium where nurses over the age of 45 and 55 get paid for a standard work week, although the actual hours they work are less than the standard work week hours (Peterson, 2001). In order to better support and retain the older workforce, it is suggested that patient care models be redeveloped (Erickson and Nevidjon, 2001) and that changes be made in the work environment to keep the physical strain to a minimum (Auerbach et al., 2003).

In order to reduce some of the physical demands some organizations have a "no lift" policy in place (Brady et al., 2004). This reduces nurses' injuries and can provide long-term savings such as reduced workers' compensation claims, reduced medical costs, time off for injuries, and prevents additional workload for the remaining staff that is forced to make up for the loss of a nurse.

Shared governance is a way in which some organizations empower nurses to be a part of the decision-making process in establishing policies and managing patient care. Before putting any plan for shared governance into action, much care and thought should be used. Shared governance takes a lot of planning and resources, so its total impact on the organization must be considered. Hess defines three models of shared governance that have emerged (Hess, 2004). The three models are the Councilor Model, the Administrative Model and the Congressional Model. The Councilor Model is the most common and utilizes subcommittees to make decisions. The Administrative Model is split into two focuses, clinical and management. The Congressional Model gives nurses the ability to vote on issues as a group. The biggest predictor to a successful shared governance program will be the expertise and knowledge of the people and their commitment to the profession and organization (Hess, 2004).

The Robert Wood Johnson Foundation study has recommended that a National Forum to Advance Nursing be created (Kimball, 2004). The purpose is to include a wide range of stakeholders in the nursing

shortage to come together and by providing input and addressing issues related to the nursing shortage. The four strategic areas that were identified for the forum to address are creating new nursing models and new models of healthcare provision, reinventing work environments, establishment of a national workforce data collection system and creating strategies to advance change in the nursing profession (Kimball, 2004). All of these strategic areas will add value and improve the nurses' care environment. By addressing the needs of the current workforce and improving the care environment in which they work, more nurses will stay in the profession and new nurses will be more inclined to join the profession.

Congress has also played a role in addressing the retention aspect of the nursing shortage. In 2002 Congress passed the Nurse Reinvestment Act. The funding for this legislation was passed in 2003. Title II of the Nurse Reinvestment Act specifically addresses the issue of nurse retention and emphasizes the importance of retaining nurses as well as providing for their professional development (Donley et al., 2002). Title II encourages building career ladder programs and provides for the awarding of grants to fund projects geared at promoting nurse involvement in the decision making process (Donley et al., 2002). Title II poses numerous other initiatives and challenges, but the primary goal is to provide the health care industry with support at a legislative level.

RESEARCH METHODOLOGY

In an effort to better understand where organizations are not meeting nurses' needs, a survey was conducted at two hospitals in a large southeastern city. The sample was a convenience sample as one author was related to a nurse at one of the facilities. The nursing supervisors agreed to our surveying part of the nurses on one shift. The respondents indicated whether or not they felt their needs were being met by their organization. The nurses were enthusiastic in completing the surveys and gave many comments at the end of the survey.

A sample of 83 nursing personnel completed the survey. The survey was adapted from the Drivers of Commitment survey in the 2002 Healthcare @ Work study (Wilkins, 2003). All respondents were either registered nurses or licensed practical nurses (LPN's made up only 3% of the responses). 93% of the survey respondents were female.

Results

The participants were asked to respond to how well their organization was meeting their expectations and needs. 63% of the respondents were unhappy with their compensation in regards to their job performance. Another 63% of the respondents were dissatisfied with their organization's willingness to receive input and equitable pay for job performance (See Table 1). 72% of those surveyed felt satisfied with their organization's ability to provide quality patient care over the next few years.

The finding that 63% of nurses are dissatisfied with their organization's willingness to hear what they have to say and receive input from the employees is similar to much of the literature. Brady's et al (2004) study showed nurses expressing disappointment in the lack of support they were shown by their employers. With the level of demand increasing, nurses have tried to reach out to their managers for support. One respondent stated that even though her career was important to her, it was overshadowed by the feelings of being undervalued. In another study where the researchers spoke with nurses who voluntarily left employment, one of the top reasons cited for leaving was the lack of support received from management and management's failure to listen to concerns (Cline et al., 2004).

With employers failing to meet their nurses' needs in regards to being supported and listened to, employers need to address how to better meet this need. Given the high failure rate it is likely that most organizations do not have participatory management style. As previously mentioned, shared governance

can be a powerful tool in alleviating some of this frustration. While shared governance gives nurses a voice in their profession and shows them they are valued, there is no research showing that shared governance leads to better patient care (Hess, 2004). However, a recent survey of nurses was done about the best practices at a hospital that has used shared governance since 1990. The survey showed that the number one thing that made a difference to the employees was shared governance (Hess, 2004). In an effort to understand just how effective shared governance is Hess has composed a list questions still in need of being researched and answered (Hess, 2004).

TABLE 1. WORKPLACE SATISFACTION

Factors in Workplace Satisfaction	Meets Expectation	Does Not Meet Expectations
1. Your organization's efforts to manage workplace stress	42%	56%
2. The link between your job performance and compensation	35%	63%
3. Faith in the current leaders in your organization to do what is right for the organization	67%	33%
4. Your supervisor's ability to create an environment of trust, respect and communication	49%	49%
5. Your benefits package covering the needs of your family	63%	37%
6. Your organization's efforts to build a sense of spirit and pride	58%	42%
7. The opportunities for personal growth provided by your job	51%	47%
8. Your organization's ability to deliver quality patient care during the next few years	72%	28%
9. The willingness of coworkers to help each other in times of heavy workload	67%	30%
10. The satisfaction that you receive from the work you do every day	63%	33%
11. Your organization's willingness to receive input from its employees	35%	63%
12. Your organization's benefits package being comparable to other organizations	56%	37%

Due to the cost involved and the time needed for developing a plan, shared governance may not be a feasible solution for many organizations. Even if shared governance is not an option, organizations should still seek ways to involve nurses in the decision-making process. It has been shown that participative managerial styles tend to produce a high level of group cohesion along with decreased levels of job stress (Dendaas, 2004).

With 63% of respondents satisfied with their benefits package and another 56% believing their organization's benefits package was comparable to others, it would appear the respondents in this survey are satisfied with their benefits. However, this is contrary to much of the literature. The fact that the sample size was small could be a contributing factor to this discrepancy between the two outcomes. In one survey, nurses noted that there was a perceived inequality between their organization's benefit packages as compared to others in the industry (Brady et al., 2004).

Interviews conducted with registered nurses provided firsthand knowledge on the subject of training and preceptor programs. Nurses interviewed were part of a preceptor program at a major teaching hospital in a large southeastern US city. The Cardio Intensive Care Unit (CICU) found the preceptor program to be one of the single largest factors in retaining their nurses. The CICU environment was a high stress,

volatile work environment. Whenever new nurses were hired in the CICU unit, they were assigned a mentor. The new employee would then partner with the mentor and continue to observe the mentor for approximately one month. Without this program, new employees were uncomfortable with the level of stress in performing the job, which led to turnover. These interviews reinforce research that identified the opportunity to observe other nurses of proven performance interact with patients as a key factor in learning advocacy practices.

DISCUSSION

Since the most potential for turnover is within an employee's first three years with a company (Burleigh, Eisenberg, Kilduff and Wilson, 2001), conducting feedback sessions and communicating individually with new employees every 4 months during their first 2 or 3 years could be a powerful tool for reducing turnover. This communication would help provide valuable insight to any issues that, if addressed, might prevent the employee from leaving the organization.

Exiting employees have stated in the survey that the call-in system was one area they were most dissatisfied with. Improving the call-in system for new employees could lead to a significant reduction in turnover. Since this is a complex issue that could have a large financial impact on the plant, a team approach to help improve the call-in system could be productive. Representatives from management and hourly employees would be best suited to address this issue.

Work/life balance ranked high in importance to workers—second only to benefits and base pay. Clearly, employees regard the ability to balance their personal and work lives as a top priority. The structure of the company needs to allow for choices. The first step in addressing the work/life balance issue is to evaluate the company's policies to see if they are supportive of a work/life balance. If not, steps should be taken to change the policies or make them more flexible to accommodate the needs of the workforce. Managers and supervisors should then be held accountable to be in tune with their employees' needs and accommodate them whenever possible.

In the survey of the bakery employees, the results also varied between age groups within the organization. The survey results agreed with previous studies confirming the importance of the supervisor relationship to the Generation X employees (Dixon-Kheir, 2005). A good supervisor relationship is important to retaining employees in their twenties. Once an employee is hired, quality relationships with their manager or supervisor can be important to the employee's decision to stay with the organization.

RECOMMENDATIONS

With the tremendous cost associated with employee turnover, it is imperative that organizations identify and address the issues that lead to employee turnover. Focusing on the supervisory relationship is important with all workers, but especially with the Generation X workers. The supervisory relationship not only influences job performance, career development, recognition and rewards, it also extends to such matters as teamwork, communication, organizational resources, and relationships with co-workers, customers, and other managers (Dixon-Kheir, 2005).

The workplace, the ways of conducting business and the nature of work are shifting, and organizations and managers must adapt to keep up (Abbasi and Hollman, 2000). The changing demographics of the workplace and the global nature of work mean that supervisors need the skills to develop and sustain quality relationships with employees of diverse cultures, races, religions, and languages. The old models of "top-down" and "team-based" communication in one language with a monolithic group of subordinates already oriented to U.S. culture are obsolete (Dixon-Kheir, 2005).

CONCLUSIONS

As the demand for hospital services continues to grow (Bazzoli et al., 2003) it is important to focus on retaining the current nursing workforce in order to provide the best patient care. Sooner or later, we all may find ourselves dealing with the healthcare system - whether it is in the capacity of receiving care as a patient, seeking care for a family member or helping someone else. It is most often the nurses who we rely on to help us through our healthcare experiences. Unlike doctors, nurses play an integral role in every phase of the healthcare process from the admittance process, until the patient's care is complete, including the actual administering of medications and treatment and contact with patient and family members. Therefore, the current nursing shortage affects all of us.

Nurse retention is important to providing better patient care and can also minimize the risk and cost to healthcare organizations (Kimball and O'Neil, 2002). Organizations must consider not only what their nurses' needs are but also how they show their nurses that they are valued. Unions and collective bargaining are becoming avenues through which nurses are finding themselves empowered to make changes (Patton and Warrino, 2004). Limited mandatory overtime, and provisions for professional development are also being addressed through collective bargaining agreements (Patton and Warrino, 2004).

The idea of shared governance and other styles of participatory management are also critical to nurse retention. This study and others reported many nurses do not feel their opinions are valued or that they have management's full support. Trying to overcome these perceptions are critical to an organization's efforts to retain their critical workforce.

Future Research

Future studies may want to investigate other variables as well as the influence of union membership on choices made. Comparing the differences in perceptions between the three shifts would have made this research stronger. Looking at shift preferences and hours worked as predictors of intent to stay is of interest also. Finally, this study was limited to two hospitals. Broader-based samples will need to be the norm in future studies in order to rule out variables attributing to the differences other than those under investigation.

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ONE MORE TIME: HERZBERG'S THEORY OF WORK MOTIVATION

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May 25, 2007

Submitted for Possible Presentation at the 2007 Meeting of SEINFORMS to be held in Myrtle Beach, South Carolina on October 4-5, 2007

Abstract

This paper examines some of the possible reasons why the theory of work motivation (the motivation-hygiene or dual-factor theory) developed by Herzberg and his colleagues in 1959 has generally been dismissed by organizational researchers. It next reviews some of the limited research using the theory today and concludes with suggestions for further analysis of the motivation-hygiene theory, a theory which does, however, continue to be of interest to practitioners.

One More Time: Herzberg's Theory of Work Motivation

In the January 2003 issue of *Harvard Business Review*, HBR (a special issue on personal and organizational motivation), Frederick Herzberg's classic 1968 HBR article entitled "One More Time: How Do You Motivate Employees?" was reprinted. (This same classic article was also reprinted in the September / October 1987 issue of HBR.) The editors of HBR indicate that they consider Herzberg's ideas some of the best on the topic of job motivation and relevant to the workplace today. (*Harvard Business Review*, 2003: 8)

This paper explores why Herzberg's theory of work motivation (hereafter referred to as the motivation-hygiene theory) has not been more generally accepted, nor even given much serious consideration by many researchers in the field of management today. The paper begins by providing an overview of the theory using original sources by either Herzberg and his colleagues (Herzberg, Mausner & Snyderman, 1959) or just Herzberg (1966). Next, the major theoretical criticisms of the theory are reviewed and some additional reasons for the possible, early rejection of the theory are discussed. Then several recent studies using the motivation-hygiene theory are reviewed. Finally, some suggestions for further research of the theory are presented.

Overview of the Motivation-Hygiene Theory

In the following discussion of Herzberg's motivation-hygiene theory of job attitudes, the words of Herzberg are frequently quoted, rather than paraphrased. In this way readers have the opportunity to hear from Herzberg himself, rather than read summaries of his work. This is deemed critical to a fresh re-examination of his ideas, since to fairly evaluate Herzberg's theory, his actual words and/or those of he and his colleagues must be known.

Herzberg's theory is commonly called either the motivation-hygiene or the dual-factor theory. Herzberg (1966) calls it the former in his book, *Work and the Nature of Man*. The first description and test of this theory can be found in an earlier work entitled, *The Motivation to Work* by Herzberg, Mausner and Snyderman (1959). In this classic work are highlighted for the first time the two sets of factors (motivator and hygiene factors), which are at the core of the theory.

As noted by Herzberg (1966: 71) the first study of the motivation-hygiene theory was intended to "test the concept that man has two sets of needs: his need as an animal to avoid pain and his need as a human to grow psychologically." To this end interviewers asked 200 accountants and engineers in the Pittsburgh area about "events they had experienced at work which either had resulted in a marked improvement in their job satisfaction or had led to a marked reduction in job satisfaction." (Herzberg, 1966: 71)

Researchers coded the reported positive and negative events based on “factors” believed to characterize the source of the participants’ attitudes, which were reported when the study participants felt “exceptionally good about their jobs” as well as when they experienced “negative feelings about their jobs” (Herzberg, 1966: 72). There were sixteen possible factors. They represented according to Herzberg (1966: 72) “a kind of shorthand for summarizing the ‘objective’ events that each respondent described.”

These factors were seen as “determiners” of either job satisfaction or job dissatisfaction. (Herzberg, 1966: 72) One event could and would be coded under several different factors, if more than one factor applied. As found in Appendix II (see Herzberg et al., 1959: 143-146), the first level of analysis factors were categorized as follows:

1. Recognition
2. Achievement
3. Possibility of growth
4. Advancement
5. Salary
6. Interpersonal relations – supervisor
7. Interpersonal relations – subordinates
8. Interpersonal relations – peers
9. Supervision – technical
10. Responsibility
11. Company policy and administration
12. Working conditions
13. The work itself
14. Factors in personal life
15. Status
16. Job security

The major findings were as follows. First, five “factors” were identified as “strong determiners of job satisfaction - *achievement, recognition, work itself, responsibility and advancement* - “ (Herzberg, 1966: 72-73) These factors only occasionally appeared when the dissatisfaction events were coded.

Second, very different factors appeared, when the dissatisfaction events were coded. “The major dissatisfiers were *company policy and administration, supervision, salary, interpersonal relations and working conditions.*” (Herzberg, 1966: 74) Moreover, these factors were rarely found for the reported satisfaction events.

Based on these findings, Herzberg (1966: 74) concluded that the “satisfier” factors have to do primarily with a “man’s relationship to what he does: his job content, achievement on a task, recognition for task achievement, the nature of the task, responsibility for a task and professional advancement or growth in task capability.” In contrast, the “dissatisfier” factors “describe his relationship to the context or environment in which he does his job.” (Herzberg, 1966: 75)

As a part of the original study (Herzberg et al., 1959), participants were also asked “to interpret the events, to tell why the particular event led to a change in their feelings about their jobs (second level of analysis).” (Herzberg, 1966: 75) It was this additional analysis that led Herzberg and his colleagues to consider the type of needs underlying their findings. They went on “to suggest that the hygiene or maintenance events led to job dissatisfaction because of a need to avoid unpleasantness; the motivator events led to job satisfaction because of a need for growth or self actualization.” (Herzberg, 1966: 75).

Thus, two major categories of needs were identified. One category reacted to the environment and might be considered “a need to *avoid unpleasantness*” whereas the

other category related to “a need for growth or self-actualization.” (Herzberg, 1966: 75)
The former became known as hygiene factors and the later as motivator factors.

Finding two very different categories of need suggests an affirmative answer to the research question raised by Herzberg and his colleagues (1959) at the beginning of their investigation. That question asked whether or not man has two different sets of needs – one for avoidance of pain and the other toward growth. Such sets of needs relate, of course, to an earlier work in 1954 by Abraham Maslow, namely *Motivation and Personality*, which has numerous editions, the most recent one is the third edition, which was published in paperback in 1987.

As those in management readily know, Maslow (1987) suggested that man has lower level needs consisting of physiological, safety and interpersonal needs, as well as higher order needs consisting of esteem and self-actualization. Thus, Herzberg’s motivation-hygiene theory could be perceived as incorporating Maslow’s lower order needs in the “hygiene” factor and the higher order needs in the “motivator” factor.

Herzberg (1966: 76) concluded that because there are separate factors to consider when evaluating job satisfaction *or* job dissatisfaction, that “these two feelings are not the obverse of each other. Thus, the opposite of job satisfaction would not be job dissatisfaction, but rather no job satisfaction; similarly the opposite of job dissatisfaction is *no* job dissatisfaction, not satisfaction with one’s job.” Both Herzberg and Maslow

believed that unless the lower order needs were satisfied, the higher order needs could not be fully realized.

Why Herzberg's Theory Has Generally Been Dismissed

This section of the paper identifies several reasons why Herzberg's theory may not have been more fully evaluated and thus why many researchers may have prematurely dismissed it. These reasons come first from a review of the theory by major researchers in the late 1960s and early 1970s and then from a review of the theory by Craig Pinder in his book entitled *Work Motivation* (1984). Next, this author identifies several additional reasons that may also have resulted in an early dismissal of the theory. Herzberg's death in January of 2000 unfortunately prevents an interview with Herzberg himself.

Major Reviews of the Motivation-Hygiene Theory

House and Wigdor (1967) were one of the first to present a comprehensive review of the motivation-hygiene theory, which they referred to as the dual-factor theory of job satisfaction and motivation. They presented an overview of the theory and then examined three major criticisms of the theory by other researchers. These three criticisms are discussed below.

The first criticism was that the methodology was flawed. Herzberg et al. (1959) had asked the individual being interviewed to look backwards in time and to recount experiences that were extremely satisfying or dissatisfying. Vroom suggested (according to House and Wigdor, 1967: 371) the possibility that “obtained differences between stated sources of satisfaction and dissatisfaction stem from defensive processes within the individual respondent.” Thus, the respondent presumably, when asked to think of success incidents, would recall times when he or she was the responsible person and to think of environmental exigencies, when frustration was experienced. Such reasoning by Vroom was based on classic attribution theory. House and Wigdor (1967) agreed with Vroom that other methods (besides a retrospective interview) would be required to test the theory.

The second criticism of the theory was “that the research from which it was inferred is fraught with procedural deficiencies.” (House and Wigdor, 1967) The primary deficiency was that those coding the data had to make evaluations as to which accounts were satisfiers and which accounts were dissatisfiers and these distinctions were not always clear. Thus, the factors, i.e. the motivators and the hygiene factors, could be contaminated by the rater’s interpretation of the data. It was suggested by House and Wigdor (1967) that the respondents themselves might better categorize the data into the most appropriate category.

The third criticism identified by House and Wigdor (1967) was that Herzberg and his colleagues’ results were inconsistent with previous research. While one would expect a

positive correlation between job satisfaction and productivity according to Herzberg's theory, this was *not* always the case. House and Wigdon (1967: 375) therefore concluded that "the effect of satisfaction on worker motivation and productivity depends on situational variables yet to be explicated by future research."

House and Wigdon also noted that should working conditions be unsatisfactory then "highly motivated behavior may have either little effect on productivity or even possibly the effect of causing frustration which interferes with productivity." (1967: 384) This writer believes that Herzberg and his colleagues would concur. Unless contextual factors in the work environment, i.e. the hygiene factors, are acceptable to employees, motivational factors will generally *not* come into play. However, Herzberg and his colleagues did not explore the impact of situational constraints and the possible effects of frustration on motivation.

Another comprehensive review of the motivation-hygiene theory was completed by Whitsett and Winslow (1967). These researchers were overall quite positive with regard to the work of Herzberg and his colleagues. They attributed much of the criticisms of the motivation-hygiene theory as misinterpretations of the theory. For example, Whitsett and Winslow (1967: 395) found that "One of the most common and persistent misinterpretations of the Motivation-Hygiene (M-H) theory is the attempt to use measures of overall job satisfaction to make statements purporting to be derived from the theory." In actuality Herzberg et al. (1959) are suggesting that the job satisfaction construct is not unipolar, so that both the motivator and hygiene factors related to job

satisfaction need to be considered. Thus, an overall measure of job satisfaction would not be acceptable to Herzberg and his colleagues.

“The essence of the motivation-hygiene concept is that the motivator factors and hygiene factors are independent, operate on different needs, and cannot be combined. Therefore, M-H theory makes no predictions about overall anything.” (Whitsett & Winslow, 1967: 396) According to Whitsett and Winslow (1967) this error of interpretation was made by Ewen, Smith, Hulin and Locke in their 1966 study. Whitsett & Winslow (1967: 396) also argue (in opposition to Ewen, Smith, Hulin & Locke) that “there is no neutral point on the motivator continuum because the motivators contribute only to satisfaction; thus a person is, with respect to motivators, either more or less satisfied, but never neutral.”

King (1970: 19) suggests that the heated debate between opponents and defenders of the two-factor theory (the motivation-hygiene theory) is a result of “the lack of an explicit statement of the theory.” King provides five versions of the theory. These versions might be perceived as hypotheses yet to be tested. In any case, King would like to have satisfaction and dissatisfaction measured by other than self-report, i.e. other than theory and the use of critical incident studies. Thus, the theory according to King (1970) needs to be more explicit and another methodology for analyzing the results is needed.

As noted in a more recent review by Pinder (1984: 20), Herzberg and his colleagues developed their basic hypotheses regarding variables comprising job satisfaction and

variables comprising job dissatisfaction based on a “review of hundreds of early studies of the causes, correlates, and consequences of job attitudes”. This review was conducted by Herzberg, Mausner, Peterson and Capwell in 1957. Thus, Herzberg and his colleagues are to be commended according to Pinder (1984) for using observations of many other researchers when formulating their own hypotheses.

While Herzberg and his colleagues (1959) did find in their classic study that one group of variables (named motivators) was identified by the accountants and engineers in more stories about satisfying job experiences and another group of variables (named hygiene factors) was more frequently associated with stories of dissatisfying job experiences, there were some variables from both groups that were crossover variables. As noted by Pinder (1984: 24) “There were a number of stories of job dissatisfaction that featured elements of some of the so-called motivator factors, especially recognition, work itself, and advancement.” Likewise, Pinder (1984: 23) cites Herzberg (1981) as indicating that there were some hygiene variables, such as “providing decent working conditions and cordial interactions on the job” that can motivate people, as well, but for shorter time periods.

While these crossovers (or reversals) were initially recognized by Herzberg and his colleagues, Herzberg seemingly forgot this admission in later years and instead argued strongly that the motivator factors and the hygiene factors were “entirely” independent of one another (Pinder, 1984: 25). Thus, the motivation-hygiene theory (and its

subsequent refinement) was hampered by excluding the complexity of crossover variables, which was previously recognized by Herzberg.

Other Potential Reasons for Rejection of the Theory

First, as noted by Herzberg (1966: 76), “The fact that job satisfaction is made up of two unipolar traits is not unique, but it remains a difficult concept to grasp.” We are so accustomed to measuring job satisfaction – job dissatisfaction as opposite ends along a single continuum, that it becomes difficult to think of job satisfaction and job dissatisfaction as two different continua, i.e. job satisfaction – no job satisfaction and job dissatisfaction and no job dissatisfaction.

The use of the prefix “dis” to indicate opposite, when placed prior to the word satisfaction also contributes to the problem. In other words, the word “dissatisfier” implies that it is the opposite of satisfaction, simply because of grammatical usage or syntax. Thus, we automatically tend to think of dissatisfaction and satisfaction as a unipolar trait at opposite ends of a single continuum.

The “adjustment continua” identified by Herzberg (1966: 87) can be used as an example to show how one continua is better understood by two continua. Thus, the adjustment continua, i.e. adjustment to life, uses the motivator-hygiene framework of Herzberg (1966) to form both a mental health continuum and a mental illness continuum. A person’s adjustment is measured by the degree of one’s success “in

achieving the motivator (mental health) needs” and “in avoiding the pain of the hygiene (mental illness) needs.” (Herzberg, 1966: 86) Thus, a person’s adjustment is considered in terms of both continua and his/her ability to satisfy the respective motivator or avoidance needs involved.

A second reason for the possible, premature dismissal of Herzberg’s work has to do with the number of people Herzberg may have offended in the process of developing and talking about his new theory. This antagonism could have resulted in a variety of ways. For example, Herzberg was adamant that he was correct and annoyed with others, who did not accept his findings. He would become passionate when he spoke about the most direct and sure method to get an individual to do something, namely “to administer a kick in the pants – to give what might be called the KITA.” (Herzberg, 2003: 88) His abbreviation for this method was probably also offensive, when the abbreviation was translated as Herzberg most likely intended.

In addition, Herzberg critiqued in his classic HBR article of 1967 (and reprinted in 2003), three different groups of individuals involved in the study and management of people. First, he criticized organizational theorists for believing that by simply organizing jobs properly, that you could assure high productivity and positive job attitudes. Then, Herzberg (2003: 92) criticized industrial engineers for believing that the key was “to concoct the most appropriate incentive system and to design the specific working conditions in a way that facilitated the most efficient use of the human machine.” Finally, Herzberg (2003: 93) pounced on the behavioral scientists for trying to use

human relations training to instill the “proper attitudes that will lead to efficient job and organizational structure.” Thus, he criticized three major constituencies in the field of management. It is no wonder that his theory was also denounced!

A third reason may lie in the paradigm that has frequently come to dominate Herzberg's work regarding the role of money. As is known from the work of Kuhn (1970), a paradigm can prevent one from seeing outside of the construct or model that is held in one's mind. This writer believes that Herzberg's placement of money as a hygiene factor, rather than as a motivator factor has also contributed to an easy dismissal of Herzberg's ideas. In other words, the common paradigm or model of money as a motivator, may have made it difficult for others to see money as merely a hygiene factor.

However, Herzberg does not say that money is never a motivator. This is especially true since money can be used to satisfy many of our wants and desires, so its distinction as a motivator versus a hygiene factor may also become blurred. Also, the amount of money an individual earns can be used as a proxy for a sense of achievement and recognition, since a larger salary can be interpreted to mean that the individual has performed well at the job's tasks.

Finally, as previously mentioned, Herzberg does recognize that some variables, such as salary, have been crossovers, i.e. that they can be perceived as both hygiene and motivator factors. In fact, salary appeared according to Pinder (1984: 25) “in almost as

many stories (proportionately) of job satisfaction as it did in stories of dissatisfaction. However, because it was related to more stories of long-term negative attitude shifts than to long-term positive shifts, Herzberg and his team classified salary in the hygiene category.” Hence, the classification of salary as a hygiene factor was done somewhat subjectively.

It should be noted, that a low salary often sends the message in U.S. culture, that the individual’s contribution is minimal. Thus, the self-worth (and/or self-esteem) of an individual receiving a low salary could be threatened. Should the low salary also not satisfy the basic needs of the individual, let alone any self-esteem or self-actualization needs, money certainly would be, as Herzberg suggests, a dissatisfier for such an individual. This writer believes, that Herzberg would readily agree that a person must receive a wage sufficient to cover his/her basic needs, in order that the motivator needs related to job content are activated.

Hackman and Oldham (1980) also recognize the importance of satisfying contextual needs prior to job enrichment, by designating “contextual satisfactions” in the work setting as a moderator of their job characteristics model. In other words, enriching jobs by designing into them the core job dimensions suggested by Hackman and Oldham (1980) of skill variety, task identity, task significance, autonomy and feedback will not automatically lead to intrinsic motivation. Rather, the worker (Hackman & Oldham, 1980) must also have his/her basic working conditions satisfied (as well as possessing

the necessary knowledge and skill, in addition to a desire for growth) in order for job redesign to be effective.

A final reason for re-examining Herzberg's theory of work motivation is the possibility that the relationships between job satisfaction and other organizational variables measured in other studies may have been attenuated by treating job satisfaction and job dissatisfaction as a unipolar concept. In other words, could it therefore be that the finding of weak relationships between job satisfaction and many other organizational variables, such as job performance, has been the result of inaccurately measuring job satisfaction and job dissatisfaction by treating those two variables along a single continuum?

The number of studies on job satisfaction and other organizational variables is huge. As noted by Kreitner and Kinicki (2004: 203) "Job satisfaction is one of the most frequently studied work attitudes by OB researchers." Kreitner & Kinicki (2004: 203) also cite Kinicki, McKee-Ryan, Schriesheim and Carson, who found in a review and meta-analysis of the Job Descriptive Index, JDI (a well known measure of job satisfaction) , that more than 12,000 job satisfaction studies had been published by the early 1990s.

If the paradigm of job satisfaction and job dissatisfaction as a unipolar construct is incorrect and Herzberg's concept of a bi-polar construct of job satisfaction and job dissatisfaction is correct, then a "paradigm shift" would need to occur, in which case those (measuring job satisfaction as a unipolar concept) would have to go back to zero.

In other words, the previous findings related to job satisfaction would be questionable, unless separate measures of job satisfaction and job dissatisfaction had been used.

Several Recent Studies Using the Motivation-Hygiene Theory

In later years, it appears that only a few scattered studies further tested the theory. For example, Maideni (1991) conducted a survey questionnaire (Likert-type instrument) among private and public sector accountants and engineers. He found that satisfied workers valued the motivator factors more than the dissatisfied workers. However, he found no difference between satisfied and dissatisfied workers on the importance placed on the hygiene factors.

Another study was conducted by Knoop (1994). Knoop tested the relationship between work values and job satisfaction. The five dimensions of job satisfaction he used were based on the Job Descriptive Index and evaluated employee satisfaction with the “work itself, pay, opportunities for promotion, supervisors and coworkers.” (Knoop, 1994: 684) His regression analyses showed that “intrinsic values contributed to all five dimensions of job satisfaction, but extrinsic values contributed to only one dimension.” (Knoop, 1994: 687)

Knoop (1994: 688) also extended the work of Herzberg somewhat by finding support in his regression analyses for several intrinsic values in addition to the four (of the original five) variables, that Herzberg (1966) found as especially strong, namely achievement, recognition, the work itself and responsibility. The additional values included “doing meaningful work, having influence over work, being able to use one’s abilities and knowledge, having independence in doing one’s work, contributing to society, receiving esteem from others, gaining job status and having influence and pride in the organization.” (Knoop, 1994: 688)

A third, more recent study using the motivation-hygiene theory was conducted by Bassett-Jones and Llyod (2005). They examined the impact of motivator and hygiene factors to better understand what influences employees to make or not to make contributions to a suggestion system. These researchers found that economic incentives were not the critical factors for contributing suggestions. Rather, it was the recognition by some line managers of the creativity of employees and the encouragement of their growth and development, such that there was a “fostering of a culture of contribution” in the organization that made a difference. (Bassett-Jones & Lloyd, 2005: 940).

Thus, Bassett-Jones & Lloyd (2005) concluded that Herzberg’s two-factor theory was a useful tool for understanding why employees are motivated to make suggestions by its identification of intrinsic drivers, rather than movers, i.e. the financial incentives, Care was taken to overcome methodological concerns raised against Herzberg by using a

survey based approach focused on observable behavior versus affective responses so as to be less vulnerable to “post-hoc rationalisation and ego defence bias.” (Bassett-Jones & Lloyd, 2005: 940). At the same time it should be mentioned that this study used minimal statistical analysis, reporting just the percentage of responses to survey items.

Some Specific Suggestions for Further Research

First, other methods, besides the original method of narrative storytelling, must be used to differentiate between job satisfaction and job dissatisfaction. Perhaps a methodology similar to the one used by Kouzes and Posner (1997) to identify key leadership principles and practices would be helpful. Kouzes and Posner (1997: xxi) began their research in 1983 by asking people to describe what they “did when they were at their ‘personal best’ in leading others.” In depth surveys were conducted with open-ended questions to more than 550 people, as well as 42 in-depth interviews. While initially they focused on middle- and senior-level managers in both private and public organizations, they have since expanded their “research to included community leaders, student leaders, church leaders, government leaders, and hundreds of others in nonmanagerial positions.” (1997: xxii)

Kouzes and Posner (1997) developed a model of leadership based on their analysis of the “personal best cases.” It was a model, which was very behaviorally oriented, i.e. it identified specific leadership practices. Next, they developed a quantitative instrument,

“The Leadership Practices Inventory,” which measured five leadership dimensions. Initially, they surveyed “over 3000 leaders and their constituents, to assess the extent to which these leaders exemplified the practices.” (1997: xxii) The data base of Kouzes and Posner had grown by 1995 to over “ten thousand leaders and fifty thousand constituents” (1997: xxii). Profiles were developed, that allowed users of the survey to compare their leadership characteristics on the five major dimensions of leadership to those in the sample.

It may be that a method analogous to that of Kouzes and Posner (and even somewhat similar to that of Herzberg and his colleagues) could be used initially, such that individuals would identify situations when they were very satisfied and performing very well at work, as well as identifying those situations when they were very dissatisfied with their working situation and performing very poorly. By means of in depth open-ended surveys and interviews, participants could be encouraged to describe the factors impacting those situations. A large sample of employees at different levels within organizations in several industries should be used.

Outside observers could then perform a content analysis of the responses. A model of job satisfaction and of job dissatisfaction tied directly to performance at work could then be developed based on the above situations and empirically tested for its validity.

Dimensions of job satisfaction and of job dissatisfaction could be investigated through factor analysis and individual profiles of job satisfaction and of job dissatisfaction tied to performance could be developed based on those factors. It should be noted that when

Herzberg and his colleagues first proposed their motivation-hygiene theory in 1959, computerization was in its infancy. Consequently, large scale empirical testing of their model was not feasible, nor was it possible to test the model on different levels of analysis.

Second, situational constraints must be studied in more depth. For example, what are the situations in which workers have very limited control? Paul Spector (1978: 818) recognized such constraints in his “Model of Organizational Frustration.” He (1978: 820) suggested that frustration of “task performance and personal goals” could be caused by such things as: 1) uncontrollable, natural factors, such as the weather; 2) company policy, such as restrictive rules and procedures of the organization; or 3) “in other people – supervisors, coworkers, and subordinates, as well as people outside the organization.” Other constraints also come to mind including the economy or inadequate tools and equipment to perform the job. It is suspected that many of these constraints would be identified using the methodology suggested at the beginning of this section, i.e. employees would be asked to identify those situations in which they were very dissatisfied and performed poorly at work.

Third, individual differences must be considered. As noted by Hackman and Oldham (1980), a distinction should be made between those employees with a need for growth and those without such a need. Hackman and Oldham (1980) realized that this individual characteristic moderated whether or not a person would respond positively and productively to an enriched job. Also, other demographic differences such as

gender, age, tenure, and number of children should be considered when re-examining the theory.

Fourth, the “crossovers” variables, which predict both satisfaction and dissatisfaction (such as good working conditions, interpersonal relationships) need to be more fully considered. It may be that this would occur as individual differences are more fully investigated. For example, it could be that some working conditions such as daycare or health insurance are stronger motivators for some individuals than others. A single mother may be very motivated by both daycare and health insurance, whereas an older individual without children, whose spouse already has family health coverage, would probably not be motivated by either daycare or health insurance.

Fifth, openness to the breaking of old paradigms, when new ones provide a better explanation, is naturally required of all investigators. Should the concept of job satisfaction as a unipolar concept be incorrect, then the work involved in a review of previous studies would need to be embraced and new studies undertaken to examine separately factors related to job satisfaction and factors related to job dissatisfaction.

In summary, Herzberg has offered researchers and practitioners rich ideas for improving productivity. However, he has frequently been misunderstood or dismissed for various reasons detailed in this paper. Consequently, this author would encourage researchers to yet once again examine the validity of the motivation-hygiene theory.

The key concepts to be investigated are 1) whether job satisfaction is caused primarily

by intrinsic work satisfaction and job dissatisfaction primarily by a dissatisfying work environment and 2) whether the concepts of job satisfaction and job dissatisfaction are two separate constructs.

The current time is particularly important because the information age, which enables and encourages the increased use of both flexible schedules and flexible locations, requires that employees work independently and creatively. This also means that individuals must be self-motivated, i.e. have intrinsic motivation, if organizations hope to maintain and encourage greater productivity from its workforce.

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CHANGE MANAGEMENT IN COMPLEX SYSTEMS: USING APPRECIATIVE INQUIRY FOR GENERATIVE LEARNING

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ABSTRACT

The author developed a model as a result of a change management consulting project that was used to facilitate successful change in the organization. The change management tool used to execute the change model was Appreciative Inquiry (AI), developed by [2] David Cooperrider and Diana Whitney (1999). This tool has been used in significant ways since and is rapidly becoming a change management tool of “record” in a number of different situations. The Change Management Process Model uses systems theory to diagnose, design interventions, and manage the process.

INTRODUCTION

A Change Management Process Model was developed for an organizational consulting project. This model uses systems theory to arrive at a diagnosis, design the interventions, and manage the change process. The primary change management tool used in the change process was Appreciative Inquiry (AI) [2] [3] (Cooperrider & Whitney, 1999; Holman, Devane, & Cady, 2007).

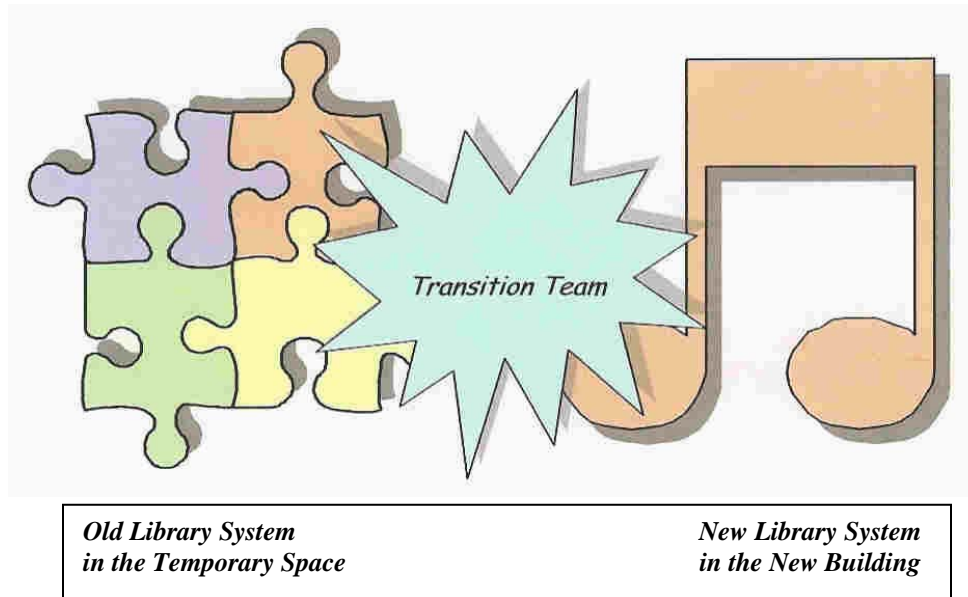
In this case, a public library system had experienced a major meltdown of organizational communications after moving the operations into a dramatically different workspace located in a new building. The organizational culture prior to the library’s move was warm, family-like, open, and a high performing organization. A central kitchen that everyone had to frequently pass through provided a place for sharing and collaborating. Everyone knew everything because it all happened in the kitchen: meetings, celebrations, problem-solving, and the sharing of food and fun. It took years for this nurturing culture to build. The shock of losing the physical space that enabled this warm and nurturing culture thrust the organization into a state of high anxiety, causing crippling communication snafus and poor performance. The historic nature of the library system was to maintain homeostasis [9] (O'Connor & McDermott, 1997); to manage change very slowly and carefully and to foster slow, deliberative adaptive policies.

Often, a “quick-fix” approach is used to address organizational crises. When this approach is used, diagnoses focus on the symptoms of a problem [10] (Olson & Eoyang, 2001). These symptoms are usually discrete and situated in one or several areas of the organization. However, in these scenarios, when interventions are executed unintended consequences can occur in the whole system.

Systems thinking, or looking at the whole rather than the parts [16] (Senge, 1990), was used to arrive at a understanding of what was happening in the library system. Kurt Lewin’s theory of change proposes that an organization (or individual or community) must progress through the stages of change he described as “Freeze, Unfreeze, and Refreeze,” and that driving forces must overcome powerful restraining forces in the system in order for the change to occur [15] (Schein, 1995). Individual resistance can form the most powerful restraining force of all, and in order to alleviate resistance, I developed a collaborative, participatory process [12] (Patton, 1997) that involved all members of the library system. People were brought in from each department and from all levels to work together to articulate the current state of the organization, address the issues, and formulate long-term solutions that would allow adaptation to the new space and the rebirth of a highly successful culture. This initial group formed a Transition Team which served, essentially, as the Champions of Change [1] (Black & Gregersen, 2003). They were tasked with taking the first steps to identify the critical issues that, when addressed, would have the greatest

positive impact on the organization. These strategies or “paths of change” [5] (McWhinney, 1997), p. 120) would then form the direction taken by the whole organization.

FIGURE 1: A CHANGE MANAGEMENT PROCESS MODEL



[4] (Mattare, 2004)

Appreciative Inquiry

AI, developed by [2] Cooperrider & Whitney (1999), is based on the idea that a change in language from a problem-seeking/solving perspective to language that assumes and builds on the best in people and organizations will produce positive effects.

Appreciative inquiry is the cooperative, corevolutionary search for the best in people, their organizations and communities, and the world around them. It involves systematic discovery of what gives “life” to an organization or community when it is most effective, and most capable in economic, ecological, and human terms.

AI assumes that every organization or community has “untapped and rich accounts of the positive”—what people talk about as past, present, and future capacities—the positive core. AI links the knowledge and energy of this core directly to an organization or community’s change agenda, and changes never thought possible are suddenly and dramatically mobilized [3] (Holman et al., 2007).

The “appreciative interview” forms the core of the process [3] (Holman et al., 2007). This is a one-on-one dialogue among organization stakeholders that uses questions framed around peak experiences, values, and what gives “life” to the organization at its best [3] (Holman et al., 2007). Some of these questions are:

1. Describe a time in your organization that you consider a high point experience, a time when you were most engaged and felt alive and vibrant.
2. Without being modest, what do you value most about yourself, your work, and your organization?
3. What are the core factors that give life to your organization when it is at its best?

- Imagine your organization ten years from now, when everything is just as you always wished it could be. What is different? How have your contributed to this “dream organization” [3] (Holman et al., 2007)?

As it becomes clear, this method gets to the positive core of the organization and facilitates a process to build upon that core. As contrasted with our traditional approach to solving problems in organizations, AI is revolutionary.

TABLE 1: COMPARISON OF PROBLEM SOLVING APPROACH TO AI APPROACH

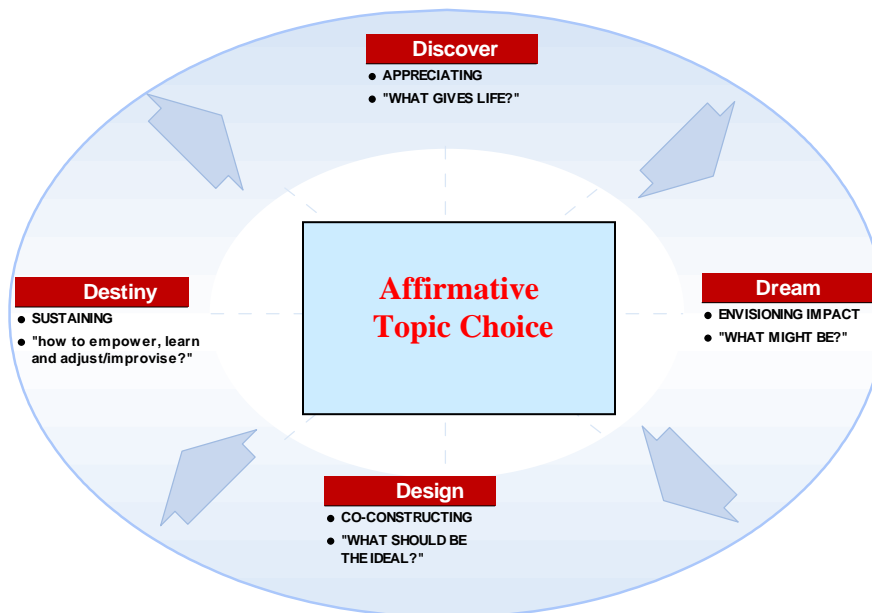
<u>Problem Solving</u>	<u>Appreciative Inquiry</u>
Identify “what’s wrong”	Appreciating and valuing the best of “what is”
Analyze the causes	Creating a vision of what might be
Possible solutions	Dialoguing what should be
Treatment/intervention	

Adapted from (Holman et al., 2007)

The basic assumption of the traditional approach to organization change is that an organization is a problem to be solved versus the AI method which assumes that an organization is a mystery to be embraced [3] (Holman et al., 2007).

The AI change method is expressed via the 4-D Cycle which is: Discovery, Dream, Design, and Destiny.

FIGURE 2: THE APPRECIATIVE INQUIRY 4-D CYCLE



Adapted from (Holman et al., 2007)

The 4-D Cycle contains processes where:

- The whole organization system “discovers” via inquiry into the positive core.

2. The organization “dreams” by co-creating a results-based vision discovered in the first step of the process.
3. The organization then “designs” by creating what possibilities could be achieved.
4. And, the organization articulates its “destiny” by strengthening the affirmative capability of the whole system [3] (Holman et al., 2007).

The central, unifying concept of the 4-D Cycle is the Affirmative Topic Choice which is the starting point of the AI process. Quite versatile, the AI process may be a quick conversation between boss and employee or a several-days-long gathering of a large community that wishes to address challenges.

The Change Management Process

When concern about the deteriorating process of internal communications first arose, the management of the library felt that the introduction of a library system Intranet would go far to improve things. This proposed solution drew from the traditional discrete problem solving approach rather than attempting to address what was strong and good about the organization that could serve as a foundation upon which to build a new vision of a future state. A failure to successfully implement the Intranet and a lot of staff resistance to it and other changes led the management team to request that I assist them.

In an effort to address the systemic nature of the issue, a more holistic and systematic approach was designed so that the process of addressing the issue became collaborative and consensual. My goal was to move people’s thinking from a “problem” orientation to a “systems” orientation. I hoped that the mental models could change away from the problem-oriented view, and that a “metaposition” view [9] (O'Connor & McDermott, 1997) could be taken, one that would move outside traditional frames. In other words, I wanted to move thinking from specific, discrete foci to seeing the “whole” [16] (Senge, 1990). Secondly, I sought to encourage and assist in instituting a team-based, collaborative approach to defining the needs, articulating the desired outcomes, and affecting those outcomes. And, thirdly, I wanted to introduce the concept of “culture” and its role in organizational development. In this case the core values, as related to the organizational culture of the library system [8] (Morgan, 1989), had been challenged.

In the culture of the library, empowerment of staff is critical and a key step in organizational development and learning in the system. Since the library is a service provided by the county government, it is closed and bureaucratic in structure, as defined by Max Weber and discussed in *Developing and Maintaining Open Organizations* [7] (Mink, Shultz, & Mink, 1991). The closed organization typically communicates “down” through ranks by omnipotent senior management [6] [7] (Mink, Esterhuysen, Mink, & Owen, 1993; Mink et al., 1991). The organization is not good at obtaining external feedback or responding to any feedback [7] (Mink et al., 1991). This particular system was not strictly a closed organization nor was it completely bureaucratic. It did have a more flexible and adaptive nature than the purest of bureaucracies. However, it needed to be more open, managing “through supportive use of authority by encouraging experimentation and tolerating ambiguity” [7] (Mink et al., 1991). By building these flexible temporary transition task forces, by being more experimental, and by using collaborative and empowering processes, the communication system developed would belong to the developers, rather than be imposed upon them.

The steps in the change process consisted of a series of interviews, focus groups, and workshops, all progressing from one to the other and all using AI. In the first interview step which was an initial discussion with management, I opened the subject of looking at addressing communication issues in a broader way. As an example, I began this process of Discovery by asking: “Describe the perfect day for yourself for giving and receiving the information you need to successfully work with the public and with other departments in the library.” This discussion provided the framework for a subsequent focus group that was expanded to include more staff at subordinate levels. The 4-D Discovery and Dream steps illuminated how much the focus group participants missed the frequent opportunities to see each other face-to-face that were available in the temporary library facility. They clearly wanted that feeling of

community and dialogue back again, plus they wanted the information they needed delivered quickly, easily, and efficiently. They wanted the delivery mechanisms to be varied, ranging from the Intranet, to frequent meetings, written memoranda, and social occasions. The consensus was that a complete, well-planned system of communication was needed, one that was collaboratively designed by its users, and included an Intranet as one part of many other methodologies that would form the whole communication system. At this point, a very major leap had taken place that moved people from single-issue, problem-solving thinking to thinking about systemic issues framed by organizational culture. I believe that this leap was accomplished because of the collaborative nature of the search for information, i.e., the management and staff discussions that had occurred. The process thus far had taken what is called a “new direction beginning,” where the statements made and questions posed were framed in terms of the opportunities presented by the move [13] (Preskill & Torres, 1999). Finally, a transition team workshop was conducted.

The transition team built on the prior discussions, defined the critical development issues that needed to be resolved, and became the Change Champions for a subsequent series of staff workshops. The establishment of the transitional team served as the first step in the library’s transitioning to a revitalized culture with an efficient communication system. The staff workshops, rolled out from the transition team workshop, involved all staff members who were primary patron contacts and those who directly supported them.

The transition workshop agenda is outlined in Table 2. The orientation of the workshop, which was evaluative, follows the format detailed by Owen and is “interactive” evaluation [11] (Owen, 1999). Owen characterizes the approach or use of interactive evaluation as: *responsive*, or focused on the illumination of the delivery of a program (in this case the delivery of communication as a tool); *action research* (which in this case is the essential nature of a brainstorming workshop); *quality review* (or institutional self-study [11] (Owen, 1999); *developmental evaluation* (continuous improvement of a key library process); and *empowerment evaluation* (encouraging the users of the communication system to develop it themselves [11] (Owen, 1999).

TABLE 2: TRANSITION TEAM WORKSHOP PLAN

Time	Activity	Format	Desired Outcomes
30 minutes	<ul style="list-style-type: none"> Icebreaker: Think outside the box exercise Overview Discussion of next activities 	<ul style="list-style-type: none"> Whole group exercise Lecture Group discussion 	<ul style="list-style-type: none"> Lay groundwork and goals for workshop Demonstrate communication experientially Communication methods
45 minutes	<ul style="list-style-type: none"> Using Appreciative Inquiry-framed questions, share and discuss high points Brainstorm a ‘perfect’ communication system 	<ul style="list-style-type: none"> Break into small groups; put ideas on flipchart to share with the group 	<ul style="list-style-type: none"> Build teamwork across departments Build collaboration Arrive at group consensus Develop new ideas and ways of thinking
45 minutes	<ul style="list-style-type: none"> Small groups present ideas 	<ul style="list-style-type: none"> Whole group 	<ul style="list-style-type: none"> Thinking ‘outside the box’ Collaboration Consensus Focus on positive

Time	Activity	Format	Desired Outcomes
30 minutes	<ul style="list-style-type: none"> • Discussion • Outline of next steps • Ideas for staff workshops • Tentative schedule • Enjoy a bowl of fresh-baked cookies 	<ul style="list-style-type: none"> • Whole group 	<ul style="list-style-type: none"> • General agreement • Outline for staff workshops • Participation • Team building • Excitement • Buy-in to the process • Acceptance of formal style of communication • Commitment to recapture of former family-like culture

Some of the questions asked of participants and discussed in breakout groups were:

- *Looking back over your experiences at the library, think of a time when you felt that communication among your colleagues and co-workers was at its best. What was going on? What made it successful? Who was involved? What was it about you that made it successful?*
- *What do you value most about working at the library?*
- *If you could change, develop, and transform communication at the library now in any way you wished, what three things would you do to?*

CONCLUSION

The use of AI in this change management project allowed an organization in crisis to Discover its core values, Dream of a better communication process, Design a new vision, and rearticulate its Destiny. AI as a change management tool used a specific model of change that created a transition team, Champions of Change, that would be the impetus for the newly defined organization dreams, vision, and values.

This process was unusually successful in that profound, fundamental change was achieved by engaging participants in a joyful and positive experience. All of this was accomplished with the recognition that change in this case occurred all during the process of “building the bridge while they walked on it” [14] (Quinn, 2004).

The initial steps of transforming the thinking of management from a problem-orientation led to a discovery process and the foundation for ongoing positive change and high performance [3] (Holman et al., 2007). Collaboration became an institutionalized organizational process and replaced the usual bureaucratic approach where management pushed decisions down the hierarchy of staff lines. Decisions in the future will be made by the consensus of the staff and accepted by management.

Now, the organization is engaged in active and enthusiastic activity to accomplish many objectives. There is a new, shared sense of what has been missing and what needs to be done to address the loss of closeness in the library culture. The excitement and consensus generated in the discussions and workshops have resulted in a commitment to working together to recapture the sense of family in the system. The staff is now in charge of recreating this sense, and they are supported by their management. In the library system, a living, breathing, vital culture will continue to grow and develop with a new, co-created and shared vision.

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ASSESSING THE INFLUENCE OF CHIEF EXECUTIVE OFFICER
SUPPORTIVENESS BEHAVIOR
ON MARKET ORIENTATION AND BUSINESS PERFORMANCE

Keywords: Market orientation, supportiveness behavior, Situational Leadership Theory, business performance, community banks.

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ABSTRACT

Research has shown that there is a positive relationship between market orientation and enhanced business performance. The support of top management is acknowledged by most as an antecedent to market orientation. It is also concluded by some that the leadership style of top management has a direct influence upon the level of market orientation. A study was conducted to assess the influence of the leadership style incorporated in the supportive behavior dimension of situational leadership theory on market orientation and business performance. Study results indicate a significant positive relationship between the supportiveness behavior dimension and market orientation. A significant positive relationship between the supportiveness behavior dimension and business performance was not found. Mixed results were indicated when testing the historically significant positive relationship between market orientation and business performance.

ASSESSING THE INFLUENCE OF CHIEF EXECUTIVE OFFICER SUPPORTIVENESS BEHAVIOR ON MARKET ORIENTATION AND BUSINESS PERFORMANCE

Background of the Problem

Research has shown a positive relationship between the level of market orientation within a firm and enhanced business performance. (Kohli & Jaworski, 1990, 1993; Narver & Slater, 1990, 1994; Desphande et al., 1993; Avlonitis & Gounaris, 1999, Chang & Chen, 1998; McNaughton et al., 2002) The research, depending upon the author, has identified a number of antecedents to market orientation. These antecedents include, but are not limited to, top management support (Ashley & Patel, 2003; Avlonitis & Gounaris, 1999; Desphande et al., 1993; Greenley, 1995; Kohli & Jaworski, 1990, 1993; Narver & Slater, 1990, 1994; Waldman et al., 2001); decentralization (Avlonitis & Gounaris, 1999; Harris, 2002); and marketing planning quality (Levitt, 1960; Pulendran et al., 2003). This study examined the relationship, in a service industry, between market orientation and business performance. It also examined the antecedents to market orientation, i.e., top management support and market planning quality, and their relationship to market orientation in this environment.

Harris and Ogbonna's (2001) study "suggests that over 27 percent of the variation of the measure of overall market orientation can be attributed to varying leadership styles" of top management (Harris & Ogbonna, 2001, p. 7). Their study also found "a leadership style characterized by non-directive role clarification (leadership participation) or consideration (supportive leadership style) fosters all facets of market orientation" (Harris

& Ogbonna, 2001, p.7). Harris and Ogbonna studied a multi-industry sample of corporations in the United Kingdom having over 5000 employees (Harris & Ogbonna, 2001).

This paper examined one particular supportive leadership style to determine the relationship between it and market orientation as well as business performance of the firm. The particular leadership style in question is the supportiveness behavior dimension of situational leadership theory, as developed by Hersey and Blanchard and subsequently modified by Zigarmi and Blanchard. (Zigarmi et al., 1997) Unlike Harris and Ogbonna, this study addressed a service industry, specifically the community banking segment of commercial banking. These banks are much smaller in employee count, generally having approximately one employee for each four million dollars in assets (FDIC, 2005). Given that community banks range in size from approximately one hundred million dollars to one billion dollars in asset size, the employee count generally ranges from approximately 20 to 500 as compared to the 5000 employee minimum in the Harris and Ogbonna study.

Market Orientation and Business Performance

Kohli and Jaworski (1990) set forth the proposition: “The greater the market orientation of an organization, the higher its business performance” (Kohli & Jaworski, 1990, p. 13). They noted that the literature, in 1990, consisted of only a few empirical studies on the consequences of a market orientation; most of these studies focused on the extent to which organizations adopted a market orientation. Their results suggest that a market orientation is likely to positively relate to business performance.

Publishing six months after Kohli and Jaworski, Narver and Slater (1990) set forth an exploratory study designed to develop a valid measure of market orientation. They cited authors, such as Levitt (1960), Kotler (1984) and Webster (1988), to support the statement that “a business that increases its market orientation will improve its financial performance” (Narver & Slater, 1990, p. 20). The authors, citing the works of others, made the statement that, for an organization to achieve above normal performance on a sustained basis, it must create a sustainable competitive advantage. The desire to provide value to customers requires a culture within the organization that will produce the behaviors necessary to maintain a sustainable competitive advantage. The culture that most effectively creates these necessary behaviors is market orientation. (Narver & Slater, 1990)

The findings of these studies support this researcher’s hypothesis that market orientation is an important determinant of profitability. Researchers have emphasized that market orientation comprises a continuum of levels. The higher the degree of market orientation, the higher will be the level of profitability. (Kohli & Jaworski, 1990)

Antecedents to Market Orientation

Top management support and marketing planning, both important antecedents to market orientation, have been the basis for research studies. (Jaworski & Kohli, 1993; Pulendran, 2003) Marketing planning is a “widely used technology in marketing. It is the principle mechanism firms possess for aligning their efforts with the expectations of their customers” (Pulendran et al., 2003, p. 2). The aligning of efforts is similar to resource allocation in that top management has involvement in the process.

Felton (1959) and Webster (1988) stated that market orientation is the responsibility of top management. Kohli and Jaworski (1990) noted that one of the most important antecedents to a market orientation is senior management support. Their findings suggest that senior managers must be convinced of the worth of a market orientation and, in turn, communicate to the organization their commitment to such an orientation. Senior management must be willing to adapt to change and take any reasonable risk associated with the implementation of the orientation. The implementation of a market orientation is the result of the recognition of a gap between the current level of orientation and the organization's preferred level of orientation. (Kohli & Jaworski, 1990)

Narver and Slater (1990) added support to this premise by inferring from their research that the most successful top management teams are willing to adapt to the changes necessary to raise the level of the firm's market orientation. These authors concluded that the support of senior management is an antecedent of market orientation.

Harris and Ogbonna's literature review noted that, while there are ample anecdotal claims of a linkage between leadership style and culture, such as a market orientation, there are no studies which empirically address the issue. The purpose of their study was "to explore and describe the impact of top management leadership style in influencing the process of market development (Harris & Ogbonna, 2001, p. 1)." Their study found that management support is an antecedent to market orientation within the firm. Their research also concluded that the leadership style of senior managers has a direct influence upon the level of a market orientation within the firm. (Harris & Ogbonna, 2001) Thus, such theories examining effective leadership behavior, market orientation, marketing planning and senior management behavior provide the theoretical basis of this study.

Situational Leadership Theory

Situational leadership theory (SLT), as developed by Hersey and Blanchard, is similar to other contingency leadership theories. It holds that “effective leadership depends upon the ability of the leader to accurately diagnose situational conditions and to respond with appropriate combinations of behavior” (Goodson, McGee & Cashman, 1989, p. 446). The two dimensions of situational leadership are directiveness behavior and supportiveness behavior. These dimensions are spread over a continuum of four leadership styles. These styles are directing, coaching, supporting, and delegating. (Blanchard, 1997)

Research Question

This study proposed the following theoretical model to address the influence of the supportiveness behavior dimension of situational leadership theory upon a firm’s market orientation and business performance. According to the research studies reviewed this appears to be a new variable relative to market orientation. The influence of top management support and marketing planning quality, known antecedents to market orientation, were used as control variables. Also addressed is the influence of market orientation upon business performance.

(INSERT FIGURE 1)

Market Orientation and Leadership

In 1960 Levitt noted that “marketing is the stepchild of most modern corporations” (Levitt, 1960, p. 1). He lamented that only rarely did a corporation have top management support for marketing innovation. He noted that, in the time period in which he was

writing, most managers seemed unaware of the profit associated with creating new value satisfaction for the corporation's customers. Levitt was of the opinion that, for managers to seize upon these profits they had to assume responsibility for the imbuing of a guiding philosophy of creativity and value satisfaction throughout the corporation. The corporation had to be a leader. It had to force competitors to react to its actions rather than responding to the actions of others (Levitt, 1960). It was top management that forced such actions.

Based upon their literature review, Kohli and Jaworski cited three antecedents to a market orientation. The antecedents were senior management factors, interdepartmental dynamics, and organizational systems. They cited numerous authors, including Webster, in support of the premise that senior management was an important antecedent to a market orientation. Webster (1988) asserted that a market orientation originated with top management and that "customer-oriented values and beliefs are uniquely the responsibility of top management" (Kohli & Jaworski, 1990, p. 7).

Kohli and Jaworski concluded that age was not an antecedent to managerial support of market orientation. One of the propositions set forth by Kohli and Jaworski was that the greater senior management's educational attainment and upward mobility, the greater the market orientation of the organization. The authors again cited Webster (1988) who argued that "the key to developing a market driven, customer oriented business lies in how managers are valued and rewarded" (Webster, 1988, p. 38).

Evaluation based on short-term profitability, at the expense of long-term business interests, would result in a lessening of a market orientation. (Kohli & Jaworski, 1990)

The findings suggested that senior managers had to be convinced of the worth of a market orientation and, in turn, communicate their commitment to such an orientation to the organization. Senior managers had to be willing to adapt to change and take any reasonable risk associated with the implementation of the orientation. The implementation of a market orientation resulted from the recognition of a gap between the current level of orientation and the organization's preferred orientation. (Kohli & Jaworski, 1990)

Research Question

The research question posed by this study is "Does the supportiveness behavior dimension of situational leadership theory, as perceived by the firm's CEO, influence the firm's market orientation and business performance?" Given the characteristics of leaders who exhibit supportiveness behavior, the intuitive answer to the research question would appear to be "yes". The body of research does not appear to adequately support this intuitive conclusion. This study uses an integrated model to address the issue of the positive influence of the supportiveness behavior dimension of situational leadership theory, as perceived by the CEO, upon a firm's market orientation as well as its business performance.

Theoretical Model and Study Variables

Prior studies have given insight into the major components of the theoretical model used in this research. These components include market orientation (Kohli & Jaworski, 1990, 1993; Narver & Slater, 1990, 1994; Desphande et al., 1993) and two of its antecedents, those being top management support and market planning quality; business performance (Kohli & Jaworski, 1990, 1994; Narver & Slater, 1990, 1994; Avlonitis &

Gournaris, 1995; Chang et al., 1999; McNaughton et al., 2002) and situational leadership theory's supportiveness behavior dimension (Hersey & Blanchard, 1993; Goodson et al., 1989).

The research model consisted of one dependent variable, two independent variables, and two antecedents to one of the independent variables. These two antecedents are used as control variables. The dependent variable is business performance. The chosen measures used to analyze business performance are growth in assets and growth in after tax profit, for the fiscal years 2003/2004 and 2004/2005. The data to compute the financial measures were submitted by the respondents from the annual audited financial statements of their respective banking institutions. These data are from the same annual audited financial statements that the financial institutions submitted to their governmental regulators. Therefore, the investigator is confident in the accuracy of the responses relative to financial information provided by the respondents.

One of the independent variables studied is the supportiveness behavioral dimension of situational leadership theory. Supportive behavior is "the extent to which the leader engages in two-way communication, listens, provides support and encouragement, facilitates interaction, and involves the follower(s) in decision making" (Zigarmi et al., 1997, p. 6). This variable was measured using the Section 2 (Supportive Behavior) component of the Leadership Action Profile II –Self Survey instrument. Questions were included within the survey instrument that addressed the supportiveness behavior dimension and are responded to using a seven-point Likert scale where 1 = Not at all and 7 = To an extreme extent. Representative survey items included: a) I encourage the free

flow of ideas; and b) I make time to listen to employee questions and problems. The Cronbach's Alpha was .86, which meets the required threshold. (Hair et al., 1998)

The other independent variable studied is the level of market orientation within the financial institution of each of the respective respondents. The definition of market orientation was that used by Narver and Slater (1990). Their definition of the term contains three behavioral components and two decision criteria. The three behavioral components were customer orientation, competitor orientation, and interfunctional discipline. The two decision criteria are profitability and long-term focus (Narver & Slater, 1990). Their instrument contained questions that are responded to using a seven-point Likert scale. Items in the survey instrument used in this study were taken from the Narver and Slater instrument and used a 7 point Likert scale where 1 = Not at all and 7 = To an extreme extent. Representative survey items included: a) We measure customer satisfaction systematically and frequently; and b) Our strategy for competitive advantage is based on our understanding of customer needs. The Cronbach's Alpha was .70 which meets the required threshold.

Narver and Slater more specifically define each of the three behavioral components of market orientation as follows. Customer orientation is the "sufficient understanding of one's target buyers to be able to create superior value for them continuously" (Narver & Slater, 1990, p. 21). Competitor orientation is the understanding of existing and potential competitors strengths, weaknesses, capabilities, and strategies in both the short and long term. And, interfunctional discipline is the coordination of activities and resources within the firm with the objective of creating superior customer value. The scale items used to compute marketing planning and top management support were drawn from the

instrument written by Pulendran, Speed and Widing (2003). The Cronbach's Alphas for these two antecedents were .81 and .69, respectively. According to Hair et al. "The generally agreed upon lower limit for Cronbach's alpha is .70, although it may decrease to .60 in exploratory research" (p.118).

Demographics of the Involved Population

Community banks were chosen as the study population. There are approximately 8,601 such banks and savings associations in the United States. (Federal Deposit Insurance Corporation, 2003) Community banks and savings associations in the states of Florida, Georgia, Tennessee, North Carolina and Virginia comprised the study population. A total of 926 institutions was selected from the directories published by the various state bankers' associations. There were two selection criteria: 1) that the bank not be part of a super-regional or nation-wide bank holding company, and 2) that the bank be at least three years old.

The same survey instrument used to pilot the study was used in the final study. A total of 926 survey questionnaires, including the 263 contained in the pilot study.

(INSERT TABLE 1)

Results of the Study

Statistically significant relationships, at the 0.000 level, were found between market orientation and the supportiveness behavior dimension, top management support, and marketing planning quality. The relationship between market orientation and the measures of business performance was mixed. There were statistically significant relationships between market orientation and growth in total assets for the time period 2003/2004 and growth in profit after taxes for the time period 2004/2005. The

significance levels were 0.019 and 0.023 respectively. This was not the case for the relationship between market orientation and growth in total assets 2004/2005 and growth in profit after tax 2003/2004. These levels were statistically non-significant at .433 and .868 respectively. No levels of statistically significant relationships were found between supportiveness behavior and top management support as they related to the measures of business performance. However, marketing planning quality was found to have a statistically significant relationship to growth in total assets for the time period 2003/2004, as well as for the time period 2004/2005. These levels were 0.000 and 0.015 respectively.

Table 2 sets forth the mean, standard deviation, alphas and bi variate correlations of the variables.

(INSERT TABLE 2)

Table 3 sets the standardized beta coefficients, equation R^2 , hypotheses and test results arising from the statistical analysis.

(INSERT TABLE 3)

Discussion of Hypotheses

In the regression equations related to H1, market orientation was regressed onto four individual measures of business performance. The four measures of business performance were growth in total assets for the periods 2003/2004 and 2004/2005 and growth in profit after tax for the same two time periods. The results were mixed.

The regression equation related to growth in total assets 2003/2004 was significant: $F(1,179) = 5.62$, $R^2 = 0.03$, $p = .02$ and $\beta = .175$. The sign of the beta was positive, therefore, the results support Hypothesis 1.

The regression equation related to growth in profits after tax 2004/2005 was also significant: $F(1,179) = 5.25$, $R^2 = .03$, $p = .02$ and $\beta = .169$. The sign of the beta was positive, therefore the results support Hypothesis 1.

The regression equation related to growth in total assets 2004/2005 was not significant: $F(1,179) = 0.62$, $R^2 = .00$, $p = .43$ and $\beta = .06$. And, the regression equation for growth in profits after tax 2003/2004 also was not significant: $F(1,179) = 0.03$, $R^2 = .00$, $p = .87$ and $\beta = -.012$. They do not support Hypothesis 1.

Two of the four regression equations related to the relationship between market orientation and the measures of business performance were positively significant and two were not positively significant. Therefore, Hypothesis 1 is rejected.

These results are contrary to the findings of Narver and Slater (1990), Kohli and Jaworski (1990, 1993), Desphande et al. (1993), Chang and Chen (1998), Noble (2002) and McNaughton (2002). They do however perhaps compliment the findings of Greenley (1995) who found that market orientation might be uneconomical in some environments.

The regression equation related to H2, where market orientation was regressed on market planning quality, top management support and supportiveness behavior, was significant: $F(3,177) = 24.9$, $R^2 = .30$, and $p = .000$. All three variables were responsible for the effect: marketing planning quality ($\beta = .17$, $p = .014$), top management support ($\beta = .242$, $p = .001$) and supportiveness behavior dimension ($\beta = .29$, $p = .000$). The signs of all the betas were positive; therefore, the results support Hypothesis 2 and it is accepted.

The researcher has found no other research that specifically addresses this particular management behavioral aspect, that is, the supportiveness behavioral dimension of situational leadership theory, and its relationship to market orientation. The necessity for market orientation to have the support of top management has been noted by numerous authors, such as Levitt (1960), Hambrick and Mason (1984) and Kohli and Jaworski (1990). The finding of a positive and significant relationship between market planning quality and market orientation are supported by the findings of Simkin (2002) and Pulendran et al. (2003).

Of particular note is the fact that, when these two generally accepted antecedents to market orientation were combined with the supportiveness behavior dimension of situation leadership theory, an equation R^2 of .30 with a $p = .000$ was generated. This raises a question as to whether the supportiveness behavior dimension, as defined by situational leadership theory, is an antecedent to market orientation.

In the regression equations related to H3, the supportiveness behavior of the firm's chief executive officer was regressed onto the four measures of business performance previously noted. The regression equation related to growth in total assets for 2003/2004 was not significant: $F(1, 179) = 0.306$, $R^2 = .00$, $p = .581$ and $\beta = .041$. The regression equation related to growth in total assets for 2004/2005 was also not significant: $F(1, 179) = 138$, $R^2 = .00$, $p = .711$ and $\beta = .028$. Growth in profit after tax for 2003/2004 showed different results. This regression equation was significant: $F(1, 179) = 3.884$, $R^2 = .02$, $p = .05$ and $\beta = -.146$. However, the sign of the beta was negative and therefore did not support Hypothesis 3. The regression equation related to growth in profit after tax for 2004/2005, also was not significant: $F(1, 179) = .020$, $R^2 = .00$, $p = .889$ and $\beta = .010$.

None of the four regression equations related to the relationship between the supportiveness behavior dimension and the measures of business performance was significant. Therefore, Hypothesis 3 is rejected.

Implications of the Study to Current Theory in the Discipline

Two implications of consequence to current theory are noted as a result of this study. The first implication is that the supportiveness behavior dimension of situational leadership theory has a positive and significant influence relative to market orientation. While there has been ample research on market orientation, there is limited empirical research, as previously noted, to support the intuitive appeal of situational leadership theory. These findings add to the base of knowledge regarding situational leadership theory in general and its supportiveness behavior dimension in particular. The author did not find any other studies that specifically addressed this relationship.

The second implication, relative to current theory, is the finding that, in this particular study, there was not a consistent positive significant relationship between market orientation and business performance. This finding is contrary to findings of numerous authors, as previously noted, who have found significant positive relationships between market orientation and business performance.

The finding that market orientation does not have a statistically positive relationship to business performance, and therefore may be uneconomic in the community banking industry, is counter-intuitive. Banking is one of the few industries where the customer, a key factor in market orientation, is also the major provider/vendor of the firm's basic raw materials inventory; that is funds. The typical customer is one who purchases a firm's revenue generating products. In the case of banking, the principal products are loans of

various sorts, such as auto loans, home mortgages, and commercial and industrial loans. The customer also purchases products from the bank which generate expense to the bank. These expense generating products are deposit liabilities, such as checking and savings accounts and certificates of deposit. Without the funds produced by the expense generating products, the bank would have fewer funds to lend thus reducing its supply of revenue generating products to sell. Given the importance of the customer in this scenario, it would seem that the orientation to the customer would not only be significant but necessary almost irrespective of the cost.

These findings regarding market orientation and business performance might be impacted by the geographic area surveyed the nature of the service industry surveyed, or, the fact that these firms have a relatively small number of employees as compared to other studies which garnered different results.

Limitations of the Study

The researcher acknowledges that the two period timeframe measurement of business performance may have been insufficient. A longitudinal study may have yielded different results regarding the relationship between market orientation and measures of business performance in the community banking industry. Also, a study that was more geographically expanded may have yielded different results as to this relationship.

The decision was made to make the CEO the proxy for all of top management when measuring market orientation and supportiveness behavior. This may have had some impact upon the results of the study.

Implications of the Findings

The findings of the study have value to both scholars and practitioners because they build upon previous research on market orientation and situational leadership theory.

The study showed that supportive behavior on the part of the CEO accounts for a portion of the level of market orientation in a positive and significant way. This managerial characteristic may be found to be of value when evaluating a CEO.

Recommendations for Future Research

Harris and Ogbonna (2001) conclude that the leadership style of senior managers has a direct influence upon the level of market orientation within the firm. This study would support their conclusion. It would be of interest, however, to test for both the supportiveness behavior dimension and the directiveness behavior dimension of situational leadership theory by using the same instrument and the same study population. Studies of other service industries with a small number of employees would also expand the knowledge base related to this matter.

Additionally, it could be that community bank CEOs, the focus of this study, behave differently than CEOs of large bank holding companies or super-regional, nationwide or international banks. The impact of the CEO in a large environment may be quite different than the impact or influence of a CEO in a small environment, such as a community bank.

Conclusions

The research problem addressed by this study related to the influence of the CEO's supportiveness behavior on the market orientation paradigm of the firm, and the business performance as measured by select financial data. One can conclude from this

investigation that market orientation and supportiveness behavior are positively related at a level of statistical significance.

The positive relationship between market orientation and two of its known antecedents, top management support and marketing planning quality, was also confirmed. Additionally, it was shown that there is a positive relationship between the supportiveness behavior dimension and market orientation. This relationship, when combined with the two generally accepted antecedents previously mentioned, generated an R^2 of .30 with a $p < .01$. Perhaps the supportiveness behavior dimension of situational leadership theory is the management style that increases market orientation to its highest level; or, is even an antecedent of market orientation. The questions are raised, but not answered, by this research.

TABLES

Table 1: Final Study: Descriptive Statistics of the Study Population

Category (181 Respondents)	Year End		
	2003	2004	2005
Asset Size (\$ millions)			
Mean	210	243	286
Standard Deviation	202	228	273
Range	16 - 1476	22 - 1639	23 - 1801
Profit After Tax (\$ millions)			
Mean	1.9	2.5	3.1
Standard Deviation	2.5	2.7	3.0
Range	(-1.5) - 19.4	(1.5) - 20.1	(1.7) - 16

Table 2: Relational Significance Levels and Alphas of the Study Variables

Variable	N	Mean	Std Dev	Mkt Ort	Sup Beh Dim	Top Mgt Sprt	Mkt Plng Qlty	GTA 3/4	GTA 4/5	GPAT 3/4	GPAT 4/5
Mkt Ort	181	4.8664	0.8069	0.70							
Sup Beh Dim	181	5.6980	0.6833	0.000**	0.86						
Top Mgt Sprt	181	5.2196	0.8257	0.000**	0.000**	0.69					
Mkt Plng Qlty	181	4.3550	1.1589	0.000**	0.000**	0.000**	0.81				
GTA 3/4	181	32.7107	41.9512	0.019*	0.581	0.701	0.000*	-			
GTA 4/5	181	42.9783	78.0715	0.433	0.711	0.714	0.015*	0.000**	-		
GPAT 3/4	181	0.5085	1.0941	0.868	0.050	0.381	0.874	0.000*	0.003	-	
GPAT 4/5	181	0.6346	1.2893	0.023	0.889	0.449	0.593	0.000**	0.000**	0.11	-

Alphas run on the diagonal.

** - Correlation is significant at the 0.01 level (two tailed).

* - Correlation is significant at the 0.05 level (two tailed).

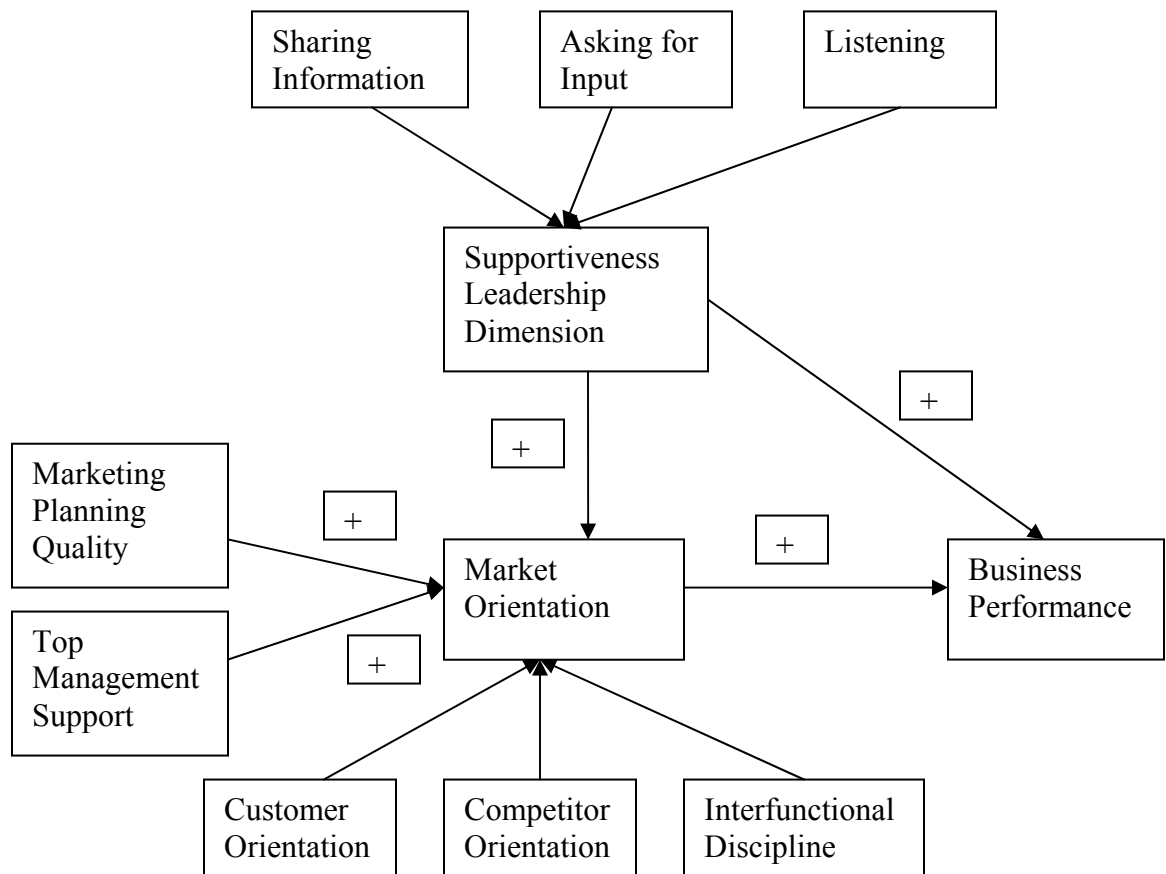
Table 3: Results of Hypothesis Testing.

Test	Hypotheses	Standardized Beta	Equation R ²
Rejects H1	H1: There is a positive relationship between the firm's market orientation and its business performance		
	Dependent Variable: GROTA54 Independent Variable: Market Orientation	.059#	.06#
	Dependent Variable: GROTA43 Independent Variable: Market Orientation	.175**	.03**
	Dependent Variable: GROPAT54 Independent Variable: Market Orientation	.169**	.03**
	Dependent Variable: GROPAT43 Independent Variable: Market Orientation	-.012#	.00#
Supports H2	H2: There is a positive relationship between the supportiveness behavior dimension of the chief executive officer and the firm's market orientation		
	Dependent Variable: Market Orientation Control Variable: Market Planning Quality Control Variable: Top Management Support Independent Variable: Supportiveness Behavior	.170* .242* .289*	.30*
Rejects H3	H3: There is a positive relationship between the supportiveness behavior dimension of the chief executive officer and the firm's business performance		
	Dependent Variable: GROTA54 Independent Variable: Supportiveness Behavior	-.028#	.00#
	Dependent Variable: GROTA43 Independent Variable: Supportiveness Behavior	.041#	.00#

	Dependent Variable: GROPAT54 Independent Variable: Supportiveness Behavior	.010#	.00#
	Dependent Variable: GROPAT43 Independent Variable: Supportiveness Behavior	-.146**	.02**
	*p= or <.01; **p= or <.05; #p=not significant		

FIGURES

Figure 1: Theoretical Model



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Examine Relationship Between Corruption and Transaction Governance Structure

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Abstract

A transaction governance structure (TGS) is a structure that mediates exchanges of goods or services (Williamson, 1979; 1981). According to traditional transaction cost theory, a transaction can be mediated by either the external market or the internal integrated firm (Coase, 1937; Williamson, 1979). A selection of TGS is based on a comparison of costs between market and firm. One influential factor, which can potentially increase transaction costs of market and favor selection of firm, is the opportunism in the market (Williamson 1985). There is no precedent of measuring opportunism in current literature. However, there are well defined indexes which measure corruption. This research explored the possibility and presented argument for using corruption to surrogate opportunism and to predict TGS accordingly. A statistical analysis indicated that corruption was significantly correlated with TGS based on the data of 154 countries.

Key Words: corruption, transaction governance structure, import and export, opportunism.

Introduction

Corruption as a cultural, political and economic phenomenon has attracted attention from industry, academia, and government. Corruption has been associated with slower productivity growth (Husted, 2005; Soon, 2006), lower level of foreign direct investment (Zhao, 2003), smaller stock market capitalization (Khumawala & Ramchand 2005) and undervaluing assets obtained through acquisitions or mergers (Gleason, Malgwi, Mathur & Owhoso, 2005). Corruption has been broadly observed across multiple countries (Ali & Isse, 2003) and intensely investigated in specific countries such as Russia (Kaufmann & Siegelbaum, 1997), Mexico (Husted 2002,1993), and China (Gong, 2003).

The majority of corruption studies was conducted by observing correlations without proposing any theoretical foundation. Corruption was frequently correlated with economic or cultural factors such as gross domestic product, foreign direct investment, power distance, masculinity, and individualism (Husted, 2005). A few studies provided formal theoretical models such as game theory (Svejnar & Smith, 1984), principal-agent model (Kiser & Tong, 1992), Cobb-Douglass production function (Mankiw, Romer & Weil, 1992; Everhart, Martinez-Vazquez & McNab, 2003), and rent-seeking theory (Lambsdorff, 2002; Kuncoro, 2006). This paper introduced transaction cost theory into corruption study. We explored the possibility and presented argument for using corruption to surrogate opportunism and to predict TGS accordingly. The rest of the paper covers the following issues – review of theoretical foundation, definition of construct, framework and hypothesis, variable measurement, statistical analysis, and conclusion.

Theoretical Foundation – Transaction Cost Economics

A transaction governance structure (TGS) is a structure that mediates exchange of goods or services (Williamson, 1979; 1981). According to traditional transaction cost theory, a transaction can be mediated by either the external market or the internal integrated firm (Coase, 1937; Williamson, 1979). A selection of TGS is based on a comparison of costs between market and firm. Market transaction costs are incurred because of opportunism in the market and limitations of decision makers in solving complex problems and processing information. On the other hand, firm transaction costs are based on agency costs associated with controlling, monitoring, and coordinating agents' activities within a firm's hierarchy. Figure 1 summarized the transaction cost theory.

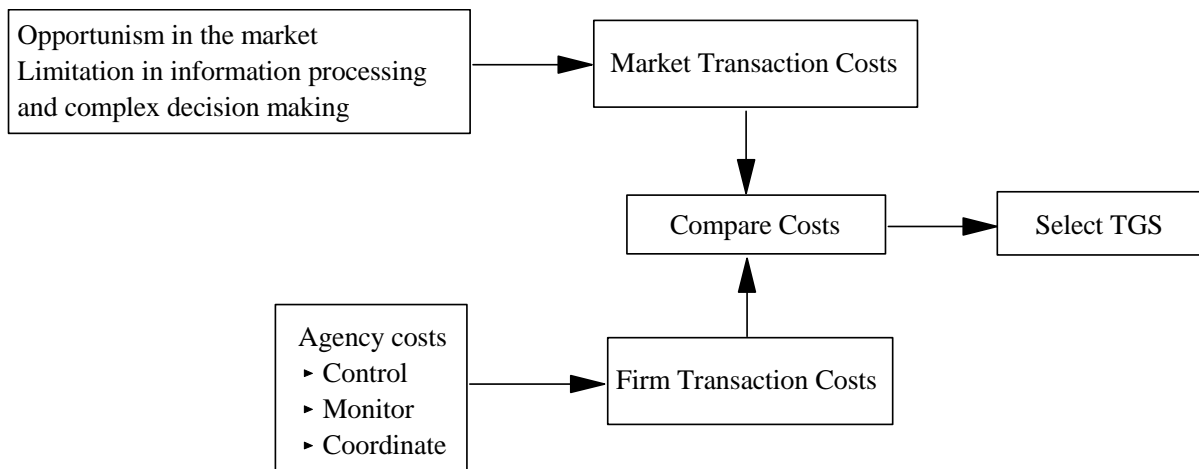


Figure 1. Transaction Cost Theory

Constructs – Opportunism and Corruption

One influential factor, which can potentially increase market transaction costs and favor selection of firm TGS, is the opportunism in the market. There is no precedent of measuring opportunism in current literature. However, there are well defined indexes which measure corruption. Before suggesting using corruption to surrogate opportunism, some questions arise regarding construct validity. Are there any similarities between the two constructs? Can corruption adequately represent the domain of opportunism? To answer the questions, let's see how these constructs are defined.

There are many definitions of corruption in the current literature. The meaning of corruption varies in different contexts. For instance, sociologists considered corruption as an effective way for Chicago mafia to establish themselves in the social system (Merton 1968). Political scientists examined corruption in relation with democracy and campaign finance (Hohenstein, 2004). Some economists saw corruption being detrimental to economic growth (Husted, 2005; Soon, 2006), while others studied corruption as a form cooperation which "grease the wheels" of commerce (Argandoña, 2005; Leff, 1964). Gift giving and favor exchange were considered as social norms in Chinese studies (Sun 2001), but investigated as bribery and corruption in Western studies (Husted, 2005; Soon, 2006).

In this paper, the construct of corruption was defined and addressed in the context of economic transactions. The definition is cited from Alemann (2004: 29).

Corruption is always an exchange process between two or more persons (or groups organized into two or more parties). The person who corrupts is in possession of economic goods or resources that are scarce; the person who is to be corrupted possesses power in its broadest

sense – power which was transferred to him or her by a defined public body to be used for the common good and according to fixed rules. The person who corrupts wants to get a concession or a contract or wants to avoid a punishment. He or she therefore bribes the person to be corrupted, i.e. the person who has got the power to issue the concessions or decide otherwise. It is, however, also possible that the person to be corrupted takes the initiative, making further demands on the person corrupting him or her.

Let's compare the definition of corruption with that of opportunism. Williamson, the founding father of transaction cost theory, defined opportunism as “self-interest seeking with guile” (Williamson 1985: 47). Is corruption self-interest seeking? Do parties carry out corruption with guile? Here we present the argument which leads to positive conclusions to the above questions.

Corruption is viewed as a particular type of rent-seeking activity by many researchers (Lambsdorff, 2002; Rose-Ackerman, 1999; Guo, 2004; Fan, 2006). Rent is defined as the return in excess of the opportunity cost of the resources devoted to the activity (Case, 2001). People are said to be rent seeking when they try to get higher wages, more profit, or any other payment over above the minimum they would be willing to accept. The corruption parties seek to pursue their interests in the competition for preferential treatment. Similar to other forms of self-interest seeking, corruption represents a way to escape the market supply-demand mechanism by influencing policies to their advantage such as obtaining a contract without competing with competitors.

Guile means insidious cunning in attaining a goal; crafty or artful deception; duplicity (Random House, 2005). According to Alemann (Alemann, 2004: 30), the condition of corruption exchange is that,

“the person corrupting and the person being corrupted had to have agreed to do something illegal. Only in the case of such a conspiracy was bribery assumed to have taken place. Often the corrupters and the corruptees act according to double standards. They know quite well that the public does not approve of their action. That is why they keep them secret.” (Alemann, 2004: 30).

Secrecy and duplicity are common in corruption. For instance, the president of America's National Association of Evangelicals, a vocal opponent of gay marriage, kept a secret sexual relationship with a male escort for three years.

In spite of the above similarity, there are differences between corruption and opportunism. First, corruption is a violation of rule or law (World Bank, n.d.; United States Sentencing Commission, 2005), while opportunism might be a fair game of the market (MacNeil, 1981). For instance, a lemon car sold under “as is” is not protected by lemon laws; it is a fair trade. Uncertainty and risk is the fact of the market. Some neoclassical economists believe that “what legal scholars call contract is nothing more than a sale with a time lag, ...a gambling arrangement with a long time lag, so that there is always a loser who wants to shirk, cheat, or in some way evade his obligation of paying.” (MacNeil, 1981:1020).

Frequently, the distinction between corruption and opportunism gets blurred when it comes to whether or not a law is violated. A violation of law in one market might be a fair game in another. For instance, in 17 of the 25 bribery settings, Singaporean participants believed that

corruptions were committed at a greater degree than the Chinese counterparts believed (Lim, 2001). The concept of corruption is interpreted differently in different countries. In the United States, corruption is clearly defined as offering, giving, receiving or soliciting of anything of value to influence the action of an official in the procurement or selection process or in contract execution (World Bank, n.d.; United States Sentencing Commission, 2005). However, in China punishment for corruption is normally given to the official who receives the bribe, not to the person who offers it (Levy, 2002). The person who offers a bribe is often portrayed as a victim who suffered an economic loss (“How Can Be So Many New Medicines,” 2006).

The second difference between corruption and opportunism is the types of participant. Opportunism can exist in various kinds participant relations (i.e., private-to-private, private-to-public, or public-to-public). Corruption is widely believed to have at least one participant being public. Private-to-public corruption has been widely studied. Private-to-private corruption, by contrast, has been relatively neglected and only recently introduced by Argandona as

“the type of corruption that occurs when a manager or employee exercises a certain power or influence over the performance of a function, task or responsibility within a private organization or corporation. Because he has a margin of discretion, he can choose to act contrary to the duties and responsibilities of his post or job, and thus in a way that directly or indirectly harms the company or organization, for his own benefit or for that of another person, company or organization.” (Argandona, 2003:255).

We have presented the distinction between corruption and opportunism. As the discussion of corruption expands into private sector and as transaction context embraces the

global market, the distinction is diminishing. Let's assume that law violation and public party participation are additional features above and beyond the features of opportunism. It is still safe to argue that corruption is a subset of opportunism and opportunism has a broader domain than corruption. As a subset, a corruption case can be considered as a special case of opportunism. Based on this argument, our research takes an inductive reasoning approach and uses corruption to surrogate opportunism and to predict TGS accordingly. We need to point out that using special cases to represent general population raises a concern of generalizability, i.e. the ability to generalize the finding to the population at large.

Research Framework and Hypothesis

With transaction cost economics as our theoretical foundation, we took a black box approach where certain factors were treated as a black box (see factors contained in dotted line in Figure 2). This approach singles out the relation between corruption and TGS for a close examination. Our hypothesis is that the level of corruption in transaction environment has significant impact on selection of TGS.

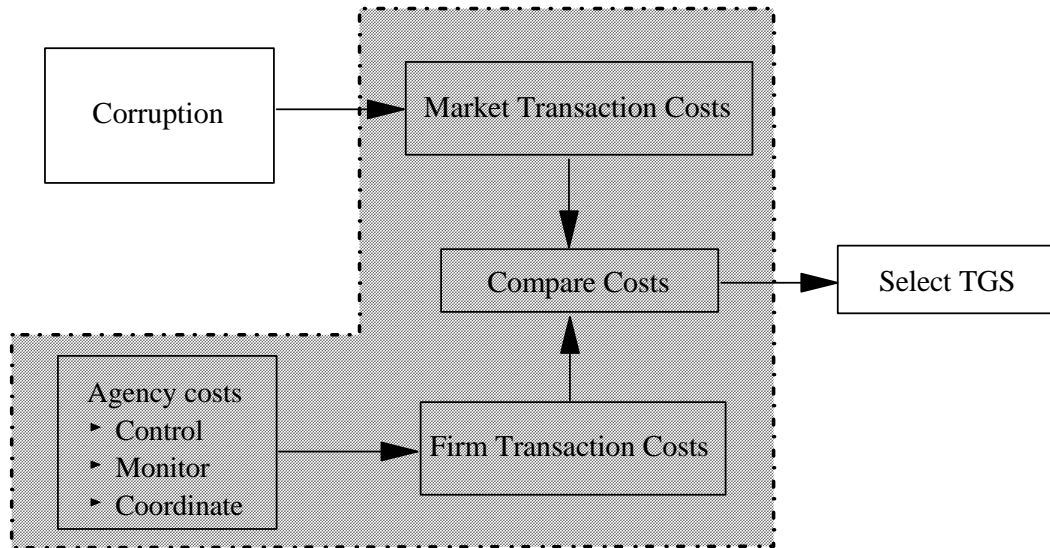


Figure 2. Research Framework

Measurements

Dependent Variable – Transaction Governance Structure

Although the concept of TGS is coined in the 1930's, the measurement of TGS is not well established. A review of 81 TGS studies from 1982 to 2004 indicated little consensus among instruments used for measuring TGS (Zhang, 2005). 46% of the studies used dichotomous scales (0 and 1) or multichotomous scales (0,1,2, ...) to measure TGSs into discrete categories such as market, joint venture, partner relationship, or firm. Another 18% of the studies used single metric measurement such as a percentage of shipments delivered by own fleet, a percentage of private warehouse use, or a ratio of outside spending over total spending. This study followed the thesis of Ettlíe and Sethuramn (2002). In their study, global outsourcing was measured as the percentage of purchases from outside the economic region as contrasted to purchases within the region. In our study, we considered international market as external

market and domestic market at internal market. We measured TGS as the level of using international market as contrasted to using domestic market, i.e. the percentage of import and export as percentage of total gross domestic product. We abbreviated this dependent variable as TGS. The data was extracted from the World Development Indicators database at the website of the World Bank.

Independent Variable – Corruption

The Corruption Perception Index published by Transparency International was used in this study. This index is a composite index that draws from 12 different surveys conducted by 9 independent institutions (such as World Bank, United Nations, Freedom House) and covers 163 countries. The countries included in the index must have scores from at least three sources. This index is the most complete and has the greatest scope of any index to date. The scores of the index range from zero to ten (with zero indicating high levels of perceived corruption and ten indicating low levels of perceived corruption). In this study, we used the Corruption Perception Index as the independent variable and abbreviated as CPI. 154 out of 163 countries were included in this study. Nine countries which had no import and export data were eliminated from the analysis.

Analysis

Table 1 shows the statistical result generated by SPSS when we regressed TGS on CPI for 154 countries. The regression equation is $TGS = \beta_0 + \beta_1 (CPI) + \varepsilon$. The coefficient of CPI is

4.384 which is significant with t value of 2.472 and p value of 0.015. The positive coefficient indicates that CPI is positive correlated with TGS. In other words, when CPI is low which means high corruption, TGS is low which means the percentage of import and export is low. The low import and export represents less in favor of using external international market as TGS and more preference of internal production and consumption. The statistics support our hypothesis that the level of corruption in transaction environment has significant impact on selection of TGS.

Based on the sums of squares provided in Table 2, we estimated statistical power of the regression analysis. With single predictor, $\alpha=0.05$, and $\eta^2 = 0.0449$, the statistical power is 0.74 which is satisfactory for social studies.

Table 1. Coefficients^(a)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	71.473	8.187		8.730	.000
CPI	4.384	1.773	.197	2.472	.015

a. Dependent Variable: TGS

Table 2. Analysis of Variance^(b) – decomposition of sums of squares

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	13439.237	1	13439.237	6.112	.015 ^(a)
Residual	334203.458	152	2198.707		
Total	347642.695	153			

a. Predictors: (Constant) and CPI

b. Dependent Variable: TGS

Conclusion

The social and economic costs of corruption have drawn significant attention from government, business, and academia. Research effort has been emphasizing effects of corruption on investment and economic growth. However, no attempt has been made to elaborate the impact of corruption on TGS. This article introduced transaction cost economics into corruption study and used corruption to explain the difference in selection of TGS. Corruption is found to be significantly correlated with the selection of TGS. This finding has strategic implication for businesses which venture into global market and face the decision of selecting TGS. A suggestion based on our finding would be that vertical integrated TGS are suitable for the transactions in countries where corruption is high, and market oriented TGS is suitable for the transactions in the countries where corruption is low. For instance, when operating in high corruption market, a manager may want to maintain or create an integrated TGS such as joint venture and partnership. When entering a low corruption market, a manager may want to take the advantage of free market and leverage on free competition to choose suppliers or partners.

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MEASURING QUALITY IN RESORT ACCOMMODATIONS

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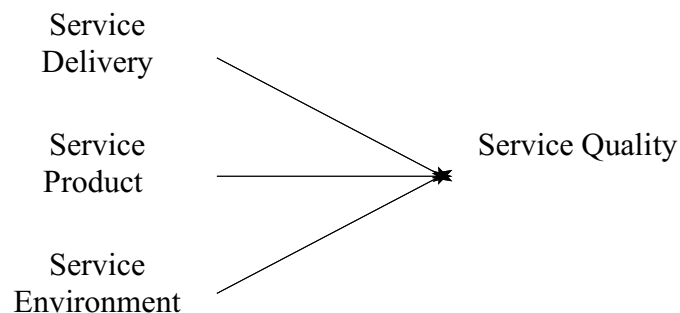
ABSTRACT

This brief paper reports on research conducted to develop a methodology to measure service quality in the resort accommodations industry. The measurement of Service Quality in general will be briefly discussed as well. This will be followed by a description of an approach adapted from the Information Systems literature [3] based on work by Rust and Oliver. [5] Finally, the approach will be applied and its reliability and validity will be evaluated.

RESORT ACCOMMODATION QUALITY MEASUREMENT

A number of factors influence consumers' perceptions of quality in service encounters. SERVQUAL [4] perhaps the most widely researched and applied methodology, suggests five: 1) tangibles, 2) reliability, 3) responsiveness, 4) assurance, and 5) empathy. However, research has shown these factors to be unstable in practice [1]. Rust and Oliver [5] propose three: 1) service delivery, 2) service product, and 3) service environment. These three form the basis for the proposed model of accommodation service quality which is illustrated in Figure 1.

FIGURE 1



Service delivery is defined as those aspects of the service experience that involve direct interaction between the customer and the service supplier; for example, making reservations or checking in. The service product would be the actual service itself; for example, the use of the room and amenities. The service environment refers to the appearance and condition of the facilities, personnel, etc. that are part of the service encounter.

DATA

The data used in this study come from proprietary studies conducted for ten resort hotels in a major Southeast beach destination. Managers from these hotels developed twenty seven items on which they wanted to evaluate their performance as perceived by their guests. The items were as follows:

<ul style="list-style-type: none"> 1. Reservations System <ul style="list-style-type: none"> a. Reservation Ease b. Accuracy of Your Reservation c. Courtesy of Reservationist 2. Check-in/Check-out <ul style="list-style-type: none"> a. Check -In/Check-Out Speed b. Accuracy c. Courtesy of the Staff 3. Physical Facilities (Grounds, landscaping, parking, outside areas, pools, etc. <ul style="list-style-type: none"> a. Cleanliness b. Maintenance 4. Room Accommodations <ul style="list-style-type: none"> a. Cleanliness b. Maintenance 5. Overall Courtesy of Hotel Staff 	<ul style="list-style-type: none"> 6. Amenities <ul style="list-style-type: none"> a. Restaurant b. Lounge c. Beach Area d. Fitness/Sports Facilities e. Indoor Pool f. Outdoor Pool g. Sauna/Whirlpool h. Conference Facilities I. Gift Shop j. Parking 7. Services/Programs <ul style="list-style-type: none"> a. Baby Sitting b. Courtesy Airport Pickup c. Room Service d. Golf Packages e. Summer Children’s Program 8. Location in the area
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A self administered questionnaire was sent to recent guests who were asked to rate their accommodations on these items on a seven point quality scale from “Very Poor” to “Excellent.” Respondents were also asked to rate how well their hotel met their expectations and the overall value for the money on a similar scale. Additionally, they were asked to indicate if , given the opportunity, they would return.

RESULTS

The twenty-seven items were subjected to a principle components analysis and a Varimax rotation. Three factors emerged. The results are presented in Table 1. Two items - parking and golf packages - did not load cleanly on any factor and will be excluded from further analysis. The three factors appear to confirm with Rust and Oliver. [5] Factor one contains the facilities and programs that one would think of as the service product. Factor two contains the points of contact with the service provider. And, factor three is made up of the service environment items.

TABLE 1

	Factor1	Factor2	Factor3
Conference Facilities	<u>0.84504</u>	0.14001	0.20199
Indoor Pool	<u>0.83179</u>	0.13804	0.17295
Baby-sitting	<u>0.81392</u>	0.26893	0.08559
Gift Shop	<u>0.79726</u>	0.17877	0.16063
Fitness/Sports Facilities	<u>0.79699</u>	0.14040	0.24750
Lounge	<u>0.77590</u>	0.19206	0.23240
Room Service	<u>0.77536</u>	0.31525	0.21366
Sauna/Whirlpool	<u>0.77001</u>	0.23095	0.19595
Airport Pickup	<u>0.75440</u>	0.31942	0.08804
Outdoor Pool	<u>0.74504</u>	0.24938	0.29495
Kids Programs	<u>0.72701</u>	0.29881	0.13679
Restaurant	<u>0.71252</u>	0.26422	0.23217
Beach Area	<u>0.68790</u>	0.20580	0.18633
Location	<u>0.55464</u>	0.39013	0.24542
Parking	0.40112	0.35507	0.33451
Reservation Courtesy	0.25312	<u>0.78991</u>	0.23208
Reservation Accuracy	0.23498	<u>0.78240</u>	0.12867
Check-in/out Accuracy	0.20835	<u>0.77748</u>	0.26440
Res. Ease	0.28750	<u>0.77309</u>	0.17372
Check-in/out Courtesy	0.21299	<u>0.73973</u>	0.37160
Check-in/out Speed	0.20555	<u>0.68235</u>	0.20434
Staff Courtesy	0.27610	<u>0.60934</u>	0.53740
Golf Packages	0.42796	0.49741	0.24807
Facilities Maintenance	0.25985	0.26836	<u>0.86039</u>
Facilities Cleanliness	0.26320	0.29249	<u>0.83791</u>
Room Maintenance	0.26528	0.32860	<u>0.83092</u>
Room Cleanliness	0.27953	0.33545	<u>0.81093</u>

In order to test the validity of the instrument, factor scores must be calculated. Because so few people used and rated the conference facilities, kid's programs, baby sitting, room service, and airport pickup, they will be dropped from further analysis. When these items are left in their missing values reduce the effective sample size from 2511 to fewer than 250. The recalculated factor structure is presented in Table 2. All the remaining items loaded cleanly on the appropriate factors with 70.3% of the variance explained.

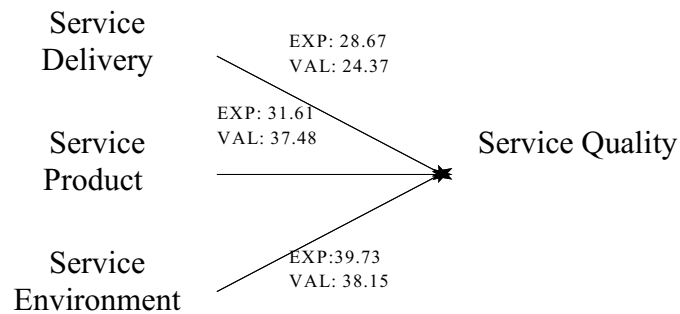
TABLE 2

	Factor1	Factor2	Factor3
Indoor Pool	0.83244	0.18745	0.16499
Sauna/Whirlpool	0.80605	0.23351	0.20475
Fitness/Sports Facilities.	0.79643	0.17002	0.21679
Outdoor Pool	0.76744	0.24162	0.26955
Gift Shop	0.76021	0.16760	0.17044
Lounge	0.75084	0.20790	0.20763
Beach Area	0.67813	0.23674	0.23023
Restaurant	0.67190	0.25824	0.25358
Location	0.50775	0.38854	0.18341
Check-in/out Accuracy	0.19295	0.81165	0.18207
Reservation Courtesy	0.23897	0.78619	0.21957
Check-in/out Courtesy	0.24276	0.77844	0.26779
Reservation. Accuracy	0.17812	0.75552	0.19425
Check-in/out Speed	0.20166	0.75525	0.15639
Res. Ease	0.26213	0.72493	0.19800
Staff Courtesy	0.33731	0.63697	0.45346
Room Maintenance	0.26347	0.29458	0.83053
Room Cleanliness	0.28148	0.32289	0.82393
Facilities Maintenance	0.34942	0.26651	0.82356
Facilities Cleanliness	0.35681	0.29510	0.79813

An examination of Table 2 reveals that, with the exception of location, all the items load highly on their respective factors and low on the others. In addition, the square root of the average variance extracted for each construct is .794, .830, and .943 for factors 1 through 3 respectively; thus, establishing convergent validity for the scales. [2] Discriminant validity can not be tested because of the orthogonal nature of the factors. However, if a non-orthogonal (Promax) rotation is applied the correlations among the factors are in the .52 to .57 range; still lower than any square root of the average variance explained for any factor. [2] Cronbach's alpha was calculated to establish internal consistency. They are .945, .935, and .929 for factors 1 through 3 respectively.

Having established the reliability and validity of the scales, the model must be tested. SERVQUAL uses the differences between expectations and perceptions of performance as the measure of quality. Here we use a direct measure of how well expectations were met as well as perceptions of overall value for the money as proxy measures for service quality. All variables were standardized and the factors were regressed against "Met Expectations" and "Overall Value". The resulting regression coefficients are Betas which when squared sum to R^2 . Dividing these squared Betas by R^2 yields the portion of explained variance due to each factor. For "Met Expectations" the variance explained is 69.2% ($p < .0001$) and for "Value" it is 53.8% ($p < .0001$.) Figure 2 shows the portion of variance explained for each construct (all betas $p < .0001$.)

FIGURE 2



CONCLUSION

The results indicate that service delivery, service product, and service environment are good predictors of service quality measured as expectations met and perceived overall value. From the ACCOMMODATIONS service provider standpoint, a close examination of the various performance items identified earlier will allow each property to make more well-informed decisions which might make a more positive impact on certain key items. In other words, spending may be more easily prioritized in such a way as to achieve more leveraged results regarding consumer perceptions and, ultimately, their decision to return. Further testing and refinement of the model are currently underway to improve variance explained.

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PERCEPTION OF CRISIS MANAGEMENT:
A COMPARATIVE ANALYSIS OF GUATEMALAN AND U.S. SMALL BUSINESSES

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Abstract

Organizations may be confronted with a crisis that strains their resources and impact their mission. Crisis management seeks to minimize the impact of these events. The crisis management literature focuses on larger businesses, there has been less written comparing small enterprises in the United States and those in a foreign country. This study examines and contrasts perception of crisis incidents in U.S. and Guatemalan small businesses. A survey conducted among small firms in both countries indicates that, for most of the crisis types studied, there were significant differences in the level of concern and/or the occurrence rates between the two countries. Reasons for this are discussed and implications for management are presented.

Introduction

Numerous events, scares, and scandals have highlighted the importance of being prepared for a crisis. Managers have analyzed their vulnerabilities and examined organizational priorities. This topic has been extensively researched in the United States. However, the experience within other nations has not been as thoroughly studied. For example, in Guatemala one of the major crisis management events that have had a long history in business is corruption (Miller, 2001). Its impact on stability and survival of businesses is substantial.

Organizations should have a crisis management plan to cope with unexpected crises since being prepared typically lessens some of the trauma and costs of a crisis. The most serious error is to assume that a crisis will never occur. A denial attitude is a formula for ineffective response to any crisis. Effective crisis planning and execution of a plan has shown to control the crisis and even turn the crisis into an advantage for the business (Wilderoter, 1987). There are also many more examples where the lack of preparation resulted in irreparable damage, from individual cases of employee embezzlement (Daniels, 2002) or mass disruption in business continuity due to natural events like Hurricane Andrew (Kruse, 1993). These problems universal to organizations worldwide and demonstrate that business managers

need to develop plans of action to either prevent the occurrence or mitigate the damage from a crisis event.

Crisis management is a method for planning for dealing with an unexpected event in an organization. Most large organizations have now developed crisis management plans and teams to be prepared in the event that some crisis would occur. On the other hand, managers of small businesses seem to avoid preparing for crisis management. Their view is “crises don’t happen in our industry/field” or “we have a well managed business and could manage our way through a crisis without a plan” (Caponigro, 2000). Typical assumptions include: (1) Crisis events only happen to other organizations or that they are somehow protected from a crisis (Mitroff, 1989). (2) Insurance policies cover losses or work interruption that may emerge from the crisis. (3) They do not have the resources or the time to establish plans or readiness requirements (Barton, 1993). (4) Today’s problems are so difficult and time consuming that makes it hard to plan for tomorrow’s uncertainties (Caponigro, 2000). While these are understandable points of view, they may be detrimental to the success of the small business operation.

Crisis management and contingency planning ideas have been discussed in business periodicals and academic literature for over several decades. The business environment seems to be faced with new and more sophisticated internal and external threats, terrorist plots, or other uncertainties that may affect organizational viability or survival. The experience and research within the United States may thus provide insight or guidance for small business managers in other nations. As these issues become essential to sustainable business development, this paper focuses on an overview of crisis management perceptions of managers in the United States and in Guatemala. It empirically investigates: (1) the different perceptions of Guatemalan and American small business managers regarding the concept and practices of crisis management, (2) the explanations for the differences in perceptions and practices that exist among businesses in both countries, and (3) the alternatives or recommendations that can strengthen the preparedness of U.S. and Guatemalan small businesses. A summary of literature is presented and five major areas of potential crisis are identified: operations, publicity problems, fraudulent activities, natural disasters (although we do not analyze this category), and legal crises. Two hypotheses about crisis management teams and the potential for a crisis in a small business are presented. These are tested, analyzed, and evaluated. A discussion focuses on the reasons why the differences exist.

Literature Review

A crisis can be defined as a turning point where events or activities run the risk of escalating in intensity, interfere with the normal operations of the business, endanger the business’s public image, or damage its bottom line in any way (Fink, 1986). This definition is associated with a broad category of events and incidents that can impact an organization.

Small businesses may be confronted with various types of crisis during their existence. Their ability to manage the crisis successfully can mean the difference between survival and disaster. Reviews of crisis preparedness by Fink (1986) and Offer (1998) indicated that half of all businesses stricken by a crisis will not survive if they do not have an adequate business recovery plan in place. Pedone (1997) offers a pessimistic observation indicating that 90% of businesses without a disaster recovery plan would fail within two years of a disaster. The relevant question in management and planning is not *whether* a crisis will occur, but *what* kind and *when* it will occur (Caponigro, 2000; Kruse, 1993). According to Caponigro (2000), crisis management is the function that works to minimize the negative impact of a crisis and helps an organization gain control of the situation.

Crisis Definition and Identification

Simbo's work (1993) indicated that one of the major reasons businesses do not have effective crisis management plans is because they have not identified the major crisis events that could impact their organization. Consequently, they have not developed the critical tools for developing comprehensive crisis plans for dealing with crisis situations. Fink (1986) asserts that crisis identification is important for two major reasons. (1) When the crisis is properly defined, it can be managed. (2) Once the crisis is defined it allows the manager to determine the degree of influence they have over the desired outcome. Since crises are generally followed by a variety of diversionary problems, it is important that the manager identify the real problem and focus interventions on the core issues rather than being distracted by other issues.

Warwick (1993) points out that one of the major stages important to preparation of a crisis management plan is performing a risk assessment of potential problems. The probabilities of a crisis in a particular area of a business activity vary. Managers should identify vulnerabilities or crisis events that could affect their organization.

The literature replete with classifications for crisis events and there is little agreement. Several scholars have arranged crises groups using two by two matrices (Marcus & Goodman, 1991; Meyers & Holusha, 1986). Others have used cluster analysis (Pearson & Mitroff, 1993). Although classification systems are important to the researchers, managers need to be concerned about their unique vulnerabilities (Caponigro, 1998). McCartney, Crandall, & Ziemnowicz (1999) have developed an efficient method of viewing crises. Their framework organizes crises into five types: (1) operational crises, (2) publicity problems, (3) fraudulent activities, (4) natural disasters, (5) and legal crises. Exhibit 1 summarizes many of the crisis events that confront small business small business managers. As managers identify crisis events and determine their business's possible vulnerability, they can seek additional information to develop proper planning to prepare for a crisis.

Exhibit 1 – Five Categories of Crisis Events

Operational Crises <ul style="list-style-type: none">• Loss of records permanently due to fire• Loss of records permanently due to computer breakdown• Major industrial accident• Breakdown of a major piece of production/service equipment	<ul style="list-style-type: none">• Computer system breakdown• Computer system invaded by hacker• Major product/service malfunction• Death of key executive
Fraudulent Activities <ul style="list-style-type: none">• Theft or disappearance of records• Embezzlement by employee(s)• Corruption by management• Corporate espionage• Theft of company property• Employee violence in the workplace	Publicity Problems <ul style="list-style-type: none">• Boycott by consumers or the public• Product sabotage• Negative media coverage
Natural Disasters <ul style="list-style-type: none">• Flood• Tornado• Snowstorm• Hurricane• Earthquake	Legal Crises <ul style="list-style-type: none">• Consumer lawsuit• Employee lawsuit• Government investigation• Product recall

Adapted from: Crandall, W., McCartney, M., & Ziemnowicz, C. (1999). Internal auditors and their perceptions of crisis events. *Internal Auditing*, 14 (1), 11-17.

Information Needs

The manager should ask the questions, “what crisis is of most concern to our business” and “has such an event or any crisis event actually happened in our business”? The answers are important because (1) when potential crises events are identified, then managers can plan for them and (2) recognition of potential events can enable management to enact measures to prevent the occurrence of that crisis. A manager who lacks sufficient information about the crisis cannot develop a plan to address it. For example, one of the most difficult events in an organization is the on-site death of an employee. If the worker was critical to the day-to-day operations, plans must be available to replace the deceased worker with comparable skill and experience (Wnek, 2000).

Crisis Management Teams

There are very convincing arguments supporting the formation of crisis management teams (Barton, 1993; Caponigro, 1998; Hickman and Crandall, 1997; Pearson and Clair, 1998) that can take charge of planning for a crisis before it occurs, as well as managing the problems that emerge during the crisis. Fink (1986) states that it is necessary to establish a crisis management team before a crisis plan can be developed. Pearson and Clair (1998) report that those organizational managers with crisis management teams show a greater concern for and attention to potential crises than organizations without crisis management teams. Moreover, Fink (1986) argues that organizations that do not have a plan reported that the crisis lasted two and one half times longer than those for organizations that had a crisis plan in place. Caponigro (2000) states that the best way to help insulate a business from the damaging effects of a crisis is to establish a crisis-management culture in the organization. Most organizations develop a crisis management team because their business culture recognizes the consequences of not being prepared for a crisis. They value the team’s contribution in achieving a proper level of preparedness. Additionally, previous crisis events have taught businesses serious lessons and have significantly heightened their awareness. The awareness in the organization that a crisis could happen will lead to planning for that event, and such preparations involves the formation, at least formally, of a crisis management team. Secondly, according to Penrose (2000), experience from actions or activities that preceded the creation of the crisis management team has taught important lessons.

An interesting question emerges during the discussion of crisis management: why is there more concern for crisis events in some businesses than in others? Is the crisis event the catalyst for concern, or is it merely a consequence of having a management team that considers planning for crisis events to be an integral part of the business’s strategy? An assortment of management literature indicates that organizations are just naturally reactive concerning potential future crisis (Mitroff, Pauchant, and Shrivastava, 1989; Pearson and Mitroff, 1993; Penrose, 2000, Shrivastava, 1993). The crisis event may be the only incentive for a business to initiate the planning process to prevent another occurrence of the same or similar events.

Crisis Planning in Small Businesses

The discussion of general issues brings the question of “what are the crisis events that are of most concern to small businesses?” Investigating this provides useful insights into some of the worst-case scenarios that should be planned for in the crisis management process. Three considerations can be evaluated: (1) has the crisis event occurred in the recent past, (2) what is the current level of concern for that particular crisis, and (3) are there any unique characteristics of the country that would increase the likelihood of a certain type of crisis? A crisis that has occurred in the recent past can become a candidate for future worst-case scenario planning. Crisis management maintains that a potential crisis must be mitigated and hopefully prevented from occurring in the future. For example, computer system breakdowns occur frequently and can cause a major disruption in the running of a business. Management

will want to take steps to prevent their re-occurrence if possible. Consequently, *some* pre-planning must take place. A common practice in larger organizations is to have back-up computer facilities in place (hot standby) before a major disruption occurs. Past experience with a specific crisis can be a catalyst to plan for future occurrence of that same crisis.

The actual concern for a crisis is important to worst-case scenario planning. While it is expected that concern will increase if a crisis has already occurred, it is also possible that concern may be elevated even if the specific crisis has not occurred at the organization. For example, the September 11 terrorist incidents in the United States elevated organizational concerns about similar attacks. Elevated concern for a specific type of crisis can make that event a candidate for worst-case scenario planning.

The particular characteristics of a region may dictate what types of crises should be included in worst-case scenario planning. For example, in parts of the United States such as Florida, weather concerns such as hurricanes are included in worst-case scenario planning (Kruse, 1993). Investigating other nations, such as Guatemala, provides new perspectives. For example, crime and corruption are prevalent in parts of Guatemala. Therefore, businesses elsewhere may be wise to plan contingencies for some of these events.

Guatemala

Guatemala is a developing nation that is the largest and most densely populated country in Central America. It faces many challenges and is among the ten poorest countries in Latin America. The economy is built on two major economic sectors, agriculture and retail services. Both of these segments provide the engine for economic development. The nation enjoys significant factors of endowment and is rich in mineral, oil, and other natural resources. Together with its low labor cost, Guatemala now has a growing light industry sector. It has the largest industrial base in Central America and is an important manufacturer of pharmaceuticals, chemicals, clothing, wood, and food products, (Mahler, 1999). However, North American style of business crisis management is a relatively new concept for businesses in Guatemala.

Crisis events in Guatemala

A major barrier to economic development has been its history of civil strife. Guatemala has been engaged in crises due to civil war, corruption in government, or violence in the streets (Kincaid, 2000). The economy has suffered because of the uncertainty and a lack of continuity in the business climate. In other words, Guatemala has been in a crisis mode for a long time. Moreover, distrust of the government filters down into general business activities. Corruption is a major crisis management issue with a long history within government and business (Miller, 2001). Because wages are low and jobs are scarce, survival is a perpetual thought on the minds of many Guatemalan citizens. Corruption can be an opportunity to escape the problems of poverty. It also may be perceived as a means of wealth accumulation otherwise not available through the normal job creation process.

Another problem is gang-activity that threatens violence on individual citizens and businesses. These gangs can be traced to political problems, as well as the unequal distribution of income (Saltz, 1995). Political problems have led to sporadic guerilla attacks, kidnappings, and high profile murders (Rarick, 2000). The unequal distribution of income has exposed small businesses to problems of internal theft, robbery, murder and extortion. Problems of corruption and violence -- along with other business crisis problems such as Internet hacking, industrial accidents, and computer malfunctioning -- have made Guatemala vulnerable and thus crisis management is a concern within society and business.

Research Methodology

Response Criteria

There were three possible ways in which a respondent could answer each question about the concern for a particular crisis event: “High,” “Low,” and by failing to answer; the occurrence questions were either answered “yes” or not answered. As exploratory research the statistical analysis of differences, was performed in a manner that allows statistical proof of differences.

As the proportion of respondents answering in a particular way is a type of average, the Central Limits Theorem guarantees that the measured proportion is a asymptotically normal distribution about the true proportion of respondents that would answer that way. Furthermore, as the U.S. and Guatemalan answers are both normally distributed, the difference between the measured values for each country will also have a normal distribution. In particular, if there is no difference between two countries,

$$\frac{p^{us} - p^g}{s^p} \sim Z \quad (1)$$

or $N(0,1)$, where p^{us} and p^g are the proportions for the United States and Guatemala, respectively and s^p is the standard error of the relevant proportion.

Hypotheses

The test begins with a null hypothesis that the attitudes and experiences are the same in both countries or

- H₀**: there is no difference in the proportion of U.S. firms and Guatemalan firms that are highly concerned about crisis events and crisis occurrences
- H₁**: there is a difference in the proportion of U.S. firms and Guatemalan firms that are highly concerned about crisis events and crisis occurrences

If the null hypothesis is true, the measure of differences in proportion should, on average, be zero. Values significantly different than zero are unlikely if there is no actual difference, and thus allow us to conclude that, for that category, the countries are different. Thus Table 3 shows “FtoR,” for “fail to reject,” for small differences. This means that we cannot prove that they are different. The result is that countries are the same (but does not prove it; the result is simply inconclusive). Entries of “Reject” mean that the difference was large enough that we can be at least ninety-five per cent certain that there is a difference. This happens for a reported Z value of 1.96 or greater, and for 1.96 or less, with positive meaning that more respondents in the U.S. answered in that manner, and the negative meaning that more Guatemalans answered in that manner.

Finally, when calculating the differences of high concern, the failure to answer was treated as low concern, while failure to answer was treated as high concern when working with low concerns. This conservative approach insures that the differences are *at least* as strong as that claimed by the statistics. Answering a question in a particular manner can be treated as a Bernoulli variable, having a success (or value of 1) when answered that way, and a failure (or value of 0) when answered in any other manner. p_i is the underlying parameter indicating the proportion of the population that will answer in that manner, also called the frequency. It is customary to define

$$q_i = 1 - p_i \quad (1)$$

The fraction of respondents answering in this matter is then a sample mean, and can be calculated as

$$\hat{p}_i = \frac{x_i}{n_i} \quad (2)$$

For “large” samples, the Central Limit Theorem guarantees that this variable will be asymptotically normal distributed, and using the well-known variance of the Bernoulli trial,

$$\hat{p}_i \sim N\left(p, \frac{p_i q_i}{n_i}\right) \quad (3)$$

where n_i is the number of responses.

Generally, a large sample is taken to be thirty or more. In the particular case of frequencies, the additional requirements are generally made that

$$n_i p_i \geq 5 \quad (4)$$

And

$$n_i q_i \geq 5 \quad (5)$$

when this is not the case, the distribution is not sufficiently normal for the test.

For the present data, the null hypothesis for any given survey question will be that the American response and the Guatemalan are identical. Under this hypothesis, p_{ica} and p_{ig} are separate observations of the same underlying parameter; p_i . That is, if the hypothesis is true, p_i is the true frequency for both American and Guatemalan firms, while p_{ica} and p_{ig} are two separate variables drawn from the distribution. Linear combinations of normal variables are distributed normally themselves; in the case of straightforward addition and subtraction the combined variance is the sum of the variances, while the combined mean is the sum or difference of the means. In this case, the means are the same under the hypothesis; their difference is hypothesized as mean zero, and is distributed

$$\hat{p}_{i,us} - \hat{p}_{i,g} \sim N\left(0, \sigma_{\hat{p}_{i,us}}^2 + \sigma_{\hat{p}_{i,g}}^2\right) \quad (6)$$

with the individual variances being of the form

$$\sigma_{\hat{p}_{i,us}}^2 = \frac{pq}{n_{ii}} \quad \sigma_{\hat{p}_{i,j}}^2 = \frac{pq}{n_{i,j}} \quad (7)$$

which combine as

$$\sigma_{\hat{p}_{i,us} - \hat{p}_{i,g}}^2 = \frac{pq}{n_{i,us}} + \frac{pq}{n_{i,g}} = pq \left(\frac{1}{n_{i,us}} + \frac{1}{n_{i,g}} \right) \quad (8)$$

and therefore the quantity

$$Z_{p_i} \equiv \frac{\hat{p}_{i,us} - \hat{p}_{i,g}}{\sqrt{\hat{p}_i \hat{q}_i} \sqrt{\frac{1}{n_{i,us}} + \frac{1}{n_{i,g}}}} \quad (9)$$

has a standard normal distribution.

Equation (9) still requires a calculation of \hat{p} , which in turn yields a usable \hat{q} . Returning to the hypothesis that both groups are the same, the best estimate of the true frequency will come from the underlying frequency p_i can be best estimated by using the degrees of freedom for each observation to form a weighted average,

$$\hat{p}_i = \frac{n_{i,us} \hat{p}_{i,us} + n_{i,g} \hat{p}_{i,g}}{n_{i,us} + n_{i,g}} \quad (10)$$

which substituted into yields the final distributed test statistic of:

$$\begin{aligned}
z_i &= \frac{\widehat{p}_{i,us} - \widehat{p}_{i,g}}{\sqrt{\widehat{p}_i \widehat{q}_i} \sqrt{\frac{1}{n_{i,us}} + \frac{1}{n_{i,g}}}} \\
&= \frac{\widehat{p}_{i,us} - p_{i,g}}{\sqrt{\frac{(n_{i,us} \widehat{p}_{i,us} + n_{i,g} \widehat{p}_{i,g}) [1 - (n_{i,us} \widehat{p}_{i,us} + n_{i,g} \widehat{p}_{i,g})]}{(n_{i,us} + n_{i,g})}} \sqrt{\frac{1}{n_{i,us}} + \frac{1}{n_{i,g}}}} \\
&= \frac{(\widehat{p}_{i,us} - \widehat{p}_{i,g})(n_{i,us} + n_{i,g})}{\sqrt{(n_{i,us} \widehat{p}_{i,us} + n_{i,g} \widehat{p}_{i,g}) [1 - (n_{i,us} \widehat{p}_{i,us} + n_{i,g} \widehat{p}_{i,g})]} \sqrt{\frac{1}{n_{i,us}} + \frac{1}{n_{i,g}}}}
\end{aligned} \tag{11}$$

which can easily be calculated partwise on a spreadsheet.

Survey Instrument

The unit of analysis was the small business manager. The objective was to measure their perceptions about business crises and crisis management. The survey instrument was based on that used by Crandall, McCartney, & Ziemnowicz (1999) and developed around the crisis events listed in Exhibit 1.

Data collection

For U.S. firms, a directory of small businesses was obtained from the state Small Business Forum and from the university's continuing education statewide small business database. The survey was mailed to 1,000 randomly selected small businesses in Pennsylvania and New York. Each survey contained a stamped, self-addressed envelope, and was addressed to the human resources or executive offices of each company. One hundred and sixty two useable surveys were received for a response rate of 16.2%.

The survey was translated into Spanish and then back translated into English to assure consistency and accuracy of the questions. For the Guatemala participants, business owners and managers from 212 enterprises located in 6 major cities (Guatemala City, Coatepeque, San Marcos, Quezaltenango, Mazaltenango, and Retalhuleu) were contacted and asked to complete the survey. All of the participants were recruited on the basis of accessibility and participated voluntarily.

Procedure

Each respondent completed one survey that asked for information on four different sections. The first section asked for demographic information on the type of business, number of employees, and number of year in the business. The second section focused on the type of crisis events such as operational crisis, publicity problems, fraudulent activity, natural disasters, and legal crisis that the business may have experienced. The third section requested an indication as to whether the organization had a crisis management team. Finally, the fourth section asked open-ended questions on how the organization reports crises to management and what other crises they have encountered that were not on the survey. Each participant was asked to answer all survey questions by marking the appropriate box or circling a response. For section two, the respondent could choose a level of concern about a crisis by circling a scale from one for "low" to a five for "high".

Results

Participants

The first phase of the analysis developed the descriptive understanding of the businesses and their composition. Table 1 lists the size of the organizations in terms of number of employees that responded to

this survey. In the U.S., ninety-four organizations (64.4%) had less than 25 employees. Twenty-seven organizations (18.5%) had between 25 to 99 employees. Nineteen organizations (13.0%) had between 100 and 499 employees while 6 organizations (4.1%) were over 500 employees. Sixteen organizations did not respond to this question on the survey. In Guatemala, the size of the organization in terms of number of employees is reported in Table 1. One hundred eighty-nine organizations had between 2 to 49 employees for a total of 93.6% of the respondents. Eleven organizations (5.4%) were composed of 50 to 499 employees. One organization had over 500 employees and one did not respond to this question.

Table 1 – Size of U.S. and Guatemalan firms in survey

Size of U.S. Firms	Frequency	Percent	Cumulative Percent
Less than 25 employees	94	64.4	64.4
Between 25 and 99 employees	27	18.5	82.9
Between 100 and 499 employees	19	13.0	95.9
Over 499 employees	6	4.1	100.0
Total	146		
Note: 16 organizations did not report on this variable			
Size of Guatemala Firms	Frequency	Percent	Cumulative Percent
Between 2 and 49 employees	189	93.6	93.6
Between 50 and 499 employees	11	5.4	99.0
More than 499 employees	1	.5	99.5
Non- response	1	.5	100.0
Total	212	100	

Existence of a Crisis Management Team

Table 2 lists the response to the question: Does your organization have a crisis management team? In the U.S., seventeen organizations (11.0%) indicated they had such a team while 138 organizations (89.0%) responded that they did not have a crisis management team. Seven organizations did not respond to this question. Among Guatemalan businesses, nineteen respondents (9.4%) indicated that their organization had a crisis management team. The majority, 183 respondents indicated their organizations did not have such a team while 10 respondents did not answer the question.

Table 2 – Frequency of crisis management team in U.S. and Guatemalan firms

Does your organization have a crisis management team? U.S.	Frequency	Percent
Yes	17	11.0
No	138	89.0
Total	155	100.0
Note: seven organizations did not report on this variable		
Does your organization have a crisis management team? Guatemala	Frequency	Percent
Yes	19	9.4
No	183	90.6
Total	202	100.0
Note: ten respondents did not answer this question		

The second phase of the analysis focused on the degree of concern for a specific crisis event occurring in small businesses. Table 3 summarizes the relationship of the crisis occurrence and concern that is associated with the specific crisis events in this business type. Crisis event by crisis event comparison reveals that there are some significant differences between the two countries. The final phase

of the statistical analysis required calculating the Z statistics for each crisis event for both countries. This procedure produced the results that are summarized in Table 3. Column A and B displays values of the proportion of respondents who indicated their concern a crisis and the occurrence of a crisis. Column C calculates the Z value for both countries and presents the results of this calculation. The following discussion provides a perspective on the differences that exist between the types of crisis in each country.

Table 3 – Comparison between crisis concern and crisis occurrence

Crisis Event:	U.S. (A)			Guatemala (B)			Z of Difference (C)		
	Hi	Lo	Occur	Hi	Lo	Occur	Hi	Lo	Occur
Theft or disappearance of records	.63	.25	.77	.40	.36	.63	4.34	-2.21	2.80
Lost records permanently due to fire	.60	.25	.92	.50	.17	.82	1.79	1.99	2.72
Lost records permanently due to computer breakdown	.25	.63	.39	.43	.20	.68	-3.56	8.28	-5.51
Computer system invaded by hacker	.34	.51	.73	.52	.12	.80	-3.44	8.08	-1.52
Major industrial accident	.57	.27	.89	.50	.16	.80	1.50	2.64	2.25
Major product/service malfunction	.46	.40	.78	.39	.30	.38	1.26	1.96	7.78
Death of a key executive	.46	.40	.64	.48	.16	.81	-.35	5.21	-3.54
Breakdown of a major piece of production or service equipment	.51	.33	.83	.42	.26	.59	1.74	1.48	5.04
Internet site disrupted due to hacker or some other act of vengeance	.35	.51	.44	.53	.10	.83	-3.60	8.47	-7.74
Boycott by consumers or the public	.76	.12	.93	.49	.20	.74	5.27	-2.10	4.66
Product sabotage	.73	.14	.87	.48	.16	.76	5.00	-.44	2.61
Negative media coverage	.65	.22	.82	.50	.13	.77	3.05	2.36	1.25
Embezzlement by employee(s)	.69	.19	.83	.36	.35	.62	6.35	-3.29	4.36
Asset misappropriation for employee's benefit	.69	.17	.83	.44	.25	.69	4.87	-1.83	3.07
Corruption by management	.73	.13	.88	.47	.23	.78	5.06	-2.51	2.63
Corporate espionage	.72	.14	.85	.51	.16	.75	4.03	-.60	2.31
Theft of company property or materials	.51	.35	.58	.44	.26	.67	1.46	1.85	-1.83
Employee violence at the workplace	.64	.23	.80	.51	.20	.69	2.53	.73	2.33
Flood	.71	.14	.73	.51	.15	.79	3.87	-.18	-1.31
Tornado	.75	.09	.84	.54	.07	.81	4.11	.63	.69
Snowstorm	.59	.24	.40	.57	.05	.80	.45	5.13	-7.81
Hurricane	.80	.07	.85	.51	.12	.78	5.69	-1.79	1.65
Earthquake	.81	.05	.89	.47	.16	.78	6.61	-3.31	2.80
Consumer lawsuit	.49	.38	.70	.54	.10	.86	-.96	6.44	-3.55
Employee lawsuit	.51	.37	.70	.50	.15	.74	.14	4.75	-.72
Government investigation	.56	.33	.69	.53	.12	.72	.40	4.70	-.55
Product recall	.67	.19	.75	.48	.17	.74	3.66	.57	.34

The Z scores highlighted in gray indicate scores that present “no difference” responses on their respective crisis event.

Guatemalan business managers failed to answer questions far more frequently than did the Americans, which shows in the data. A positive z value indicates that that a larger number of American respondents answered in this manner, while a negative value indicates that more Guatemalans answered in this manner. While the concern rates frequently have opposite signs on their z values, this is not always the case. For example, for the second question about record loss due to fire, Americans reported that they

were highly concerned 60% of the time, compared to 50%, a statistically insignificant difference. However, 25% of American and only 17% of Guatemalans answered that they had low concern, a difference that *is* statistically significant. This apparent paradox is resolved by noting that a far larger number of Guatemalans failed to respond to the question: 33% as compared to the American rate of 15%.

In many areas, the data shows conclusively that American and Guatemalan attitudes and experiences with crisis management are different. Any value with a magnitude greater than 1.96 allows the hypothesis that the response is the same for both countries to be rejected at the 95% level. Similarly, values with a magnitude of 2.576 or greater can be rejected at the 99% level. Values beyond 3 are rejected at any reasonable level. The subsequent discussion presents the results from the analysis as they relate to seven major crisis events in businesses in each nation.

Theft of records

The first question, the theft or disappearance of records, is useful for illustrating most of the possible outcomes of the questions. Note first that the “High” and “low” responses do not total 100%. This is due the fact that not all questions were answered on all surveys. Additionally, the non-response rate is lower on all questions for the Guatemalan data. Accordingly, the statistics developed in the methodology section consider both an answer of “Low” and the lack of a response as “not high” when comparing “High”, and similarly comparing “Low”. This treatment assures that overly strong claims will not be made.

With a z value of +4.34, it is clear that theft or disappearance of records is of far greater concern to American businesses than those in Guatemala. This value is extreme enough to reject a hypothesis that the concern is the same at any reasonable level. The z value for low concern is 2.21, with the sign reflecting the fact that Guatemalans were more likely to express low concern. This, too, is a statistically significant difference, but at the 90% level. Note that the magnitude of the two values is not the same, or even similar-this is an artifact of the different non-response rates.

Finally, most companies in both countries had a theft or disappearance within the last three years. The z value of +2.80 is sufficient to reject the hypothesis that the rate is the same at the 99% level.

Loss of records due to fire

Americans were more likely to report *both* high and low concern than Guatemalans. Again, this is a consequence of different non-response rates for the two countries. In this case, the differences result in rejecting one hypothesis while failing to reject the other. The z of +1.79 is insufficient to conclude that the countries are highly concerned at a different rate, while the +1.99 allows the conclusion the rate of low concern *is* different with 95% confidence. Finally, the occurrence rate is different.

Computer crises

The two computer questions yield startling differences between the U.S. and Guatemala. Firms in the U.S. are far more likely to have a low level of concern than high, in each case; while Guatemalans are more likely to be highly concerned than to show low concern. The z of 3.56 and 3.44 for the high concern yield the conclusion at the 99% level that this rate is different, and the +8.28 and +8.08 values show conclusively at any reasonable level that Guatemalans are less likely to have low concern for computer breakdown or hacker invasion. While the difference in intrusion rate is statistically insignificant, nearly twice as many Guatemalans have had data loss, with a z of a staggering 5.51.

Major product or service malfunction

Having a major product or service malfunction is clearly a significant problem when it happens. Not only are revenues lost, but also the firm's reputation is tarnished. A barely significant statistical difference exists for low concern, and is insignificant for high concern, with the U.S. respondents being more likely to give both answers. An interesting difference is in the occurrence rate where U.S. firms are more than twice as likely to report that they have had this problem. The z statistic of 7.78 makes it among

the highest reported in any category. It can be concluded that U.S. firms have this problem far more often than Guatemalan firms. It is unclear why a more developed country with greater resources would have such a problem. The technical resources would seem to provide a greater ability to avoid catastrophic failure. One possible explanation is that these resources also allow more complicated products and services, thus making them subject to more failure modes.

Product sabotage

While there is a small statistical difference in the proportion of firms suffering from sabotage in each country, and almost no difference in the number of firms reporting low concern. The U.S. firms are a time and a half as likely to be highly concerned about the matter, at nearly three quarters.

Embezzlement and Misappropriation by Employees

An area that shows particularly strong differences is that of embezzlement by employees. U.S. firms are almost twice as likely to be highly concerned, while Guatemalan firms are more than twice as likely to express low concern. Both differences are significant at well past the 99.9% level. Furthermore, the event is far more likely to occur in the U.S. as well. Perhaps most interesting is that Guatemalans express low concern even with a high incidence of the problem. While 62% report a problem, only 36% have high concern, and 35% express low concern. Surprisingly, even firms suffering from the problem express low concern. The asset misappropriation by employees and management corruption questions show similar patterns, the differences are all in the same direction, and are all statistically significant save for low concern about employee misappropriation.

Consumer Lawsuit

While the United States has a reputation for a highly litigious, consumer lawsuits appear to be a far more serious concern in Guatemala. While the difference in high concern is insignificant, at about half for both countries, nearly four times as many U.S. firms report a low level of concern. In fact, the only categories for which fewer Guatemalans reported low concern than the 10% for litigation are tornados and snowstorms. Furthermore, this low concern is in spite of a statistically higher reported rate of litigation in Guatemala, while most firms reported such suits in both countries, only half as many Guatemalan firms do not report the problem.

Product recall

While most categories are interesting for the differences seen, the product recall category is more interesting for the similarities seen. Firms in the U.S. report a statistically higher rate of high concern. The low concern rate, however, and even the occurrence rate, is nearly identical. While it is not possible to prove the null hypothesis statistically, values this small strongly suggest no difference.

The findings in this study reveal no significant difference in the means for the degree of concern for a potential crisis in businesses that have a crisis management team and those that do not. However, there was a significant difference in means for the degree of concern for a potential crisis in businesses that had experienced a crisis versus those businesses that had not experienced a crisis.

At first impression, these are unexpected results. The United States generally uses far more technology, and more advanced computers, and thus could be expected to have more serious concerns. However, the U.S. also has more skilled IT workers available to secure and maintain the systems, and the newer computers will be more likely to have more up to date and more secure software, as well. Similar results were found on the Internet site question. An outright majority of U.S. firms report a lack of concern to site disruption due to malicious actions, while a majority of Guatemalans report high concerns. For both concern levels, the statistics are similar to the other computer questions. Additionally, the incidence is far higher in Guatemala where five out of six firms report having had the problem, nearly twice the rate of the U.S.

Conclusions

This study has looked at the perceptions and experiences of Guatemalan small businesses in relation to crisis events and crisis management. The results indicate that in general, small businesses are not that concerned about crisis issues and subsequently, few having crisis management teams. One reason this may be the case is that smaller businesses experience fewer crisis events relative to larger organizations. As a result, the perceived need to plan for a crisis is not as strong.

However, there is a paradox. Small businesses are also very likely not to recover fully if they do experience a crisis event. In fact, small businesses often have fewer resources and less expertise to handle “the big one” should it occur. As a result, this study concludes that small businesses, like their larger counterparts, should adopt sophisticated crisis management plans. This includes the formation of a crisis management team, the identification of worst-case scenarios, the practicing of mock disasters, and the upgrading of these plans as needed.

These results come from a moderately sized sample and a simple statistical analysis. At this level, it can be seen that significant differences exist between both the expectations and the experiences of businesses in the two countries. However, a larger data set, drawn from a larger cross-section of both countries, would strengthen the findings; the conclusions justify such an effort. Additionally, further statistical analysis of the present data set is possible.

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CRITICAL SUCCESS FACTORS FOR SMALL BUSINESS IN CHINA: SMALL BUSINESS OWNERS CONTRASTED WITH THEIR COUNTERPARTS IN MEXICO AND THE US

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Paper Summary

Small Business is an important factor in the economy of the United States, Mexico and China. A high initial failure rate is a common challenge to small businesses. If factors critical to the success of small businesses can be identified, the impact of incorporating these into business plans could positively affect the United States, Mexican and Chinese economy. If critical success factors common to the United States, Mexico and China are discovered, there is the potential that universal critical success factors for small business may be identified. Observed critical success factors form a structure that strongly reflects previous United States and Mexico study findings as well as in prior work.

The search for a unified theory of success factors critical to small business success is reviewed. The information from China is further examined for changes in critical success factors through firm life cycle. This research assumes the universality of the three groupings: Task Environment, General Environment and Personal Characteristics. The difference in employee behavior in large firms for Asia and the United States is examined for insight into possible differences in small business personality.

The new data introduced in this paper is from a survey administered to small business entrepreneurs around Hangzhou, China. Although the instrument was patterned after previous small business surveys performed in United States and Mexico, cultural differences informed structural changes in the design. The personal interviews were coordinated by Dr Jin Chen of Zhejiang University at Hangzhou.

The respondents are all classified as small businesses. The majority of the respondents were young when they founded their business. This high percentage of younger entrepreneurs reflects a generation taking advantage of new opportunities provided by policy changes and a new business climate. Education percentage is very high. Manufacturing is the largest component of the respondents. The firm legal status reveals a high level of legal structure. 50% of the firms are corporations with Limited Liability Companies, and Limited Liability Partnerships proving very

popular as well. Examination of firm age revealed a steep drop off at ten years reflecting the recent nature of private enterprise in China.

Four tables are presented illustrating the supporting analysis.

Analysis produced one new factor not predicted in prior work: Strategic Management and Financial Competence, and two factors that were recognizable from prior work in the United States and Mexico, with some redefinition: Owner's Experience, Knowledge (Personal Characteristic), and Goal Orientation / Motivation (Personal Characteristic).

When examining the US factors, we see supplier and employee issues as highly ranked factors while in the China and Mexican factor rankings, we see Competitive Force, and Owners Experience and Knowledge. This suggests that in Mexico and China, small business owner's give priority to factors that depend more on competition and the owner's ability where in the US, labor relations are of greater importance. The presence of the factor: Owner's Political Affiliation and its attendant high ranking in the China study were enabled by Dr. Chen's creation of this item. The implication is that business by private firms will frequently take place with state owned or directed firms and the correct political affiliation is an enabling factor in a successful transaction. Other items ranking only in the China study are Owner's Charisma, Vision of the Owner, Owners Trustworthiness, and Owners Self-Confidence. These items speak to a concept described as the Chinese management characteristic of Human-Centeredness.

Changes in relative importance of success factors at different points in the Chinese small firm life cycle were not observed. Entrepreneurs at all surveyed stages have very similar self assessments about critical success factors.

The importance of small business to the economies of China, Mexico and the United States are great. The small business entrepreneur in China is surviving in a profoundly different market to that found in North America. The significance of items not strongly correlated to any factor in a US and Mexico study such as Owner's Political Affiliations, Overseas Exposure, Owner's Charisma, point to a set of business skills that is very different to that of their North American counterparts. Education levels on the extreme high end of the scale are indicative of a highly informed and professional entrepreneur class in contrast to those found in the United States and Mexico. A unique stress on strategic planning, short term strategic thinking, and significant reliance professional advisors may be reflections of this scholarly approach to Chinese small business.

References are available upon request.

HOW WELL ARE CHINESE EMPLOYEES COPING WITH WORK-FAMILY CONFLICTS?

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ABSTRACT

In the wake of globalization, work-family conflict is becoming an issue of increasing importance to the labor force in China. Workers in China are becoming more educated and, with this education, there comes a demand for jobs that accommodate the family-related needs of employees. Chinese job applicants are becoming more interested in lifestyle factors and they are focusing less on wages and promotion opportunities. Workers want to have sufficient time to spend with their families and children. A recent study found that 40% of Chinese parents have turned down jobs or promotions because of the toll it would have taken on their families. This indicates that in order to create a good working atmosphere, employers must create jobs that support workers' family situations. If they do not, it will be difficult for those employers to hire and retain high quality employees.

Clifton and Edward [4] note that more and more organizations in the U.S. are adopting programs to meet the specific needs of families. Such programs, often called "family-friendly projects," often take on one of three forms noted by Glass and Finley [6]: 1. Leave policies for vacation, sickness, child care, and maternity; 2. Flexible work arrangements such as job-sharing, flexible hours, and working from home; 3. Social support such as counseling, child-care services, and education services. While such formal programs do not exist in China today, many employers are beginning to offer some kind of support for coping with work-family conflict situations.

The purpose of this study is to estimate the current work-family condition of white-collar employees in China. There have been many studies investigating work-family conflicts in America (see [2] and [5] for literature reviews) but little research has been done on the conflicts facing employees in China (see [8], [9], [10] for related research published in Chinese journals). Through an empirical study of workers in Shanghai, this current research investigates factors and variables related to perceived work-family conflict. It also determines the types of strategies that are being used by employees and employers to cope with work-family conflict situations in China.

We use the definition of "work-family conflict" provided by Greenhaus and Beutell [7]. These authors suggest that when an individual's work and family roles are not coordinated, conflicts will arise. These conflicts can be related to time, strain, or behavior and, as noted by Bruck, Allen, and Spector [1], can occur in either direction; that is, work-family conflicts (work interferes with family) or family-work conflicts (family interferes with work). In this study, we will focus on the former – when factors related to one's job lead to conflicts with family commitments. For example, factors such as job involvement, work schedules, career path, job characteristics, and working hours can have a negative impact on one's family life. If an employee is experiencing work-family conflicts, the result can be inefficiency on the job, absenteeism, and low quality of life. Such work-family conflicts are detrimental to both the employee and the employer.

In this research, questions to be addressed include: What are the reasons for work-family conflicts in China? What measures can be taken to avoid such conflicts? What strategies can be used to alleviate existing conflicts? How are employees coping with the conflicts? How serious is the work-family conflict problem in China? How do the work-family conflict situations in China and the USA compare? In order to address these questions, a questionnaire was administered to 250 white collar employees in Shanghai. Each of the surveyed employees was earning an M.B.A. at Fudan University while working full-time. The survey respondents worked in a variety of industries including banking, consumer goods, information technology, medicine, scientific research, service industries, and telecommunications. Of the 250 administered and returned surveys, 38 were invalid, leading to 212 useable questionnaires.

The administered survey consisted of five parts. The first part included nine questions related to demographic characteristics: gender, age, job position, working hours per week, family responsibilities, elder care provided, marital status, spousal work situation, and number of children. The second part of the survey consisted of five Likert-scored items aimed at understanding the source of the respondents' work-family conflicts. The third part of the questionnaire consisted of nine Likert-scored items related to the amount of work-family conflict that employees experienced. The fourth part of the survey consisted of five items related to coping strategies for dealing with work-family conflicts. The fifth and final part of the survey consisted of four items related to the level of social support the employees were receiving from employers, co-workers, and family members. Using scales developed by Carlson, Kacmar, and Williams [3], the survey measured four antecedent variables (work role conflict, work role ambiguity, work social support, and work involvement). Job satisfaction and family satisfaction were the two outcome variables that were measured.

Demographic results for the sample of 212 Shanghai employees who returned useable surveys are as follows:

- Survey respondents consisted of 26% females and 74% male.
- Fifty-one percent of respondents were in the 25-30 year age group, 48% in the 31-40 year age group, and 1% were over 40 years old.
- Nine percent of respondents were top level managers, 55% middle level managers, 27% low level managers and 9% were not in managerial positions.
- Nineteen percent of respondents worked up to 40 hours per week, 46% worked between 41 and 50 hours per week, 29% worked between 51 and 60 hours per week, and 6% worked more than 60 hours per week.
- Forty-two percent of respondents assumed up to 20% of their family's responsibilities, 30% assumed between 21 and 40 percent, 16% assumed between 41 and 60 percent, and 12% assumed more than 60 percent of their family's responsibilities.
- Seventy percent were married and 30% were not married.

The analysis of the non-demographic data is currently in progress. We are performing a number of statistical procedures, including the following: factor analyses to test the validity of the measurement scales, correlation analyses on the satisfaction outcomes, comparisons of the severity of the work-family conflict components, and regression analyses to determine the explanatory roles of the antecedent variables. The results we obtain for the Chinese employees will then be compared to earlier findings for American workers.

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A NOTE ON GENDER DIFFERENCES IN STRATEGIC RIS-TAKING: A BUSINESS GAME SIMULATION EXPERIMENT

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ABSTRACT

This study presents the results of a business game simulation experiment. In particular, the risk-taking behavior of males and females were investigated. The results suggest that female decision makers may show higher levels of "anticipated regret." In addition, under the positive state of good financial performance feedback, decision-makers regardless of gender pursued more conservative strategies than decision makers operating under negative financial conditions. This supports the "law of effect" hypothesis. Statistically significant gender differences were evident, however. Under conditions of positive feedback, females resisted strategies that varied from previous successes, opting for more conservative strategies than their male counterparts. This finding may be explained by notions of "experienced regret."

INTRODUCTION

Strategic decisions, almost by definition, are risk-based decisions under the veil of uncertainty, or even ignorance, combining both a "fuzzy" problem domain and an ill-defined payoff structure. In such cases of ill-defined problems the decision maker's underlying attitudes and propensity towards risk will influence the evaluation and subsequent selection of a solution (Shapira, 1998). Decision makers, when confronted with uncertainty, typically restructure ill-defined problems in order to solve them (Von Winterfeldt and Edwards, 1986), and the way they are structured depends upon many personal factors (Raiffa, 1982). Some authors, for example, (e.g., Mann, 1994; Ronay and Kom, 2005) have suggested that females tend to view risk as potential loss, while males associate risk with opportunity. While there is certainly substantial debate about these gender related issues, meta-analyses of gender-based research by both Arch (1993) and Byrnes et al (1999) have found important gender differences in risk taking. More recent research has found that other factors, such as peer group pressure (Ronay and Kim, 2005) and ambiance (Magnan and Hinsz, 2005), may also influence the fundamental gender/risk-taking relationships.

THE NATURE OF RISK

Understanding risk, in simple terms, starts with variation around the mean of a probability distribution; however, the theoretical measurement of risk taking propensity is extremely complex and exacting, involving estimations of individual utility curves. Strategic decisions, however, involve multiple objectives, are sequential and future oriented, and typically involve various forms of feedback. Under such conditions, other factors often bundled under the rubric of "risk-taking", are used to explain behavior. In addition, "risk averseness" is often confounded with issues of decision "regret" (Larrick and Boles, 1995; Zeelenberg et al, 1996). Seminal work by Bell (1982) and Loomes and Sugden (1982) brought the concept of regret to the forefront of risk taking decision theory. Regret is experienced when it turns out that another decision should have been selected. Regret theory, by its very nature, involves emotions -- if I make the wrong decision, how painful will be my regret? Classical regret theory suggests that individuals will incorporate aspects of "anticipatory regret" in their decisions based upon "anticipated" feedback. However, strategic decisions also involve sequential "actual" feedback, which evokes another type of regret, that is, "experienced regret" (Zeelenberg and Beattie, 1997).

The complex nature of risk taking and management decision making presents a fundamental empirical dilemma. In spite of our complex and multi-dimensional understanding of risk taking in management (see Shapira, 1998; Wiseman and Gomez-Mejia, 1998), most empirical studies have taken, and continue to take, a rather simplistic view of risk taking. The core of many of these empirical studies involve administering instruments designed to measure risk-taking (an "explicit measure"), such as Wallach and Kogan's choice dilemma questionnaire (CDQ), to a class of individuals such as entrepreneurs (i.e., Masters and Meier, 1988) or to examine how individuals differ in their choices within a simple hypothetical written scenario (an "implicit measure", see Ronay and Kim, 2005). These techniques are what Brynes et al (1999) call "hypothetical choice" studies, and while useful for studying a "slice" of the theoretical risk taking pie, they will provide "suspect" conclusions if generalized too far.

In this study, we attempt a "middle" ground of experimental investigation. We explore gender differences and risk taking within a controlled strategic setting using a computerized simulation, we examine gender differences in risk taking in a way substantially different than the vast majority of other research that utilize either survey methodology or simple, single-decision experiments. While using computerized business simulations as an experimental vehicle is not unheard of in social research, it is rare due to extensive programming, testing, and formatting requirements. However, there are several important advantages to computer simulation experiments including essential realism, control, and safety (Muhs and Justis, 1981; Zey, 1981).

METHOD

Experimental Procedure - A Computerized Business Game

Subjects were presented with a detailed common initial scenario of a business situation in the form of a typical computerized business simulation game. Taking the perspective of a new CEO, subjects made a limited set of strategic decisions. The industry was described as high technology, price elastic, and with four competitors all sharing similar strategies, profits, expenses, market shares, etc. It was suggested that one competitor was moving towards a high product quality/high price strategy, another towards a low product quality/low price strategy, and the third towards a medium product quality/medium prices.

Initial conditions were set for stock price, product price, product R&D expenditures, advertising expenditures, and market share. In addition, sufficient information was provided regarding cost of goods sold, general selling expenses, G&A expenses, and tax rates to generate simple income statements. Subjects were told that their objective was to maximize period-ending net income. Strategic variables under the control of the subjects were product price, advertising expenditures, product R&D expenditures, and the choice to enter into a joint venture with one of the three competitors.

The joint venture, if elected as a strategy, would consist of a product R&D agreement with associated costs and benefits. Costs were described as including negotiating and monitoring a contract, and potential risk of technological appropriation to an "opportunistic" joint venture partner. The benefits were said to derive from jointly produced new and better models with increased sales.

Subjects were told that feedback regarding their strategies would be provided after processing the decision inputs using a computerized simulation model. The simulation involved two iterations of the computer model, and three decision periods -- the first using the initial conditions stated above, and the second and third based upon the feedback provided by the computer model after the previous strategies were analyzed.

In the actual experiment, the subjects' decisions were not used to generate the results -- instead, positive or negative financial performance was an experimental treatment. Two different levels of net income

(10% decrease or 10% increase) were randomly assigned to subjects after the first decision period, independent of their strategies. The computer model then iteratively worked backwards from the randomly selected income levels to generate a computerized sales and financial income statement report logically consistent with the inputted decision values of price, advertising, and R&D, a form of computerized “backcasting”. The second iteration also used the 10% increase/decrease of net income. Because of sample size limitations, those subjects receiving a 10% increase/decrease after the first iteration also received another 10% increase/decrease for the second iteration; therefore we had two sets of “feedback” results – increase-increase and decrease-decrease.

At the beginning of the simulation the initial risk propensity was measured by a five item survey based on the choice dilemma procedure of Wallach and Kogan (1964), and refined by (Muldrow and Bayton (1979, p. 102). Choice dilemma procedures are closer to approximating risk propensity based on probability, expected value, and utility curves than instruments based upon agreeing with various statements, such as attitudes towards blind dates or bungee jumping.

SUBJECTS

The simulation was administered to three undergraduate corporate strategy/business policy classes at a large public university. Statistical analysis of biographical data (age, work experience, etc.) revealed no significant gender differences. Also, no statistically significant differences were found for the risk propensity index (mean female score = 2.21, mean male score 2.07). The simulation was administered at the end of the semester, and classes were taught by the same instructor (different from the authors).

RESULTS

Strategies: Decision Period 1 (Pre-Feedback)

The first decision period was based upon the initial set of conditions, prior to any feedback regarding the impact of these strategies. Subjects made decisions regarding pricing, advertising, R&D, and joint ventures.

Pricing, Advertising, and R&D. Given the neutral nature of the competitive context established in decision period 1, there is no a priori theoretical reason to expect gender differences in the initial allocation of strategic resources. In fact, there were only slight gender differences in strategic approach during the initial decision point; only R&D expenditures were statistically significant ($p < 0.10$) with 69% of the females, versus 85% of the males increasing R&D, while pricing and advertising decisions were almost identical. It should be noted that pricing, advertising, and R&D not only represents a strategic decision, but also an information gathering strategy since the subjects knew that feedback was forthcoming, and they would have additional opportunity to adjust these decision variables.

Joint Venture. By design, the joint venture decision did not constitute information search since it was a one-time decision based upon the initial conditions. Also, the joint venture decision, unlike the other decision variables, represents a "strategic partnership," involving, in theory, significant “transaction” costs including partner search, specifying mutual obligations, and negotiating such obligations (Williamson and Winter, 1993, Kay, 2001). Given the initial conditions of the simulation, however, these costs should not be gender dependent.

Another cost, however, is finding an opportunistic partner who may appropriate proprietary knowledge. If the potential joint venture partner is seen as being opportunistically inclined then contracting costs increase due to the extra need for policing and possible adjudication. In these cases strategic partnerships are less likely (Kay, Robe and Zagnoli, 1987). Since perceptions of potential partner behavior may be

based upon personal factors (Raiffa, 1982), particularly "decision regret" concerns (Scanzoni and Arnett, 1987), gender differences may be relevant.

The data appears to support more of a gender "regret" hypothesis, and not "risk propensity." An ordinary least squares regression model was estimated using joint venture as the dependent variable and as independent variables: gender and risk propensity index ($R^2=0.43$). Only the gender variable (females being less likely to form joint ventures) proved significant ($p<0.05$). As additional evidence, of those females opting for joint ventures 78% selected the "high quality/high price" firm as a partner versus only 52% of the males ($t=1.49$, $p<0.10$). Here "high quality" may give an appearance of a less opportunistically inclined partner. An interesting analogy to the importance of commitment, or non-opportunistic behavior, by the joint venture partner is found in studies of marriage and dating; here gender differences are also evident, and explained by "anticipated regret" regarding the importance and perceived likelihood of partner commitment and "quality" of partner (e.g., Scanzoni and Arnett, 1987). However, this analogy, while enticing, should not be carried too far until further research substantiates any parallels between business partnering and personal partnering.

Strategies: Decision Period 2 (Post-Feedback)

Subjects were randomly assigned either "positive" performance (10% higher income) or "negative" performance (10% lower income), and the computer model iteratively worked backwards to generate sales and income reports that were logically consistent with the inputted decision values. Thirty males and twenty-seven females were randomly assigned to the "positive" performance group, while thirty-five males and twenty-two females were assigned to the "negative" performance group. Provided with this feedback subjects then made another set of pricing, advertising, and R&D decisions. A joint venture was not an option during this iteration.

Two measures of strategic response were developed. The first variable, RPT, measured the propensity to either reverse or repeat the direction of expenditures from the previous decision period, while the second variable, CSRV, examined strategic conservatism based on both direction and percentage increase/decrease of responses.

Gender and performance were factorially varied in a 2 x 2 design, with CSRV as the dependent variable; RPT was examined as proportional data. CSRV data were analyzed using an model examining interactions. Covariate and additional log-linear analyses indicated that the risk propensity index and other biographical variables were statistically insignificant, and for brevity purposes they are dropped from the discussion.

"Positive" vs "Negative" Performance. The effect of the experimental treatment rewarded some decision makers, while punishing others for their strategic decisions. The "law of effect" -- that behavior is a function of its consequences -- suggests that those strategic choices, which were rewarded, are more likely to be repeated. Also, people want to protect a "happy" state, and thus will be conservative in decisions if that decision is connected to the "happy" state (Isen et al, 1982). We therefore expect that subjects assigned to the better performing group will be more likely to repeat their strategies, or respond using other conservative strategies, regardless of gender.

The "law of effect" or "happy" state hypothesis is strongly supported. For the "positive" performance group only 26% (RPT/n) of the subjects followed reversal strategies in decision period 2, while 71% of the subjects assigned "negative" performance reports developed reversal strategies ($p<0.01$). Similar results are found when looking at strategic conservatism. For the "positive" performance group the mean value of CSRV, 3.59, is significantly less than the 4.90 mean CSRV for the "negative" performance group ($p<0.01$).

Gender Differences. There are no significant main effects on the gender variable; this is not surprising since the performance treatment provides the important gender related hypotheses -- positive performance provides "value" to be either protected or used, while negative performance primarily provides "information" relevant for future decisions.

As noted above, some authors have argued that females may view risk more as a potential loss function. If this is so, we would expect gender differences in both the propensity for strategic likely to "protect" their good fortune – a form of higher degrees of “experienced regret.” For the "negative" performance group no gender differences are hypothesized since there is "nothing" to protect and the decision maker must continue searching for successful strategies regardless of personal value differences or decision “regret” concerns.

Analysis of interactive effects supports this hypothesis. Females were less likely than males to follow risky strategies after obtaining positive feedback from prior strategic decisions. For RPT, 35% of the males versus 17% of the females made strategic reversal decisions ($p < 0.10$); likewise CSRV averaged 4.05 for males and 3.09 for females ($p < 0.05$). As expected, for the negative feedback group, the propensity toward reversal strategies is almost identical, with 70% of the males and 72% of the females reversing prior decisions; for CSRV females had a slightly higher mean score, although statistically insignificant.

Strategies: Decision Period 3 (Post-Feedback)

The final iteration of the simulation resulted in another increase of 10% in net profit for those who received an increase in the first iteration (a positive-positive performance), and an additional decrease for those with a decrease in the first iteration (a negative-negative performance). In effect, the 2nd experimental treatment rewarded and punished to an even greater degree.

"Positive-Positive" vs "Negative-Negative" Performance. The "law of effect" hypothesis is supported again. For the "positive-positive" performance group only 13% (RPT/n) of the subjects followed reversal strategies in decision period 3, while 94% of the subjects assigned "negative" performance reports developed reversal strategies ($p < 0.01$). Similar results are found when looking at strategic conservatism. For the "positive-positive" performance group the mean performance group ($p < 0.01$).

Gender Differences. As with the first iteration, females were less likely than males to follow risky strategies after obtaining positive feedback from prior strategic decisions. For the second round, CSRV averaged 2.89 for males and 1.45 for females ($p < 0.05$); differences in RPT, although in the hypothesized direction, were not statistically significant. As expected, for the negative feedback group, there was no statistically significant difference.

CONCLUSIONS

This study supports the argument that both gender differences and gender similarities are evident in strategic decision making behavior. Using a computerized business simulation as an experimental vehicle, several relationships were suggested. First, females acting as strategic decision makers, although sharing essentially equal risk taking attitudes (based upon a risk propensity survey), were still far less likely to pursue joint venture strategies. This suggests female decision makers may perceive a high overall contract cost associated with joint venture strategies, possibly caused by emphasizing the potential of opportunistic behavior by joint venture partners (an "anticipated regret" issue).

Second, under the positive state of good financial performance feedback, decision-makers regardless of gender pursued more conservative strategies than decision makers operating under negative financial conditions. This supports the "law of effect" hypothesis. Statistically significant gender differences were evident, however. Under conditions of positive feedback, females resisted strategies that varied from previous successes, opting for more conservative strategies than their male counterparts. This finding may also be explained by notions of "experienced regret."

Third, under conditions of uncertainty where greater amounts of critical information remained to be discovered, such as unexplained poor performance (second and third decision periods) or immediately following deregulation (first decision period), no gender differences were noted in strategic behavior. Given the narrow limits of this research this suggests that information search behavior in competitive environments may be gender independent.

In conclusion, strategic decision making is a complex process involving ill-defined problem domains and a vector of multiple decision variables. While it may be premature to extend the results of this research much beyond its experimental setting, the study offers several intriguing conclusions -- primarily that the often attempted effort of classifying females or males as being less or more risk prone may be far too simplistic. In fact, there are several different issues at play -- propensity toward risk, anticipatory decision regret, experienced regret, and information search strategies. While it is beyond the scope of this research to examine the possible underlying causes for gender differences in regret, this research provides some evidence that male and female decision makers may not differ much on risk propensity or information search, but rather on dimensions of "decision regret." These differences, however, may dramatically influence the pattern of competitive decision making.

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DO BASIC COMMUNICATION SKILLS AFFECT JOB SATISFACTION AND SATISFACTION WITH THE SUPERVISOR?

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ABSTRACT

This study examined the relationship between basic communication skills, job satisfaction, and satisfaction with my supervisor for a sample of 360 employees. Results indicated that perceptions regarding managers' encoding ability account for significant variance in job satisfaction and approached significance for satisfaction with the supervisor. Perceptions of managers' decoding ability accounted for significant variance in satisfaction with the supervisor, but not job satisfaction.

INTRODUCTION

Job descriptions for managers usually list good communication skills as a job qualification. Managers and scholars have long assumed that communication skill (competence) is an important indicator of success for managers. This assumption is entirely logical since the nature of managerial work requires communication skill to perform the most basic functions associated with the job. Possibly because the link between communication competence and managerial performance is believed to be basic in nature, there have been relatively few efforts to identify or to understand the relationship between the components of communication competence and the outcomes desired by both the manager and the organization. Organizations spend large amounts of money and time attempting to improve the "communication skills" of their current and future managers. Understanding which basic communications abilities are most important to managerial success could make training more meaningful.

Job satisfaction represents an expression of one's overall sense of satisfaction – or dissatisfaction – with a job. Job satisfaction is one of the most studied variables in the behavioral management literature. Job satisfaction has been defined as "a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences (Locke, 1976, p. 1300)." Job satisfaction is a considered to be a more global attitude than satisfaction with the supervisor. However, satisfaction with the supervisor is a much less studied attitude. Satisfaction with my supervisor denotes the degree to which an employee is satisfied with the immediate supervisor rather than other conditions or agents in the work situation (Scarpello and Vandenberg, 1987). If individuals in an organization are satisfied with the behaviors of their immediate supervisor, the following question arises: Is there a relationship between that satisfaction and other attitudes? The general question addressed by this research is the extent to which differences in satisfaction with the supervisor and/or with the job can be explained by examining variations in the managers' basic communication skills. The purpose of this paper is to evaluate the relationships between basic components of communication competence and satisfaction with the supervisor and job satisfaction.

PREVIOUS RESEARCH

McCroskey (1984) observed that "communication competence means different things to different scholars" (p. 261). Many researchers have conceptualized communication competence from either a behavioral skill or a social cognitive perspective (e.g., Weimann, 1977; Brandt, 1979; Cooley & Roach, 1984; Sypher, 1984; Sypher & Zorn, 1986) and have defined the concept accordingly. The social cognitive perspective argues for a link between one's social skill and one's communication competence. The key determinant of success from the social cognitive perspective is the match between the communication behavior used by a person and the social situation. The behavioral skills point of view suggests that there are universal communication skills or characteristics which provide a basis for differentiating effective from ineffective managers. For this perspective, the key to success is the skill with which the manager engages in behaviors associated with goal attainment. Monge, Bachman, Dillard, and Eisenberg (1982), Penley, Alexander, Jernigan, and Henwood (1991), and Alexander, Penley, and Jernigan (1991, 1992) are representative of the behavioral skills perspective. This paper will use a skills perspective of communication competence. Consistent with Lustig and King (1980), the competent communicator is defined as "... one who possesses a broad communication repertoire, the requisite skills to choose among the available communication options in a particular situation, and the ability to implement selected behaviors effectively (p. 75)."

Scarpello and Vandenberg (1987) rely on a definition of supervision proposed by Mann. That is, "supervision is an organizational role whose effective enactment entails ability to reconcile and coordinate the needs and goals of the work group's members with organizational requirements (p. 450)." He defines supervisor effectiveness as a function of three interrelated skills: "technical (dealing knowledgeably with task issues), human relations (getting work done with and through people), and administrative (coordinating activities and acting in terms of the system within which one operates) (p. 450)." Scarpello and Vandenberg (1987) developed the Satisfaction with My Supervisor Scale (SWMSS) to measure the effectiveness of supervisor behaviors.

Research using the SWMSS provides support for both the construct and the scale. Individuals whose specific turnover motive was dissatisfaction with the supervisor showed a decline in turnover intentions and improvements in their evaluation of and satisfaction with their managers after they requested and received an internal transfer (Vandenberg & Nelson, 1999). Jeanquart-Barone (1996) finds that supervisor support, resources, participation in decision-making and procedural justice accounts for 74 percent of variance in satisfaction with male supervisors. However, supervisory support, resources, and procedural justice accounts for 86 percent of variance in satisfaction with female supervisors.

Others have researched subordinate satisfaction with the supervisor using different measures, frameworks, and methodologies. In a study of counselor trainees, Ladany, Ellis, and Friedlander (1999) report increases in emotional bond scores (a component of working alliance) were directly related to satisfaction with supervision. Ladany et al. (1999) appear to partially confirm work on charismatic leadership by Shamir, House, and Arthur (1993). Shamir et al. (1993) propose that charismatic leaders are exceptional leaders who have a major impact on their followers and on social systems. The effects of charismatic leadership on commitment to the mission and on the transformation from self-interests to collective interests appear to be most relevant to this research project. Shamir et al. (1993) describe the behavioral characteristics of followers committed to the leader's mission as similar to those of employees who are morally committed. Charismatic leadership leads to greater emotional attachment, along with increased follower motivation, trust, and confidence in the leader (Shamir et al., 1993).

In a study of self-directed teams, Butler, Cantrell, and Flick (1999) find upward trust and transformational leadership behaviors were powerful predictors of satisfaction with supervision. In a study of hierarchical decision-making teams, Phillips, Douthitt, and Hyland (2001) find that team decision accuracy, leader

consideration behavior, and decision influence predict satisfaction with the leader. Moreover, the effect of leader consideration behavior was completely mediated by team-member perceptions of procedural and interactional justice. Subordinates' perceptions of fairness in their relationship with the supervisor partially mediated the relationship between both team decision accuracy and decision influence and satisfaction with the leader. According to Phillips et al. (2001), "satisfaction with the leader is likely to depend heavily on the leader's ability to secure positive outcomes for the team." Team performance accounts for almost half the between-team variance in member satisfaction with the leader. In other words, satisfaction with the leader is a function of team performance.

METHOD

The sample for this study consisted of 360 employees working in a large southern city. Respondents included the following groups: employees of the headquarters staff of a division of a multinational company, employees of regional production plants from two national consumer products corporations, employees of a multinational chemical firm, and employees of a regional financial services company. Questionnaires along with cover letters and addressed, postage-paid return envelopes were distributed through company mail to 640 potential study participants. Completed questionnaires were mailed directly to the researchers. Usable responses were received from 360 individuals for an overall 56 percent response rate. Response rates for the individual samples ranged from 20 to 50 percent.

Personal characteristics of the research subjects are summarized in Table 1. The mean age for the sample was 35 years, with more than 60 percent being male, 77 percent being White, and 15 percent being African American. The education levels were as follows: (38.6 percent) college graduates, (7.6 percent) graduate degrees, (31.5 percent) completed some college, (20.7 percent) high school graduates, and (1.6 percent) high school dropouts. The mean tenure with the current employer was eight years, in the current job was five years, and with the supervisor was two years.

Table 1
Sample Characteristics

Total number of usable responses	360
Non-managers	252
Managers	102
Gender:	
Male	234
Female	117
Education:	
High School or less	69
Some College	104
College Graduate	141
Graduate Degree	40
Race/Ethnicity	
Non-white	79
White	272
Mean Age	36
Mean Job Tenure (years)	4.5
Mean Length of Employment (years)	8
Mean Tenure with Supervisor (years)	2.3

Note: Because of missing responses, categories may not total to 360 or 100 percent

Measures

Job satisfaction was measured using the Index of Job Satisfaction developed by Brayfield and Rothe (1951). The index consists of eighteen items half of which are reverse scored. Originally formulated with a 5 point agree-disagree scale, the index was modified to a 7-point very strongly agree to very strongly disagree scale in order to make it consistent with the other measures employed in this study. Sample items from the index include: "My job is like a hobby to me," "I am often bored with my job (R)," and "I find real enjoyment in my work."

The Satisfaction with My Supervisor Scale (SWMSS) developed by Scarpello and Vandenberg (1987) was used to gauge subordinate satisfaction with the manager. The SWMSS is an eighteen-item seven-point scale (the anchors ranged from 1 very dissatisfied to 7 very satisfied) that assesses three categories of skills (technical, human relations, and administrative) associated with effective supervision. The following are sample items from the SWMSS: "the way my supervisor understands the problems I might run into doing the job," "the way my supervisor listens when I have something important to say," and "the way my supervisor follows through to get problems solved." For this study, the coefficient alpha for the SWMSS scale was .96. Scarpello and Vandenberg (1987) report coefficient alphas ranging from .95 to .96. Vandenberg and Scarpello (1991) report internal-consistency coefficients of .95.

Perceptions of managerial communication competence were measured using the Communicator Competence Questionnaire (CCQ) developed by Monge, Bachman, Dillard, and Eisenberg (1982). The CCQ is a perceptually oriented 12-item questionnaire designed to assess communication competence in an organizational setting. The encoding subscale assesses communication competence along seven dimensions of perceived encoding skill: (1) command of the language; (2) gets to the point; (3) deals effectively with others; (4) the degree to which writing is difficult to understand; (5) ability to express ideas clearly; (6) the degree to which speaking is difficult to understand; and (7) the extent to which the manager says the right thing at the right time. The decoding subscale assesses communication competence along five dimensions of perceived decoding skill: (1) good listener; (2) easy to talk to; (3) responsive; (4) attentive; and (5) sensitive to the needs of others.

Using a multiple analysis of variance design, the effectiveness of managerial communication behavior was assessed. This paper evaluated the significance of variance in the relationship between basic managerial communication skills and two outcomes: job satisfaction and satisfaction with the manager.

The following research hypotheses will be tested:

1. Perceptions of managers' basic communication competence (encoding and decoding) will account for significant variance in job satisfaction.
2. Perceptions of managers' basic communication competence (encoding and decoding) will account for significant variance in satisfaction with the supervisor.

RESULTS AND DISCUSSION

Multiple analysis of variance results are presented in Table 2. The results indicate that perceptions regarding managers encoding ability accounts for significant variance in job satisfaction ($F = 2.297$, $p .000$) and approached significance for satisfaction with the supervisor ($F = 1.492$, $p .056$). Perceptions of managers decoding ability accounted for significant variance in satisfaction with the supervisor ($F = 6.191$, $p .000$), but not job satisfaction.

Table 2
Multivariate Analysis of Variance

Variable	Job Satisfaction			Satisfaction with Supervisor		
	DF	F	p	DF	F	p
Encode	34	2.297	.000	34	1.494	.056
Decode	28	.662	.898	28	6.191	.000
Encode x Decode	135	1.120	.256	135	.934	.653

The results of this study provide some encouraging support for our position that components of a manager's basic communication competence (encoding and decoding skills) are significantly associated with outcomes desired by the manager and the organization. The results indicate that what Jablin and his colleagues (1989) referred to as threshold communication skills (encoding and decoding) were positively associated with satisfaction with supervision and partially associated with job satisfaction. For this study, encoding ability was of particular importance.

Our analysis highlights the importance of basic articulation and listening skills to satisfaction with supervision by work group members. In a 1990 study, Keys and Case also highlights the importance of basic communication competence skills for successful managers. Keys and Case report that managers who cast their ideas in the language of the person they were attempting to influence were more likely to be successful in achieving their objective than managers who did not (p. 48). The results of this study also support the Keys and Case suggestion that listening (decoding) skill is an important aspect of encouraging subordinates attempts to influence their manager. Subordinates of the manager high in decoding skill will be encouraged to communicate their ideas while subordinates of the less skillful manager will not. In addition, a high degree of managerial decoding skill is probably important for reading behavioral cues.

The limitations of these results and need for additional research should be recognized. This study looked at only broad perceptions of communication competence. It has not examined either specific communication skills or specific communication behaviors that might provide a better understanding of the relationship of managerial communication competence to outcomes. Research into the relationship of specific aspects of decoding skill to performance and satisfaction with supervision appear justified. In addition, differences among managers based on level of management, sex, or sub-sample were not considered due to sub-sample limitations. Future investigations should examine such differences. To conclude, this study partially confirms the conventional view of the importance of the basic components of communication competence (general encoding and decoding skill) to perceptions of job satisfaction and satisfaction with supervision.

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THE CHALLENGES OF BUSINESS OWNERSHIP: A COMPARISON OF MINORITY AND NON-MINORITY WOMEN BUSINESS OWNERS

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ABSTRACT

Women business owners often face a different set of challenges than those faced by male business owners. Among women business owners, minority women may face a different set of challenges than their non-minority counterparts. Both the actual challenges and the perceptions of such challenges may impact business practices and decisions. The present paper compares the perceptions of challenges faced by minority and non-minority women business owners. We found that minority women business owners often perceived that they faced greater challenges than did non-minority women business owners, even when factors such as the size of the business and the owner's age and education were controlled.

INTRODUCTION

Women-owned businesses represent a rapidly growing segment of the U.S. economy. According to the Small Business Administration (2001), approximately one-third of all small businesses are women-owned and the number continues to grow. While business ownership presents its own set of challenges, it may be particularly challenging for women business owners (e.g., Winn, 2004). Further, among women business owners, minority women may face a different set of challenges than their non-minority counterparts. Smith-Hunter and Boyd (2004) found that minority women became business owners for different reasons than did non-minority women, and that they faced different challenges in starting and operating their businesses.

Studies of the challenges faced by women business owners in general and minority women business owners in particular have most often focused on challenges in obtaining financial capital and in developing or accessing social capital. Coleman (2004) and Lucas (2006) studied the extent to which women and minority group members faced challenges in obtaining access to capital. Lucas (2006) argued that minority women business owners may have difficulty in obtaining access to capital because of a lack of both business experience and industry-specific experience and because their businesses tend to be smaller and newer. Coleman (2004) examined the relationship between the business owners' gender, race, level of education and their ability to borrow money. She found that white women were no less likely than white men to apply for loans or to avoid applying because of a fear of being turned down. However, she did find that black men were more likely to be turned down or to avoid applying for a loan due to a fear of being turned down. She was not able to examine this phenomenon in minority women business owners because there were too few minority women business owners in her sample.

Other studies have found that women business owners in general and minority women business owners in particular may lack some of the social capital and access to networks that would enhance business success (e.g. Smith-Hunter & Boyd, 2004). Social capital may be in the form of knowledge and experience gained from working at high levels of an established company before becoming a business owner, or having access to networks that could provide information on the availability of financing or on access to markets.

Together, these results suggest that women and minority business owners are impacted by differences in the business environment and that their decisions and actions may be influenced simply by perceptions of these differences. Business owners may choose to not fully explore access to capital or due to a belief that they will be unsuccessful attaining their goal because of challenges in the business environment. Thus, not only do actual challenges impact the outcomes of the business, perceived challenges may be a factor considered in the owner's decision-making process.

The purpose of this paper is to examine the differences in perceptions of challenges facing minority versus non-minority business owners, and to explore the reason for those challenges. We examine differences in business owners' perceptions of the challenges that they face personally, and in the challenges that they believe are faced by women business owners in general. Company and owner characteristics may be related to challenges faced by the business owners, so we control for differences in size of the company as operationalized by number of full-time employees (FTEs), the number of part time employees (PTEs) and the amount of sales of the business. We also control for the age of the business since the newness of the business is often a factor in determining need for access to capital, and at the same time a liability in obtaining access to such capital (e.g. Coleman, 2004). We also control for the educational attainment and the age of the business owner. As Coleman (2007) noted, research has shown a relationship between educational attainment and business success. Similarly, Coleman (2007) suggested that age of the business owner may serve as a proxy for experience and maturity which contribute to business success.

METHODS

Sampling Technique, and Response Rates

As part of a larger study, a mailing list of women owned businesses in a southern state was purchased from Dunn and Bradstreet. The mailing list reported 30,511 women businesses owners throughout the state. The mailing list was sorted by zip code, aggregating zip codes into strata using the first three digits of the zip code. The proportion of the population represented by each stratum was calculated. We then randomly sampled addresses within each stratum so that the proportion of addresses in the selected sample from each stratum was consistent with that stratum's representation in the population. For example, one stratum comprised 14.09% of the addresses on the mailing list; therefore, 14.09% of the total surveys were sent to addresses randomly selected from that stratum.

This stratified random sampling technique (see Pedhazur & Schmelkin, 1991) was used to reach a representative sample of women-owned businesses throughout the state. Thus, while the

numbers of businesses sampled in more densely populated areas of the state were larger than those in other, more rural, areas of the state, the sample was proportionate to their representation in the larger mailing list.

We initially selected 6,000 addresses to send complete survey packets. The survey was available in both electronic and paper forms. Each woman-owned business in the sample was sent a survey packet including a cover letter describing the purpose of the survey and instructions for accessing the on-line survey, and a printed copy of the survey. The recipients were instructed to complete only one copy of the survey (electronic or paper).

In an attempt to increase sample size, while not incurring the expense of mailing additional survey packets, we selected an additional 3,000 of the remaining addresses again using the stratified random sampling technique. Business owners in the second sample were sent a post-card with an abbreviated description of the study and instructions for accessing the on-line instrument. Some respondents who received the post card requested a paper copy of the survey and were provided with one upon such a request.

The proportion of respondents from each stratum was compared to the proportion of businesses selected for the overall sample from each stratum using a chi-square test. The results of the test ($\chi^2 = 1.62$, n.s.) indicate that there are no statistically significant differences in the proportion responding across postal distribution centers. Thus, with respect to geographic dispersion, the sample is representative of the population as defined by the mailing list.

The overall usable response rate to the survey was 4.8%, yielding a sample of 432 usable responses. Some of the returned surveys could not be included in the study. Some respondents reported that they had no ownership stake in the business, and could therefore not be counted as business owners. Although the mailing list went to businesses described as women-owned, there were some male survey respondents. Only responses from females were included in the final sample. Further, the first author was contacted by several individuals who were selected from the mailing list, but were who not business owners, and by one person reporting that the addressee was deceased. Thus, it should be noted that some portion of the addresses on the mailing list were not women business owners; therefore, the usable response rate of 4.8% must be viewed as a conservative estimate of the true response rate from women business owners.

Survey Instrument

Company characteristics. Company characteristics were measured using items developed for the present study. Business owners were asked to indicate how many full-employees and part-time employees employed by their company. They were also asked to report how long the company has been in business (in years) and the previous year's gross annual sales (in dollars).

Owner characteristics. Owners were asked to indicate their age. This item included a categorical response format (1 = "under 30"; 2 = "30-39"; 3 = "40-49"; 4 = "50-59"; 5 = "60-69"; and 7 = "age 70 and older"). Education was also measured using a categorical response format. Response options were: 1="less than high school"; 2 = "high school graduate"; 3 = "some college"; 4 = "college degree"; 5 = "some graduate work"; and 6 = "graduate degree."

Similarly, owners were asked to indicate their race. Response options were “Black,” “Hispanic,” “Asian and Pacific Islander,” “American Indian and Alaska Native,” “White,” and “Other.”

Perceived challenges . Respondents were also asked to indicate what challenges they believed faced them personally as a woman business owner. The list of challenges included: 1) securing capital for building or expanding a business; 2) health insurance costs; 3) understanding the tax code; 4) the current state of the economy; 5) competitive business environment; 6) regulatory burden; 7) procurement opportunities in the public sector; 8) procurement opportunities in the private sector; 9) managing your business relationship with your corporate legal advisor; 10) managing your business relationship with your certified public accountant under the new accounting regulations; 11) understanding the new accounting regulations; 12) recruiting and retaining an effective workforce; 13) networking effectively; and 14) achieving a satisfying work/life balance. Participants responded to these items using a 5-point Likert-type response format (5 = “very difficult for me personally”; 4 = “difficult for me personally”; 3 = “neutral”; 2 = “minor concern for me personally” and 1 = “not a concern for me personally”).

Respondents were then asked to respond to the same set of items a second time indicating the extent to which they believed the challenges were difficult for women business owners in general. A 5-point Likert-type response format was again used (5 = “very difficult for women business owners”; 4 = “difficult for women business owners”; 3 = “neutral”; 2 = “minor concern for women business owners” and 1 = “not a concern for women business owners”).

RESULTS

Preliminary analyses were conducted to examine the characteristics of the sample. As noted above, the sample for the present study was 432 women owned businesses in a southeastern state. Thirty four percent of the women business owners were between ages 50-59 and 65% had a college degree or higher levels of education. The racial composition of the sample was 7.9% Black, 1.2% Asian and Pacific Islander, 86.6% White, 1.6% Hispanic, and 1.9% American Indian and Alaska Native. The responses of Black, Asian and Pacific Islander, Hispanic, and American Indian and Alaska Native participants were combined into the minority women sample (coded 1) and the responses of White participants were the non-minority sample (coded 0).

The average age of the businesses was 13.2 years, average dollars in sales was \$524,000. The businesses employed an average of 5.2 full-time employees and 2.8 part-time employees.

The means, standard deviations, and correlations among study variables are presented in Tables 1 and 2. Table 1 reports the correlations among company and owner characteristics and the challenges the business owners believe they face personally. Table 2 reports the correlations among company and owner characteristics and the challenges the business owners believe are faced by women business owners in general.

Table 1																							
Correlations Among Minority Status, Control Variable and Perceived Challenges for the Busines Owner Personally																							
	Mean	S.D.	N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	Minority	0.14	0.34	387																			
2	Full-time employees	5.15	22.56	391	-.03																		
3	Part-time employees	2.75	8.84	391	.13*	.20**																	
4	Sales	485512.24	1776424.85	391	-.04	.83**	.25**																
5	Age of Business	13.18	10.79	391	-.20**	.47**	.02	.44**															
6	Age of Owner	3.55	1.06	387	-.14**	-.03	.00	.03	.51**														
7	Education of Owner	4.18	1.40	386	.02	-.02	.05	-.03	-.04	.04													
8	Securing capital	2.54	1.56	381	.22**	-.04	.06	-.05	-.19**	-.18**	-.13*												
9	Health Insur. Costs	3.24	1.61	382	.06	-.02	.07	.00	-.08	-.13**	-.07	.42**											
10	Understand tax code	2.87	1.36	380	.17**	-.09	.01	-.08	-.22**	-.25**	-.15**	.29**	.28**										
11	State of economy	3.06	1.13	383	.08	-.11*	.09	-.09	-.04	-.11*	-.11*	.30**	.33**	.37**									
12	Competitive business environment	2.84	1.15	377	.06	.07	.03	.11*	-.01	-.08	-.09	.21**	.17**	.31**	.49**								
13	Regulatory burden	2.56	1.21	374	.06	.00	.02	-.01	-.02	-.02	-.09	.23**	.16**	.28**	.29**	.37**							
14	Procure - public sector	2.49	1.34	368	.22**	-.01	.13*	.04	-.11*	-.09	-.12*	.31**	.22**	.28**	.32**	.39**	.45**						
15	Procure - private sector	2.49	1.25	370	.26**	.00	.09	.03	-.08	-.11*	-.16**	.36**	.22**	.30**	.33**	.43**	.40**	.78**					
16	Relation with legal advisor	1.82	1.06	370	.11*	-.02	.09	-.03	-.16**	-.25**	-.14**	.33**	.21**	.31**	.23**	.25**	.26**	.35**	.36**				
17	Relation with CPA	4.13	1.11	376	.13*	-.02	.12*	.01	-.13*	-.22**	-.13*	.34**	.24**	.39**	.23**	.21**	.19**	.24**	.28**	.66**			
18	Understand accounting regs.	3.64	1.31	377	.13*	-.03	.11*	.00	-.13*	-.19**	-.15**	.31**	.25**	.56**	.34**	.25**	.24**	.28**	.30**	.49**	-.63**		
19	Recruiting and retaining workforce	3.43	1.44	377	.17**	.03	.13*	.06	-.04	-.15**	-.12*	.21**	.26**	.19**	.17**	.19**	.26**	.31**	.28**	.36**	.32**	.35**	
20	Networking effectively	3.42	1.31	375	.17**	-.06	.01	-.05	-.17**	-.13*	-.06	.25**	.11*	.19**	.29**	.36**	.20**	.34**	.36**	.26**	.28**	.29**	.32**
21	Work-life balance	3.09	1.40	383	.12*	-.07	.03	-.08	-.17**	-.16**	-.08	.21**	.14**	.20**	.20**	.24**	.20**	.16**	.17**	.22**	.21**	.23**	.39**
	*p< .05, **p < .01																						

Table 2																								
Correlations Among Minority Status, Control Variable and Perceived Challenges for Women Business Owners in General																								
	Mean	S.D.	N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
1	Minority	0.14	0.34	387																				
2	Full-time employees	5.15	22.56	391	-.03																			
3	Part-time employees	2.75	8.84	391	.13*	.20**																		
4	Sales	485,512.24	1,776,424.85	191	-.04	.83**	.25**																	
5	Age of Business	13.18	10.79	391	-.20**	.47**	.02	.44**																
6	Age of Owner	3.55	1.06	387	-.14**	-.03	.00	.03	.51**															
7	Education of Owner	4.18	1.40	386	.02	-.02	.05	-.03	-.04	.04														
8	Securing capital	3.63	1.12	359	.09	-.12*	.00	-.11*	-.13*	-.01	.05													
9	Health Insur. Costs	3.73	1.11	355	.09	-.15**	-.06	-.15**	-.14*	-.05	-.06	.58**												
10	Understand tax code	3.31	1.02	352	.10	-.13*	-.01	-.13*	-.10	-.01	-.01	.52**	.57**											
11	State of economy	3.41	0.96	353	.08	-.14**	.04	-.15**	-.03	.05	-.02	.51**	.46**	.61**										
12	Competitive business environment	3.50	1.00	353	.05	-.11*	.04	-.12*	-.12*	-.02	.00	.48**	.39**	.49**	.57**									
13	Regulatory burden	3.22	0.93	346	.09	.00	-.02	-.04	-.08	-.03	-.02	.31**	.39**	.59**	.47**	.51**								
14	Procure - public sector	3.33	1.05	342	.14*	-.08	.10	-.02	-.11*	.02	-.03	.46**	.35**	.40**	.44**	.59**	.52**							
15	Procure - private sector	3.28	1.02	340	.08	-.06	.09	-.04	-.09	.04	.07	.47**	.30**	.40**	.41**	.60**	.49**	.84**						
16	Relation with legal advisor	2.76	0.99	346	.13*	-.07	.07	-.08	-.12*	-.12*	.09	.36**	.18**	.44**	.34**	.41**	.45**	.41**	.46**					
17	Relation with CPA	2.70	1.01	348	.14*	-.07	.05	-.06	-.13*	-.15**	.06	.38**	.20**	.50**	.37**	.39**	.47**	.39**	.37**	.84**				
18	Understand accounting regs.	2.94	1.00	342	.12*	-.09	.04	-.09	-.13*	-.11*	.08	.37**	.27**	.58**	.42**	.44**	.48**	.39**	.40**	.65**	.75**			
19	Recruiting and retaining workforce	3.31	1.16	348	.21**	-.13*	.03	-.08	-.12*	-.07	.01	.26**	.32**	.34**	.26**	.39**	.39**	.32**	.35**	.35**	.32**	.34**		
20	Networking effectively	3.12	1.12	349	.16**	-.06	.09	-.06	-.17**	-.07	.02	.28**	.18**	.27**	.26**	.40**	.35**	.33**	.38**	.38**	.38**	.36**	.50**	
21	Work-life balance	3.82	1.12	355	.08	-.08	.11*	-.07	-.20**	-.09	.05	.34**	.29**	.31**	.25**	.45**	.33**	.29**	.31**	.36**	.36**	.35**	.42**	.49**
		*p < .05, **p < .01																						

Initial Comparisons of Minority and Non-Minority Women Business Owners

We used one-way analysis of variance (ANOVA; results indicated by an F-test) to examine differences in characteristics of the business, owner demographics, and perceived challenges facing the business owners.

The characteristics of the businesses and the owners were compared based on minority status. There were no significant differences between businesses owned by minority women and non-minority women with respect to the number of full-time employees. There was a significant difference ($F = 6.2$; $p < .05$) in the number of part-time employees employed by the two groups. Minority women reported an average of 5.6 part-time employees (s.d. = 16.6), while non-minority women reported an average of 2.3 part-time employees (s.d. = 6.8). There was no significant difference in annual sales reported by the two groups. There was a significant difference in the age of the business ($F = 15.4$; $p < .01$). The businesses owned by minority women were an average of 7.8 years old (s.d. = 5.8), while businesses owned by non-minority women were an average of 14.0 years old (s.d. = 11.2). The demographics of the business owners were also compared. There were no significant differences in the age or educational levels of the business owners between the two groups.

Challenges Facing Women Business Owners

The responses of minority women were compared to those of non-minority women on the items measuring the extent to which respondents believed various aspects of the business environment were challenging for them personally. There were many significant differences between the two groups in their response to these items. The items on which there were statistically differences (F-test; $p < .05$) appear in bold in Table 3 below. Again, these items were scored so that a higher mean indicates a greater challenge. As Table 3 indicates, minority women perceived significantly greater challenges in managing a business on all but two items. There were no significant differences in perception of “health care costs” and “the current state of the economy” as challenges to the business owners personally. This finding is notable because health care costs and the state of the economy represent more objective external realities which are likely to have an impact on businesses independent of the race or gender of the business owner.

Table 4 presents the business owners perceptions of the challenges of various environmental factors for women business owners in general. The items on which there are statistically significant differences between the groups appear in bold. Again, responses to these items are scored such that a higher number indicates a greater perceived challenge. As Table 4 shows, there were fewer significant differences in the responses of the two groups to these items; however, the differences that were found indicate that minority women perceive greater challenges in the business environment for women business owners in general. There were significant differences in perception of “procurement opportunities in the public sector” as a challenge for women business owners. Similarly, there were greater perceived challenges in the areas of “managing your business relationship with your corporate legal advisor,” in “managing your relationship with your certified public accountant under the new accounting regulations,” in “understanding the new accounting regulations,” “recruiting and retaining an effective workforce,” and “networking effectively.”

Table 3

Respondents' Perceptions of Difficulty of Business Challenges for Themselves by Race of the Business Owner

	Non Minority		Women of Color	
	Mean	S.D.	Mean	S.D.
Securing capital for building or expanding a business	2.4	1.5	3.4	1.7
Health insurance costs	3.2	1.6	3.5	1.6
Understanding the tax code	2.8	1.4	3.5	1.2
The current state of the economy	3.0	1.1	3.3	1.0
Competitive business environment	2.8	1.1	3.0	1.2
Regulatory burden	2.5	1.2	2.7	1.2
Procurement opportunities in the public sector	2.4	1.3	3.2	1.5
Procurement opportunities in the private sector	2.4	1.2	3.3	1.3
Managing your business relationship with your corporate legal advisor	1.8	1.0	2.1	1.2
Managing your business relationship with your certified public accountant under the new accounting regulations	1.8	1.0	2.2	1.4
Understanding the new accounting regulations	2.3	1.3	2.8	1.5
Recruiting and retaining an effective workforce	2.5	1.4	3.2	1.5
Networking effectively	2.5	1.3	3.1	1.4
Achieving a satisfying work/life balance	3.0	1.4	3.5	1.4

Table 4

**Respondents' Perceptions of Difficulty of Business Challenges for Women Business Owners
in General by Race of the Business Owner**

	Non-minority Women		Women of Color	
	Mean	S.D.	Mean	S.D.
Securing capital for building or expanding a business	3.6	1.1	3.9	1.1
Health insurance costs	3.7	1.1	4.0	1.0
Understanding the tax code	3.3	1.0	3.6	1.1
The current state of the economy	3.4	0.9	3.6	0.9
Competitive business environment	3.5	1.0	3.6	1.0
Regulatory burden	3.2	0.9	3.4	1.0
Procurement opportunities in the public sector	3.3	1.0	3.7	1.2
Procurement opportunities in the private sector	3.2	1.0	3.5	1.2
Managing your business relationship with your corporate legal advisor	2.7	1.0	3.1	1.1
Managing your business relationship with your certified public accountant under the new accounting regulations	2.6	1.0	3.0	1.1
Understanding the new accounting regulations	2.9	1.0	3.2	1.1
Recruiting and retaining an effective workforce	3.2	1.1	3.9	1.1
Networking effectively	3.1	1.1	3.6	1.0
Achieving a satisfying work/life balance	3.8	1.1	4.0	1.0

Results of regression analysis

Regression analysis was used to examine the relationship between minority status and perceived challenges facing the business owners personally as well as the perceived challenges facing women business owners in general, controlling for company and owner characteristics. The results of these regression analyses are presented in Tables 5 and 6.

As Table 5 shows minority status was significantly related to perceptions of challenges above and beyond factors often associated with business success such as the size of the business (as operationalized by the number of employees and the dollar volume of sales), how long the business has been established, and the age and education of the business owner. As Table 6 shows, minority status also explained significant variance in perceptions of challenges for women business owners in general above and beyond the above-noted control factors. It should be noted, however, that the control variables as a group were not significantly related to perceived challenges for women business owners in general.

DISCUSSION

The results of the present study taken together with those of earlier studies highlight the fact that although women business owners as a group often face more challenges in establishing and operating their businesses than do male business owners, minority women business owners may face even greater challenges. Perceptions of such challenges may impact decisions made for the business such as whether to pursue applying for a business loan and whether and how to impact social networks that could contribute to business success.

The limitations of the study center on the fact that the data were all self-reported. In future studies it would be useful to obtain additional external measures of the challenges faced by women business owners.

Future research should focus in the impact of perceived challenges on behavior and decision making. As noted previously, simply the perception of challenges may impact on business decisions, entirely independently of the reality of such challenges.

Table 5

Results of Regressing Perceived Challenges to the Business Owner on Control Variable and Minority Status

	Securing Capital ^a	Health Insurance Costs	Understand tax code	State of the Economy	Competitive Business Environment	Regulatory burden	Procure - Public sector	Procure - Private sector	Relation with legal advisor	Relation with CPA	Understand new accounting regulations	Recruiting and retaining workforce	Network effectively	Work-Life balance
<u>Company and Owner Characteristics</u>														
Full-time Employees	.03	.06	-.08	-.10	.01	.16	.04	.10	-.01	-.05	-.04	-.06	-.01	.00
Part-time Employees	.06	.03	.04	.14*	-.03	-.05	.05	-.01	.10	.12	.11	.14*	-.01	.04
Sales	-.04	.04	.01	-.04	-.11	.01	.09	.07	.01	.05	.04	.10	.01	-.04
Age of Business	-.10	.03	-.09	.09	-.02	.04	-.03	.05	.06	-.01	.01	.08	-.08	-.06
Education of Owner	-.14**	-.08	-.16**	-.12*	-.09	-.09	-.13*	-.17**	.13**	-.12*	-.16**	-.13**	-.07	-.07
Age of Owner	-.10	-.15*	-.17**	-.15*	-.08	-.02	-.03	-.09	.21**	-.20**	-.16**	-.17**	-.07	-.12*
Equation F	4.71**	2.25*	6.65*	3.29**	1.49	1.48	3.01**	3.76**	6.10**	5.38**	4.66**	4.17**	1.89	2.40*
R ²	.073	.039	.100	.052	.024	.029	.049	.061	.095	.083	.073	.066	.031	.038
<u>Minority Status</u>														
Equation F	5.51**	2.14*	6.63**	2.93**	1.54	1.86	5.08**	6.67**	5.45**	5.06**	4.55**	5.16**	2.68**	2.33*
R ²	.097	.040	.114	.054	.029	.017	.093	.118	.098	.091	.082	.092	.050	.043
R ² change	.024**	.001	.015*	.002	.005	.005	.044**	.057**	.003	.008	.010	.027**	.019**	.005
^a Standardized betas throughout														
* p < .05, ** p < .01														

Table 6

Results of Regressing Perceived Challenges to Women Business Owners on Control Variable and Minority Status

	Securing Capital ^a	Health Insurance Costs	Understand tax code	State of the Economy	Competitive Business Environment	Regulatory burden	Procure - Public sector	Procure - Private sector	Relation with legal advisor	Relation with CPA	Understand new accounting regulations	Recruiting and retaining workforce	Network effectively	Work-Life balance
<u>Company and Owner Characteristics</u>														
Full-time Employees	-.02	-.03	-.05	-.07	.03	.10	.01	.07	.00	-.01	.00	-.13	.06	.06
Part-time Employees	-.01	-.03	.01	.08	.03	-.06	.03	.02	.06	.02	.02	.06	.04	.06
Sales	.01	-.04	-.02	-.06	-.02	-.05	.11	.07	-.02	.01	.00	.08	.04	.02
Age of Business	-.09	-.06	-.02	.04	-.05	-.07	-.06	.03	.02	.03	.01	.04	-.11	-.11
Education of Owner	.03	-.07	-.01	-.02	-.02	-.02	-.05	.04	.10	.08	.10	.02	.01	.04
Age of Owner	.05	-.02	.02	.03	.01	.03	.07	.06	-.13*	-.15*	-.11	-.07	.00	-.03
Equation F	.55	1.14	.36	.88	.32	.76	1.37	1.22	1.78	1.72	1.21	1.16	1.61	1.97
R ²	.010	.141	.006	.015	.006	.014	.025	.022	.032	.030	.022	.07	.028	0.034
<u>Minority Status</u>														
Equation F	.66	1.15	.90	.92	.389	1.16	2.24*	1.55	2.24*	2.32*	1.66	3.48**	2.53*	1.833
R ²	.013	.023	.019	.019	.008	.024	.046	.033	.046	.047	.035	.069	.051	.037
R ² change	.003	.003	.013*	.004	.002	.010	.022**	.011	.014*	.017*	.013*	.048**	.022**	.003
^a Standardized betas throughout														
* p < .05; ** p < .01														

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GENDER DIFFERENCES IN PREFERENCE FOR AND USE OF BRAND NAME AND GENERIC/STORE BRAND OVER-THE-COUNTER ANALGESICS

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ABSTRACT

One of the largest categories of medications sold in pharmacies without prescriptions is analgesics. This category exhibits a market typically defined by active ingredients ranging from aspirin to ibuprofen. Promotional dollars spent on this category are large due to TV direct-to-consumer ads, but even those costs have not stopped new entrants. The question rarely addressed in marketing research in this product category concerns possible gender segmentation in preferences for and use of over-the-counter analgesics containing various active ingredients. Results from a web survey of 872 consumers suggest there are important gender differences marketers should consider when promoting over-the-counter analgesics.

INTRODUCTION

Gross sales of over-the-counter (OTC) pain medications (analgesics) declined 11% between 1999 and 2004. That represents a 21% drop in constant 2004 dollars in market channels excluding Wal-Mart. However, the market size was over \$2.1 billion in 2004.

Some of the decline in the OTC analgesics market since 1999 may be due to the discovery of the new COX-2 inhibitor class of drugs and the growth of the prescription drugs Celebrex[®] and Vioxx[®]. These drugs were approved by the Federal Drug Administration (FDA) in 1998 and 1999, respectively, and appeal to many looking for effective treatment for arthritis pain without the potential upset stomach that aspirin and other COX-1 blockers such as aspirin or ibuprofen can cause.

In addition, many issues related to the safety of OTC analgesics have been noted by the Food and Drug Administration (FDA). Among them are studies that show many Americans tend to overuse these types of products sometimes causing “analgesic neuropathy.” There also have been some well-publicized incidences of harmful consequences of OTC pain reliever usage such as liver failure and bleeding ulcers. Vioxx and Celebrex as well as other prescription drugs, have been shown to sometimes have serious and even fatal side effects. The drug Vioxx, a Merck drug used to alleviate arthritis symptoms, was pulled from the market in September 2004, and in April 2005, the FDA asked Pfizer to voluntarily remove Bextra[®] from the market. These problems seem to be perceived by the consumer as a class problem, since OTC analgesics have yet to benefit from concerns about prescription pain relievers [7].

The analgesic products can be usefully segmented based on ingredients (narcotic vs. non-narcotics or acetaminophen vs. aspirin vs. ibuprofen vs. naproxen sodium) and delivery system (pills-capsules-caplets vs. liquids vs. spray vs. oral melt-away vs. topical). For the purposes of this study, the analgesics market includes all oral analgesics that are available without a prescription, containing one of the four main ingredients acetaminophen, aspirin, ibuprofen, or naproxen sodium listed above.

However, from a marketing perspective, the analgesic consumer market can also be segmented on the basis of whether the consumer is male or female. Previous research has shown basic physiological and psychological differences between men and women may influence their reactions to drugs in terms of both effectiveness and side effects.

Gender Differences in Effectiveness

One main factor involved in gender differences is that women generally have lower body weight and organ sizes, and a higher percentage of body fat which affects drug effectiveness [6][4]. One impact of this difference is that acetaminophen is inactivated (conjugated) nearly 50 percent more in women taking an oral contraceptive compared with women not on contraception [6]. Also, when compared with placebo, ibuprofen is less effective at providing analgesic relief for women than for men during experimentally induced pain situations [9].

Hypothesis 1: On the basis of these findings, it is expected that women would report less use of acetaminophen and ibuprofen compared to men.

Gender Differences in Side Effects

Ten prescription drugs were withdrawn from the market in the U.S. between January 1997 and December 2000. Statistically greater health risks for women than men occurred for eight of these withdrawn drugs. For four of these eight drugs showing gender differences, the higher statistical risk for women may be accounted for by the fact more women than men took the drug. However, in four cases where these drugs were evenly prescribed to men and women, the higher risk for women may be linked to physiological differences between the sexes [3][8].

Although men and women report about the same number of adverse events, those reported for women are more serious rather than nuisances. These differences could be caused by differences in the way that men and women report adverse drug events. However, there are a number of potential factors that might explain the increased risk of serious adverse drug reactions in women, such as sex-related differences in physiology and in the way in which drugs are absorbed, metabolized, and eliminated by the body. Gender-related differences in the use of medications may also explain the higher risk for serious adverse reactions in women [5]. Women consume more medications than men, including over-the-counter medications, herbal remedies, and vitamins, which may put them at higher risk for adverse drug reactions [6].

Hypotheses 2 and 3: Because of these greater risks, women may be more likely to read drug information and ask their doctor about OTC medications more often compared to men.

METHODOLOGY

Questionnaire Development

Focus group research was used to identify pertinent areas of inquiry regarding the use of OTC analgesics, including:

- Analgesics currently in use
- Pain occasions
- Medicine format preferences
- Brand Preferences
- Marketing influences on consumer decision-making
- Product influences on consumer decision-making
- Attentiveness to product packaging information

From this beginning effort, subsequent pre-tests were used to further refine the self-administered questionnaire used in this study. The finalized questionnaire was then posted to a unique Internet address for data collection (done by WebSurveyor/VOVICI software product).

An Opportunity for Course Integration

Students enrolled in Marketing Strategy (at Coastal Carolina University) and Principles of Marketing (at The Citadel) participated in online simulations of the OTC pharmaceutical industry. In addition, the survey was introduced into these courses to enhance survey delivery and use, including:

- Providing students richer information on which to base decisions.
- Providing a market comparison to the consumer data included in the simulation.
- Involving the students in an active research project.

Data Collection

The population of analysis for this study consisted of the general population. Data collection occurred through two universities in the United States, both medium-sized comprehensive universities (Coastal Carolina University and The Citadel). The data was collected using a non-random process: each student enrolled in Marketing Strategy (at Coastal Carolina University) and Principles of Marketing (at The Citadel) assumed responsibility for sending the questionnaire to a pre-determined number of email addresses from members of their social network. Given the student composition of these two institutions, the students have access to a wide cross section of the general population as family, friends, co-workers, and so on.

To ensure consistency, the following cover letter was used to request respondent participation:

As you know, I am a student here at (CCU or The Citadel). In one of my senior-level marketing classes, we are using an online computer simulation to study the challenges of formulating marketing strategy. Specifically, we are using a simulation of the over-the-counter (OTC) pharmaceutical industry. We must make product, pricing, promotion, and distribution decisions in our role as brand managers.

We have lots of consumer information available to us to help us make smart decisions. We thought it would be interesting (and fun!) to collect additional information to help us. Here is a link to a survey we have created to learn more about these buyer behaviors.

<http://websurveyor.net/wsb.dll/40369/OTCSP07.htm>

I ask that you go to the link and take the survey. (You may be able to link directly to the survey ... or, you may have to paste the link into your internet browser.) As our class moves forward, we'll analyze the data and use the results to make smart strategy decisions. Thanks for your help. I knew I could count on you!

RESULTS AND DISCUSSION

Sample Demographics

The sample of 873 respondents came from both Coastal Carolina University (n=564) and The Citadel (n=309) student fielding. The sample demographics are below in Table 1:

Table 1: Sample Demographics

<p>Gender</p> <ul style="list-style-type: none"> • Male = 58% • Female = 42% <p>Age Group</p> <ul style="list-style-type: none"> • 18 – 25 = 55% • 26 – 44 = 20% • 45 – 64 = 25% 	<p>Covered by Health Insurance with Prescription Drug Plan</p> <ul style="list-style-type: none"> • Yes = 84% • No = 3% • Unsure = 13% <p>Educational Attainment</p> <ul style="list-style-type: none"> • High school graduate or less = 6% • Attending/attended college = 61% • Graduated 4-year college = 20% • Postgraduate study or degree = 13%
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Differences Between Universities

Chi Square tests for significant differences between the two university samples on the main dependent variables were conducted. No significant differences at $p < .05$ were found between the universities on any of the four dependent measures: use of acetaminophen, use of ibuprofen, likelihood of reading packaging information, and asking the doctor for advice about using OTC and prescription medications.

Hypothesis 1

Hypothesis 1 stated that women would report less use of acetaminophen and ibuprofen compared to men. Hypothesis 1 was supported by the data for acetaminophen. Significantly (Chi Square (1) = 14.8, $p < .0001$) more females (71%) reported using acetaminophen in the past 12 months compared to males

(58%). There was no significant difference in use of ibuprophen [Chi Square (1) = .65] for males (75%) compared to females (73%).

Hypothesis 2

Hypothesis 2 stated that women are more likely to read drug information about OTC medications compared to men. The data for this issue appear in Table 2 below. The data were collected in response to a question concerning how likely respondents are to read packaging information about an OTC analgesic.

Table 2: Percentage of Males and Females Likely to Read Specific Drug Information

Specific Drug Information	Always		Almost Always		Sometimes		Not Likely at All	
	F	M	F	M	F	M	F	M
Recommended Dosage	77%	61%	16%	21%	6%	13%	1%	5%
Recommended Time Between Dosages	72%	52%	18%	25%	9%	17%	2%	7%
Active Ingredient List	33%	18%	17%	19%	32%	35%	18%	28%
Possible Side Effects	41%	32%	31%	29%	23%	28%	5%	12%

In support of Hypothesis 2, females are more curious about all four items of drug information compared to males. These differences are all statistically significant with three degrees of freedom at $p < .0001$.

Hypothesis 3

Hypothesis 3 said women are more likely to ask their doctor about OTC medications compared to men. The data for this issue appear in Table 3 below. The data were collected in response to a question about how often respondents ask their physician for advice concerning use of OTC and prescription analgesics.

Table 3: Percentage of Males and Females Likely to Ask the Doctor about Advertised Drugs

Asking Physician For Advice	Never		1 – 2 Times		3 – 4 Times		4 – 5 + Times	
	F	M	F	M	F	M	F	M
OTC Medication	56%	69%	37%	27%	4%	3%	3%	1%
Prescription Medication	33%	37%	45%	41%	14%	13%	9%	9%

Hypothesis 3 was supported for OTC Medications, but not Prescription Medications. Females are more likely to ask the doctor for advice about OTC Medications than are males ($p < .0001$). However, there is no significant difference in the likelihood of females to ask the doctor about prescription medications compared to males.

These findings suggest there are important gender differences marketers should consider when promoting over-the-counter analgesics. Promotion suggesting females should ask their doctor about acetaminophen may be effective since females are likely to talk to their doctor and are likely to use acetaminophen more than males. This finding also suggests loyalty to acetaminophen may be reinforced by physicians in the market.

Although patient opinions about direct-to-consumer advertising (DTC) have become less positive over time in general [1] it has been shown [2] that DTC television advertising has an effect of getting the right medications to the right patients in the analgesic class. The use of information about drugs to inform discussions with doctors about OTC analgesics among females may be an important treatment efficiency factor in getting OTC products used instead of dangerous narcotics or expensive COX-2 inhibitors.

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***MEDIATING IMPACT OF CHANNEL KNOWLEDGE ON SHOPPING ORIENTATIONS
IN CONSUMERS' BUYING BEHAVIOR: A STUDY OF TOURISM PRODUCTS***

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ABSTRACT

This study examined the underlying factors of online shopping behavior with special reference to the travel and tourism products (air travel, lodging, cruise, and rental car). Samples were collected from two large state universities in the southeastern U.S. Respondents were asked about their perceptions of online purchase experience and frequency of purchase within past six months. The results revealed 4 underlying domains of convenience orientation, recreational orientation, self-deregulation, and channel knowledge. Convenience orientation, recreational orientation, and self-deregulation were significant determinants of online purchase of tourism product.

INTRODUCTION

Tourism websites are plentiful and sales are increasing. The growth rate of the online travel market is exceeding that of the total travel market. PhoCusWright (2006) projects that the Internet booking will account for 54% of all U.S. travel bookings in 2007. The Internet, indeed, is the most fast growing distribution market.

Responding to such demands, tourism suppliers (e.g. hotels and airlines) added their direct online channels in fear of loosing their business to a new, yet increasingly refined online business models (Web-based travel agents), such as merchant and opaque (Kang, 2005). Channel friction is shaping up to be a huge problem in industry general (McCune, 1999; Schoenbachler & Gordon, 2002) but particularly in tourism industry where traditional tour operators and travel agents are concentrated and control a large percentage of sales (Kang, 2005). Internet-based travel agents become a substantial threat to the traditional intermediaries but also to the tourism suppliers, who actually owns inventory - rooms, seats, cars, and ships.

Although tourism literatures and experts unanimously agree that today's customers are proficient at using Internet and possess unprecedented power and knowledge about products, inventories, and competitive

offerings (Schoenbachler & Gordon, 2002), they ask the same unanswered questions; reasons why Internet users buy travel products online. To answer this question, the authors investigated factors of Internet purchase with a special reference to tourism-related product from both theoretical and practical perspectives. Utilizing well-established shopping orientation theory, the current study examined convenience and recreational shopping orientation, self deregulation, and channel knowledge on purchase of travel product online. In particular, this paper tested four hypotheses as below:

- H1: Convenience shopping orientation positively influences online reservations.
- H2: Recreational shopping orientation positively influences online reservations.
- H3: The less self-regulated customers are, the more they make online reservations.
- H4: Customer's channel knowledge positively influences online reservations.

LITERATURE REVIEW

Shopping orientations are related to general predisposition toward acts of shopping. The concept of shopping orientations is operationalized on the basis of attitudes toward activities, interests, and opinion statements pertaining to acts of shopping (Holbrook, 1986; Kim & LaRose, 2004).

This study examined two most well studied shopping orientations in marketing literature; convenience (Bellenger, Robertson, & Greenberg, 1977; Girad, Silverblatt, & Korgaonkar, 2002; Jarvenpaa & Todd, 1997; Li, Kuo, & Russel, 1999) and recreational (Bellenger & Korgaonkar, 1980; Donthu & Garcia, 1999) orientation as well as self-deregulation that was found to be an important determinants of online shopping behavior (Kim & LaRose, 2004).

Convenience orientation: The convenience maximization orientation (Girad, Silverblatt, & Korgaonkar, 2002; Jarvenpaa & Todd, 1997; Li, Kuo, & Russel, 1999) refers to shoppers attitudes (Holbrook, 1986) toward shopping as a procedure to maximize their individual economic efficiencies; specifically, to minimize their search and transaction costs. Convenience orientation stresses the utilitarian value of shopping, as a task-related, rational, deliberate, and efficient activity (Babin, Darden, & Griffin, 1994). Therefore, shoppers with convenience orientations try to minimize their search cost as much as possible to save time or energy for activities other than shopping (Anderson, 1971). These previous studies were tested in retail-based setting, yet the convenience orientations may perfectly explain the increase of online shopping as it saves the time and effort needed visits for product or price comparisons (Darian, 1987; Girard, et al., 2002; Jarvenpaa & Todd, 1997; Li, et al., 1999).

Recreational orientation: Shoppers with a recreational orientation view shopping as a form of recreation and often make impulse buys (Bellenger & Korgaonkar, 1980; Donthu & Garcia, 1999). The hedonic value of recreational orientation results from enjoyment and playfulness rather than from task completion (Holbrook & Hirschman, 1982). Hedonic value is indicated by increased arousal (e.g. excitement caused by bargains), perceived freedom, fantasy fulfillment, and escapism (Hirschman, 1983). Thus, shoppers who pursue hedonic or recreational outcomes from shopping tend to spend more time on shopping, go shopping without plans or product lists, and continue shopping even after purchasing products they planned to buy. In these situations, purchases may be driven by "need to purchase" rather than "need for a product" (Rook, 1987). Therefore, shopping experiences driven by a recreational orientation lead shoppers to make more unregulated buys. (Bellenger & Korgaonkar, 1980).

Self-deregualtion: In Babin, et al. (1994)'s study, a website shopper with a specific gift purchase in mind was attracted by an on-site shopping recommendation to buy a fun gift for himself on impulse. More recent marketing studies (Kim & LaRose, 2004) found that online shopper may exhibit unregulated purchase behavior regardless of shopping orientations under the circumstances of exposed stimuli (solicitation, interactive features of Website). Online shoppers were found to possess multiple shopping

orientations (Brown, Pope, & Voges, 2003), combining the pursuit of convenience and recreational outcomes when they were attracted by a nature of impulse buying. This suggests that shopping with a convenience orientation may be accompanied by pleasure or arousal, and does not need to exclude hedonic outcomes. LaRose and Eastin (2002) found that deficient self-regulation was related to the amount of online shopping activity.

Channel Knowledge: While there are a plethora amount of debates on whether customers know who they are paying to or who provides products and services, it is interesting that very limited number of empirical researches is done in examining an impact of customers' channel knowledge on the purchasing of travel product online. Because empirical research on channel knowledge, especially online ones is quite limited, we had to rely on a restricted number of previous studies of e-commerce. Li, Kuo, and Russell (1999) found channel knowledge is the strongest predictor of online buying behavior suggesting that knowledgeable customers tend to have more positive perceptions of the online channel's utility and thus are more frequent web buyers.

METHODS

Data was collected at two large state universities in the southeastern region. Participants were screened if they had made an online reservation (e.g., air travel, lodging, cruise, and rental car) in past six months, and then asked about their online booking experience. After removing influential points, 87 responses were retained for further analysis.

A battery of 28 items was generated based on the literature, encompassing 4 domains (convenience, recreational, self-regulation, channel knowledge). Respondents were asked to rate their level of agreement on 28 items in order to measure the perceptions about their online purchase experience. A seven-point Likert scale was used, ranging from strongly disagree (1) to strongly agree (7). The frequency of purchase was measure by a single item on a 7-point scale, ranging from never (1) to very often (7).

RESULTS

A principal component analysis (PCA) with varimax rotation was conducted. Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy of the final model was .778, which verifies factor analysis is appropriate for the data. The PCA generated four factors with the eigenvalue of above 1.0. Four factors accounted for about 66.4% of the total variances. The factors were labeled according to the items with higher loadings and common characteristics in each dimension, namely convenience, recreational, deficient self-regulation, and channel knowledge. As seen in Table 1, each factor was consisted of six items.

TABLE 1. EFA Results

<i>Item</i>	<i>Mean (S.D)</i>	<i>Convenience</i>	<i>Recreational</i>	<i>Deficient Self-regulation</i>	<i>Channel Knowledge</i>
CON1	5.81 (1.314)	.868			
CON2	5.69 (1.448)	.872			
CON3	5.62 (1.472)	.797			
CON5	5.65 (1.232)	.846			
CON6	5.83 (1.180)	.827			
CON7	6.00 (1.058)	.788			
REC1	4.80 (1.240)		.806		
REC2	4.17 (1.369)		.745		
REC3	4.71 (1.255)		.844		

REC5	4.54 (1.275)		.873	
REC6	4.37 (1.359)		.804	
REC7	4.18 (1.798)		.517	
DS1	2.12 (1.590)		.693	
DS3	2.28 (1.685)		.793	
DS4	2.12 (1.537)		.778	
DS6	1.94 (1.506)		.894	
DS7	1.93 (1.540)		.836	
DS9	2.12 (1.567)		.806	
CK1	3.96 (1.602)			.711
CK2	3.94 (1.450)			.649
CK3	4.21 (1.440)			.524
CK4	3.52 (1.269)			.645
CK5	3.56 (1.507)			.837
CK6	4.13 (1.378)			.809
<i>Eigenvalues</i>	6.190	4.709	2.866	2.178
<i>% of variance explained</i>	19.1	17.1	16.5	13.7
<i>Cronbach's Alpha</i>	.92	.88	.91	.81

A multiple regression was used to examine the extent to which factor contributed to the actual purchase of tourism product. Retained factor scores for 4 domains were regressed on the frequency of online reservations.

TABLE 2. Results of Multiple regression of factor scores on online reservation

	Standardized Beta	p-value
DV = "how often did you make online reservation in the past six months?"		
Convenience	.237	.014**
Recreational	.304	.002**
Deficient Self-regulation	.324	.001**
Channel Knowledge	.180	.061*
$R^2 = 29\%$. * $p < 0.10$ ** $p < .05$ *** $p < .001$		

From Table 2, three independent variables reported a statistically significant results on frequency of online reservation, which include convenience ($\beta = .237$, $p = .014$), recreational ($\beta = .304$, $p = .002$), and deficient self-regulation ($\beta = .324$, $p = .001$). Channel knowledge, however, showed a marginally significant influence the dependent variable ($\beta = .180$, $p = .061$).

DISCUSSION

The result of this study offers very interesting explanations of online booking behavior. First, the two dominant shopping orientation theories hold true in electronic shopping of tourism products. Secondly, the result implies a possible relationship of customer's channel knowledge and booking preference on the various booking websites.

Future study should examine a direct linkage between recreational and convenience orientation with deficient self regulation (Kim & LaRose, 2004), as well as a linkage between customers' knowledge and perceived utility (conventional orientation). In addition, the result calls for a holistic path model for shopping orientation, self-regulation, channel knowledge, and its outcome of actual purchasing behavior, with consideration of demographic variables, such as income and age (Li, Kuo, & Russell, 1999).

APPENDIX

Convenience

- Con1: Online reservation is more convenient than going to travel agent.
- Con2: Online reservation is more convenient than calling to travel agent.
- Con3: Online reservation is more convenient than calling service provider directly (airline, hotel, rental car company, etc.).
- Con5: Online reservation takes less time to reserve what I want.
- Con6: I can shop around for the best buy by booking online.
- Con7: By going online, I can consider a wide selection before making a reservation.

Recreational

- Rec1: Online reservation is enjoyable.
- Rec2: Online reservation cheers me up.
- Rec3: I enjoy making reservations online.
- Rec4: Surfing reservation sites is usually a pleasant experience for me.
- Rec6: I never feel bored when I surf to make reservations.
- Rec7: I like alerts of new deals and special offers.

Deficient self-regulation scale

- DS1: I made a reservation on the Internet that I did not originally intend to.
- DS3: I made a reservation on the Internet for things that I knew I couldn't afford.
- DS4: I made a reservation of a trip on the Internet that I really didn't need.
- DS6: I kept making more and more reservations every time I went online booking sites.
- DS7: I felt anxious to go online and purchase some more.
- DS9: I cancelled reservation that I made online.

Channel Knowledge

- CK1: I know why price for the same tourism products are different through Websites
- CK2: I know the end service provider of a product that I paid for.
- CK3: I know which Website will give me the best price for the same product.
- CK4: When I find a travel product with different prices on multiple sites, I know who actually has the inventory.
- CK5: I know who will eventually get my information when I make a reservation online.
- CK6: I know exactly who I am paying to.

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RELEVANCE OF ETHNOCENTRISM ON LEBANESE BUYING HABITS

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ABSTRACT

This article explores the effect of ethnocentrism on the Lebanese buying habits. People are required to make purchase decisions almost every day (Arnould, et al 2004). Businesses need to understand the effect of the culture in shaping consumer habits. Studying the effect of ethnocentrism on the consumer habits is one way of investigating buyer behavior and market segmentation. This paper studies consumer market segments that exist among Lebanese consumers by using life-style patterns and ethnocentrism.

Introduction

Ethnocentrism means the inclination of people to view their own group as superior and reject people who are culturally dissimilar (Booth 1979, Worchel, & Cooper 1979). It gives the individual a sense of identity, feelings of belongingness, and most important by an understanding of what purchase behavior is acceptable or unacceptable to the in-group. Symbols and values of one's own ethnicity or nationality become objects of pride and attachment, whereas symbols of other groups may become objects of contempt (Levine & Campbell 1972). Consequently, consumers refrain from purchasing imported products because they believe that it hurts the domestic economy and causes the loss of jobs (Shimp & Sharma 1987). In this paper, the concepts related to consumer lifestyle, ethnocentrism, and their effect on consumer behavior are investigated. The results of an exploratory survey of consumers in Lebanon, a small and densely populated nation in the Middle East, are evaluated for potential use by marketing managers.

Literature Review

The relevance of ethnocentricity becomes a critical issue when considering the increasing trend toward free trade and the rapid pace at which national economies are turning global. In coping with these challenges, businesses have to go global to remain competitive. Businesses are targeting global consumers, whom they need to reach and maintain. Understanding these consumers and knowing their lifestyles become a necessity.

Various models have been developed put to explain consumer behavior. Kesic and Prii-Rajh (2003) have associated lifestyle with the way people live and spend their time and money. Lindquist and Sirgy (2003) assert that lifestyle summarizes a collection of individual characteristics and behavior. These characteristics are socio-cultural variables such as age, gender, ethnicity, social group, and religion. Psychographics is one of the main instruments used to analyze and measure lifestyles. It focuses on knowing the characteristics of consumers that affect their buying decisions (Lindquist & Sirgy, 2003). Psychographics also provides a mechanism to investigate the attitudes, interests, and opinions (AIO) of targeted consumers. These preferences are highly important because they allow the prediction of consumer behavior (Gonzalez & Bello, 2002).

Westfall (1962) claimed that a successful marketing model lies in the researchers' ability to come up with variables that distinguish people's actions and decisions. These variables are more involved than just the demographic and socioeconomic characteristics. Wells (1975) argued that demographic profiles have not been deemed sufficient because they lack richness and often need to be supplemented with additional data. Social class adds more depth to demographics, but often needs to be supplemented in order to obtain meaningful insights into consumers' characteristics. "Lifestyle segmentation" has been a useful concept for marketing and advertising planning purposes (Wells & Tigert, 1977; Kaynak & Kara, 1996). Lifestyles are an expression of an individual's self-concept. It is the total image people have of themselves, which is a result of how people were socialized in their culture. Hawkins, et al, (2004) argued that consumers exhibit unique lifestyles, for example, some have been labeled as career-oriented individuals. Lifestyles produce needs and desires that ultimately affect the decision-making of each consumer. They added that feelings and emotions are very important in consumer purchase decisions and both have an effect on the analysis of product attributes. Greater insight into the lifestyle of target customers provides businesses with a variety of ideas for the development of marketing and advertising strategies (Perreault & McCarthy, 2006). The objective of these strategies is to persuade people to assume behavior patterns that are typical of their lifestyles. An important consequence of adopting these patterns is to motivate them to purchase different types of products or services (Gonzalez & Bello, 2003).

Papadopoulos and Heslop (1993) discussed the effects of a product's country of origin on buyers' perceptions. Roth & Romeo (1992) as well as Kaynak & Kara (1998) asserted that consumers have significantly different country images or general perceptions about products made in different countries. Shimp & Sharma (1987), in discussing the consumer's lifestyle, highlighted the concept of ethnocentrism, which represents people's beliefs about the appropriateness and even the morality of purchasing a particular product or service.

A number of studies have highlighted the effect of consumer ethnocentrism and country of origin on consumers' attitudes (Ibanez & Montoro, 1996; Bigne & Marin, 1995). Ethnocentric consumers favor local products as they deem that products from their own country are the best (Klien, et al., 1998). Ethnocentrism also influences consumers' behavior when they believe that their national interest is being threatened (Sharma et al, 1995; Shimp & Sharma, 1987). The greater the consumers attach a higher value for products that are made in their home country compared to other countries, the greater is their ethnocentric tendency (Huddleston et al, 2001).

Studies have shown that consumers in developed countries are likely to identify domestic products as being of higher quality when compared to imported products (Damanpour, 1993; Elliott & Cameron, 1994; Herche, 1992), while the reverse is true for consumers in developing countries (Batra et al., 2000; Bow & Ford, 1993, Wang et al. 2004). Shimp and Sharma (1987) created consumer ethnocentrism as a concept for the study of consumer behavior with marketing implications (Sharma et al., 1995). The majority of lifestyle studies have been carried out in developed nations. There have been only a few studies covering developing nations. This study focuses on the lifestyle of Lebanese people in an attempt to identify consumer market behavior in a developing country. Presenting a perspective of Lebanon as a developing nation provides a context for understanding lifestyle behavior in that country.

Lebanon: A Developing Nation

Lebanon is located on the eastern side of the Mediterranean Sea. It has a 150-mile coastline on its western side, with Israel bordering it to the south, and Syria to the east and north. Despite its small area of 3,344 square miles, it has a high degree of diversity. Although no official census has been conducted since 1932, Lebanon's estimated of 3.8 million inhabitants places it among nations with the highest population density in the world (CIA Fact Book). Lebanon's inhabitants include numerous foreign nationals, immigrants, and long-term residents (Dar Al Nahar, 1995). Approximately one-third of the population is under the age of twenty. The current population growth rate of 1.2% is the lowest in the region. A unique characteristic is that Lebanese emigrants are scattered throughout the globe and number more than four times the residents (Al Khalil, 1996).

Lebanon is synonymous to ethnic and religious diversity with relative freedom of movement and autonomy. Eighteen different religious communities of the three monotheist religions are officially recognized by law, and are very active culturally, politically, and economically – though Judaism has become less apparent culturally and politically lately, while still active as an economic force. Because of its location at the intersection of the three main continents of the Old World, the Lebanese “mixing pot” has been enriched with numerous cultural contributions from the many invasions, incursions, immigrations, and interactions this land has witnessed over the centuries. Any notion of racial, ethnic, or even cultural unity – or purity – is thus excluded and openness to the “different” is common. Having the reputation of the land of refuge, hospitality, and relative freedom exceptional in the area for the numerous persecuted communities of the Middle East seeking sanctuary, Lebanon experiences a constantly growing influx of different peoples and cultures. The society's Arabic identity is very peculiar, notably due to its high level of “westernization” and liberalism added to a very typical national cachet.

The literacy rate of 90% is one of the highest in the Arab world. It is even higher among the youth, more than half of whom educated privately (The OBG, 2005). The nation enjoys a highly skilled labor that is comparable to most European nations. The urban population is noted for entrepreneurial and commercial activities. While staunchly attached to their independence for which they have fought and still struggle to preserve, the Lebanese remain actively engaged in global cultural and intellectual interchanges, most notably with the surrounding Near East, Arabic, French, and Anglo-American cultures (Fauvel, 1975).

The century old dispute between Arab and Lebanese nationalists, exacerbated by the Israeli-Palestinian conflict with its ramifications across the whole Middle East, spilled out into the streets of Beirut in the 1970s. Though simplistic accounts of the subsequent wars overemphasize the sectarian nature of the divergence, it remains a much more complex combination of cultural, socio-economic, and political conflicts. Despite the fragmentation of the society and the many redrawing of the divides, the state has endured and its inhabitants remain first and foremost Lebanese, though with varying views about their Lebanese identity (The OBG, 2005).

Research Methodology

Measuring ethnocentricity is a focal point in a number of studies (Shimp & Sharma, 1987; Netemeyer et al., 1991; Han, 1988; and Chasin et al., 1988). Shimp and Sharma (1987) developed CETSCALE measure, which is one of the important contributions in consumer research to measure ethnocentricity. The CETSCALE consists of seventeen items scored on a seven-point Likert-type format and represents an accepted means of estimating consumer ethnocentrism across cultures/nations. In a study among four developed nations (France, Germany, Japan, and the USA), Netemeyer et al. (1991) reported alpha levels ranging from 0.91 to 0.95, which provides a strong support to the validity and internal consistency of this measure. They recommended the use of this measure in other nations.

Data Collection

This explanatory study replicates others where the CETSCALE measure – along with the psychographic and demographic variables of consumer behavior – were used to test consumer's ethnocentricity (Luque-Martinez, Ibanez-Zapata, & del Barrio-Garcia, 2000). This study consisted of a sample of 91 individuals selected from the two main parts of Beirut, the capital city. A non-probabilistic sampling methodology was used to collect data. The data was collected through self-administered questionnaires using a drop-off/pick-up method. The drop-off/pick-up is a data-gathering method that incorporates the advantages of both personal interviews and self-administered questionnaires (Stover & Stone, 1978; Imperia, O'Guinn, & MacAdams, 1985). Respondents were randomly contacted and asked to complete the questionnaire at their own convenience.

Data Analysis

The reliability analysis of the 37 activities, AIO statements produced a Cronbach's alpha coefficient of 0.9094, which is highly significant. A study with a coefficient 0.65 or better is considered reliable (Girden, 2001).

A factor analysis of AIO statements was conducted to study the lifestyle of Lebanese consumers. The resultant factor matrix was rotated using Varimax rotations. The analysis produced four factors, which explained 29 percent of the total variance. Only those factors with an eigen value greater than 1.00 were retained. Table 1 summarizes the factor loading and the four factors extracted from the data.

Table 1: Factor Analysis of AIO Statements (Varimax Rotation)

Factors and Characteristics	Factor Loading	% of Variance Explained
Factor 1: Self-Reliance and Leadership		
I think I have more self-confidence than most people	0.59	4.711
Factor 2: Nurturing and Family Orientation		
When my children are ill in bed I drop most everything else in order to see to their comfort	.50	
My children are the most important thing in my life	0.742	
I try to arrange my home for my children's convenience	0.796	9.656
Factor 3: Health and Optimism		
During the warm weather, I drink low calorie soft drinks several times a week	0.57	
I buy more low calorie foods than the average housewife	0.62	
I have used low calorie foods at least one meal a day	0.77	8.293
Factor 4: Household Oriented and Industrious		
I like to sew and frequently do	0.81	
I would like to know how to sew like an expert	0.59	7.095
Total cumulative variance		29.755

Table 1 includes only those AIO statements that have a factor loading of greater than 0.5 on their respective factors. The first factor loadings show statements that reflect a positive self-image and it explains 4.7% of the total variance. One variable remained in the model and it is that the respondents believe they have self-confidence. The second factor "Nurturing and Family Orientation" explained 9.6% of the total variance. This factor shows the care that the Lebanese people provide to their children. The third factor, which explains 8.2% of variance, focuses on health and physical well-being. The consumers are health conscious and emphasize healthy food. The fourth factor "Household Oriented and Industrious" explains 7.1% of the variance and shows that the consumers try to do things that they can do themselves. It may indicate the desire to do the best for their children.

These four factors explain 29% of the variance. They reveal certain basic characteristics of the Lebanese people. The Lebanese consumers believe that they are community leaders. They are family oriented and are deeply concerned with the well being of their children. They care for their children and teach them good habits. The Lebanese consumers are health conscious and are likely to do things by themselves and are willing to learn new ways of doing things.

General demographic consumer information such as their geographical distribution, economical condition, and age also provided important insight into consumer behavior in Lebanon. The survey reveals no support for the common Lebanese stereotype of the traditional male dominated family. The survey indicated that educational level among females is the same as males and the two-income family has now become the norm. These findings make the Lebanese unique among consumers in the Middle East. Traditions such as the role of the family play a strong influence,

however, the Lebanese lifestyle has changed into more Western-oriented norms. For example, new life-style practices have shifted from a male dominated decision-making into a new joint family-household involvement in purchase decisions.

Ethnocentrism

To measure consumer ethnocentrism the 17-item CETSCALE developed by Shimp and Sharma (1987) was used. Table 2 shows the result of the reliability analysis of these items. Overall, the Cronbach's alpha coefficient of 0.9354 can be considered a reasonably high reliability coefficient. Based on this, it can be assumed that all 17 items used are measuring the same construct (ethnocentrism) and, therefore, a summative measure can be used to represent the ethnocentrism score of the respondents. The results of the ethnocentric analysis are shown in Table 2 below.

TABLE 2: Ethnocentrism Measured on 17-Item CETSCALE^a

Item No.	Item ¹	Reliability ²	Mean Score
1	Lebanese people should always buy products made in Lebanon instead of imports	.933	5.08
2	Only those products that are unavailable in Lebanon should be imported	.933	5.30
3	Buy Lebanese made products and keep Lebanese working	.933	6.01
4	Lebanese products, first, last, and foremost	.932	4.85
5	Purchasing foreign-made products is un-Lebanese	.936	3.24
6	It is not right to purchase foreign products, because it puts Lebanese out of jobs	.929	3.85
7	A real Lebanese should always buy Lebanese made products	.930	3.90
8	We should purchase products manufactured in Lebanon instead of letting other countries get rich on us	.929	4.98
9	It is always best to purchase Lebanese products	.930	4.57
10	There should be very little trading or purchasing of goods from other countries unless of necessity	.929	4.44
11	Lebanese should not buy foreign products because this hurts business and causes unemployment	.931	3.96
12	Curbs should be put on all imports	.929	4.27
13	It may cost me in the long-run but I prefer to support Lebanese products	.932	4.96
14	Foreigners should not be allowed to put their products on our markets	.930	2.95
15	Foreign products should be taxed heavily to reduce their entry into Lebanon	.932	4.47
16	We should buy from foreign countries only those products that we cannot obtain within our own country.	.931	4.94
17	Consumers who purchase products made in other countries are responsible for putting their fellow Lebanese out of work.	.928	3.62

¹ Response format is 7-point Likert-type scale (strongly agree = 7, strongly disagree = 1)

² Calculated using Cronbach's alpha (Alpha if item deleted). Overall Alpha = .9354.

Table 2 shows the highest scoring factor was Item 3 and it indicates buying Lebanese products keeps Lebanese working. High scores were reported in most of the items. Items 1, 2, 4, 8, 9, 10, 12, 15, and 16 had scores above 4.0. This indicates that the Lebanese consumers have preference to local products and they view imports as a negative factor that hurts the economy. Imports are perceived as benefiting the exporting countries and contributing to unemployment in Lebanon. However, the Lebanese consumer is not against foreign products. Item 14 had the lowest score

(2.95), which states that foreigners should not be allowed to put their products in the market. This represents that the Lebanese consumer is not against imports but they intrinsically prefer local products.

The mean score on the CETSCALE is 4.44, which is high. The Lebanese consumer appears to accept imports if local products are not available. Lebanese consumers do not put the blame on imported goods (items 11 and 17 had scores below 4) for high unemployment or a bad economy. This reflects the unique characteristics of Lebanese people. Even though they prefer to consume local products, but they are receptive to the imported goods if the need arises.

The respondents were asked to indicate who in the family, the husband or the wife, makes buying decisions for certain items. The results are shown in Table 3 below.

Table 3: Primary Decision Maker for Specific Products (percent responses)

Product Category	Decision Maker	When to Buy	Where to Buy	What to Buy	How Much to Spend
		(%)	(%)	(%)	(%)
Grocery	Husband	8.8	13.2	7.8	16.5
	Wife	58.2	52.7	60.0	42.9
	Joint	26.4	26.4	25.6	34.1
	Not Reported	6.6	7.7	6.7	6.6
Major Appliances	Husband	12.1	17.6	14.3	17.6
	Wife	22.0	23.1	20.9	13.2
	Joint	54.9	49.5	54.9	58.2
	Not Reported	11.0	9.9	9.9	11.0
Furniture	Husband	9.9	9.9	4.4	15.4
	Wife	20.9	23.1	28.6	14.3
	Joint	61.5	60.4	59.3	62.6
	Not Reported	7.7	6.6	7.7	7.7
Automobile	Husband	41.76	50.55	41.76	41.76
	Wife	5.49	3.30	5.49	4.40
	Joint	46.15	39.56	46.15	47.25
	Not Reported	6.59	6.59	6.59	6.59
Savings	Husband	21.98	26.37	24.18	24.18
	Wife	14.29	13.19	15.38	13.19
	Joint	53.85	51.65	51.65	53.85
	Not Reported	9.89	8.79	8.79	8.79
Vacations	Husband	8.79	6.67	5.49	15.38
	Wife	13.19	15.56	17.58	6.59
	Joint	68.13	68.89	68.13	69.23
	Not Reported	9.89	8.89	8.79	8.79
Life Insurance	Husband	39.56	42.22	43.96	41.76
	Wife	4.40	4.44	4.40	4.40
	Joint	42.86	41.11	39.56	41.76
	Not Reported	13.19	12.22	12.09	12.09

The survey results show that the wife is the primary decision maker in the grocery category. This reflects the nurturing nature of the Lebanese consumer where the wife decides what type of food to buy. Items that affect the whole family, such as looking for appliances, vacations, and savings are clearly joint ones. The husband's or the wife's opinion may carry higher weight where he or she may have more information about an item. For example, in buying an automobile or life insurance, the husband has a much greater say. Almost all decisions, except for groceries, joint household decision-making is common for Lebanese consumers.

CONCLUSIONS

The findings indicate unique consumer behavior characteristics in Lebanon. The highest rated factor was strong family orientation explaining almost ten percent of the variation. This factor – considered the most important – is not surprising considering the significance of family among all the Lebanese subcultures. The study also found that decisions (with the exception of grocery purchases) are now done jointly by both husband and wife. The common stereotype of a male dominated traditional Lebanese family was not supported. Furthermore, two-income families dominated and the education level of the females was the same as the males in the survey. These indicators make consumers in Lebanon unique compared to people in the surrounding countries. Although Lebanon is a gateway to the Middle East – and heavily influenced by traditions – the Lebanese lifestyle has moved more into the Western type. The uniqueness of the Lebanese people is that they have retained their traditional culture of being family focused while simultaneously they have adopted Western life style practices.

Even though the present study is exploratory, findings of the study show that lifestyle dimensions of Lebanese consumers influences their buying behavior, which also reflect their ethnocentric tendencies. This study has a significant impact because it shows that such information is important to marketing professionals in developing strategies that will properly position their product offer and strategies. The fact that four major factors were identified as important lifestyle dimensions among Lebanese consumers is also significant. This underscores the need for more studies related to the specifics of lifestyles that could then contribute to making more effective marketing strategies.

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THE IMPACT OF RESIDUAL RFID LOGISTICS ON CONSUMER USE AND PURCHASE INTENTIONS

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ABSTRACT

In today's global competitive environment, organizations face a variety of challenges. Many organizations are adopting radio frequency identification technologies (RFID) as part of their information supply chains. These technologies provide many benefits to the organizations that use them. However, how these technologies affect consumers and their willingness to adopt the technology is often overlooked. Many of these tags remain active after the consumers purchase them. These RFID tags, placed in a product for one purpose and left in the product after they have served that purpose, are residual RFIDs. Residual RFID technology can have many positive and negative effects on consumers' willingness to buy and use products containing RFID, and thus, on the business's ability to sell products containing RFID. In this study, we outline some of the advantages and disadvantages of residual RFID from the consumer perspective, then follow up with an in-depth survey and analysis of consumer perceptions.

Keywords: Technology Acceptance, Emerging Technological Challenges in the Business Environment, Risk, and Residual RFID.

INTRODUCTION

Many organizations are adopting radio frequency identification technologies (RFID) as part of their information supply chains in order to stay competitive in a global environment. RFID technologies provide many benefits to the organizations including the improvement of the supply chain, inventory systems, customer relationship management, and the overall efficiency of the organization.

Organizations face a variety of challenges in today's global competitive business environment. Organizations thrive for continuous improvement as well as enhancing the entire supply chain in order to stay competitive. One of the ways an organization can deal with this situation is to study and apply the methods of supply chain management (SCM). The goal of SCM is to offer products at low cost with high customer satisfaction by managing production, procurement, distribution, and inventory control. The critical issues of SCM are to integrate the inventory, distribution and sales information and to make the integrated logistics information visible to the other organizations in the distribution and sales channels in real-time ([2] [5] [6] [7] [13] [14]). According to studies conducted by Prater, et al. [10] and Smith [11], RFID technology provides automatic data capture, data identification and information interchange. Therefore, merchandise tracking, product sorting, and distribution data collection and analysis can be efficiently accomplished.

It has been predicted that in the near future, the vast majority of the products manufactured, bought and/or sold will have a small tag that can remotely and uniquely identify that individual item. Any person or business with an appropriate scanner may be able to know the item type, price, where it was made, sold, purchased and resold by reading a small radio frequency identification (RFID) tag. RFID tags are currently being deployed in the supply chains of many organizations. These tags offer many benefits to organizations; however, many of these tags can remain active after they leave the organization, broadcasting their identities and histories to anyone with a scanner and link to the proper database. These left over tags, installed to help the supply chain, but not removed after the purchase, are referred to as residual RFIDs.

Residual RFID technology can have many positive and negative affects on consumers' willingness to buy and use products containing RFID, and therefore on the business's ability to sell products containing RFID. If consumers refuse to buy products with active RFID tags in them, the business harm is greater than the business benefit, regardless of any gain in supply chain efficiency.

While many researchers have looked at the benefits that accrue to corporations and supply chains through RFID technology, many organizations have not adequately considered the impact of residual RFID technology on consumers, business and society. The ultimate purpose of RFID technology is to provide retailers and suppliers with the ability, in time, to track any item remotely and uniquely at the individual level. The impact of this ability, both positive and negative, on consumers in our society will be enormous. Whether consumers are ready for it or not, RFID technology is becoming a part of their lives. Many of its applications have little to no effect on the general consumer; however, the integration of this technology into other aspects of consumers' lives raises certain concerns.

The study conducted by Lin, et al. [8] indicated that RFID technology can provide real-time data to make appropriate managerial decisions in the supply chain management systems since these systems are complex, dynamic, and stochastic. Caton [3] indicated that RFID has a major advantage in supply chain management; however, the organization should plan and test its successful implementation. The study also suggested that the focus of information technology should be on the supply chain since RFID will have a significant impact on all stages of SCM.

The two different types of RFID tags, active and passive, offer their own differing benefits and liabilities to consumers. Active RFID tags are driven by a power source, typically a small battery. These tags are capable of broadcasting their own signal over varying distances, depending upon the potency of the battery and range of the frequency. Although useful only for the duration of their power source, these tags may be extremely important in certain military and other applications, but may offer only limited practicality for consumer use, as the cost to produce such tags would render them prohibitive in a consumer environment.

Passive tags have no power source and are relatively inexpensive to produce. These economical tags are those that are most likely to be found on consumer goods. Lacking a power source, these tags are incapable of broadcasting their own signal. Initially, this sounds like a benefit in terms of consumer privacy, but the lack of a power source effectively makes these tags nearly immortal in consumer terms. They are activated only when scanned or read by a RFID scanning device. Such activation may occur at a retail location, airport security checkpoint, bus terminal, restaurant, mall, or as the result of a handheld scanner that could be used unobtrusively at any time or place. Active tags have limited life span, but passive tags are forever. These passive tags are the tags that become residual RFID tags.

The benefits of RFID technology in business and governmental applications have been well documented, as have the security and privacy risks associated with the technology for consumers. The benefits of RFID technology for consumers, however, are often overlooked. Yet it is imperative consumers understand that there are legitimate consumer benefits associated with the use of this technology. Without realizable consumer benefit to counteract the perceived risks associated with RFID, retailers will find it difficult to maintain a solid customer base in the face of the perceived security and privacy risks.

While consumers may realize legitimate benefits from residual RFID, the liabilities likewise cannot be ignored. Spiekermann and Ziekow [12] suggest that five immediate and key threats of RFID technology are:

1. Unauthorized assessment of one's belongings by others
2. Tracking of persons via their objects
3. Retrieving social networks
4. Technology paternalism
5. Making people responsible for their objects

The most obvious violation is perhaps the first listed by Spiekermann and Ziekow [12]. They suggest that "by scanning inventories of flats and houses or baggage at airports promising targets for theft or burglary might be identified." They also suggest that individuals may be tracked by others through the objects they carry [12]. The offending party may be an individual, organization, or government. In addition, businesses could potentially target individuals with personalized advertising both in-store and out based upon objects they carry. While businesses may desire such efficiency in advertising, many consumers may view such efforts as intrusive.

Cazier et al. [4] state that privacy risk factors are found to negatively influence consumer intentions. If a consumer perceives a particular privacy or security risk as a result of residual RFID, that perception could profoundly affect that consumer's intention to purchase a particular product carrying a RFID tag or engage in commerce with a retailer that utilizes RFID technology.

It should also be noted that when people perceive risks, they change their behaviors accordingly, often by performing a risk benefit calculation that assists them in deciding whether they should or should not

disclose private information [9]. But in the case of RFID, that choice to disclose or not disclose may not be available. Whether it is the retailer's scanning of purchased goods or the illicit scanning by would-be thieves, consumer purchases will be tracked, catalogued, and evaluated for further action.

In this study, we outline some of the advantages and disadvantages of residual RFID from the consumer perspective, then follow up with an in depth survey and analysis of student perceptions. Using various statistical methods, we demonstrate that consumers' perception of privacy risk likelihood and privacy risk harm negatively impact their intentions to use this technology. The implications of these findings need to be considered before the pending implementation of residual RFID technologies in the supply chain on a mass scale.

Methodology

The research methodology was conducted using a survey instrument, based on previously validated scales where possible, that assessed the perceptions and usage intentions of individuals toward organizations and products that develop and/or employ residual RFID technology. While there has been some popular press about residual RFID technologies, such as the report by Abramson [1] on National Public Radio (NPR), the implications of residual RFID technologies may not have fully entered the consciousness of the average consumer. Since mass adoption of these technologies is imminent, it is important to understand how consumers do and will react to mass residual RFID adoption. Therefore, a brief education piece instructing subjects regarding the fundamental principles of residual RFID technology was presented to each subject prior to completing the survey.

In the interest of research accuracy and applicability, we selected questions for the survey instrument from previously validated instruments where possible, adapting them to meet the criteria of our survey. In addition, we conducted two separate pilot studies in an effort to further validate and refine the selected questions before conducting the final survey and compiling the results.

Note: Results will be presented at the conference.

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A MANPOWER SCHEDULING SYSTEM FOR A HELICOPTER REASSEMBLY SHOP

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ABSTRACT

This paper presents the design concept, functionalities and application of the simulated annealing-based manpower scheduling systems (SAMSS) at a labor-intensive helicopter reassembly shop in the Southern US. A helicopter maintenance process typically follows a disassembly, a repair or an overhaul, and a reassembly process. Among these, the reassembly process is considered as a bottleneck, and significantly relies on human labor. Hence, the shop management requested a user-friendly manpower scheduling tool providing a feasible and an optimized schedule under diverse what-if conditions. The design of SAMSS started from the capture of the reassembly process information with the IDEF3 (Integrated DEFinition) method, which was translated into a task network with shop status data, then heuristics and simulated annealing-based scheduling algorithms were applied to provide a feasible solution and/or a near optimal solution. To increase the compatibility with existing software, the MS-Excel[®] and MS-Project[®] interfaces were developed. A manpower scheduling system needs to promptly provide a short term schedule and diverse what-if scenario analyses to shop managers for better decision making. The Gantt chart, workload distribution chart, and flowtime sensitivity analysis for each crew supported in SAMSS were considered useful in a real life case study presented.

INTRODUCTION

A military helicopter has several types of maintenance programs such as phase maintenance and overhaul maintenance for safety and for asset readiness. The phase maintenance is a schedule maintenance program where a helicopter is sent to a maintenance shop for inspection after specific flight time hours, which depends on the helicopter type. In the overhaul maintenance, the helicopter is completely overhauled, repaired, and reassembled after specific calendar time based use – i.e. 3 years. A depot facility provides both an overhaul maintenance program and a heavy maintenance program for the helicopter requiring significant repair service. This paper is based on the overhaul case study performed in an army depot located at the Southern part of the United States.

Once a helicopter is inducted for the overhaul service, the helicopter frame is placed at one of the bays, and typically moves through 1) a pre-shop analysis and disassembly, 2) a cleaning process, 3) a paint and strip process, 4) a structure and electrical service process, 5) an exterior and interior prime process, 6) a reassembly process, 7) a final paint process, and 8) a final flight test process area. Through the pre-shop analysis, the helicopter is disassembled into several modules and components for inspection. Based on the inspection result, the modules and components are routed to appropriate shops not shown in the above processes - People call these shops back-shops since they are located in the back side of the depot. For example, an engine is routed to the engine shop, and the blades are routed to the blade shop. The disassembled main frame is moved in succession to be cleaned and stripped. Then the structure and

electrical check and the repair of the helicopter are performed, followed by an exterior and interior prime process necessary for repainting the helicopter. After that, the frame is reassembled at a bay with required modules and components through manual operations. The helicopter is then cleaned before going through the final paint and flight test process. It should be noted that the disassembly and reassembly processes use different bays on the same floor to accelerate both processes. The total flowtime - time between the job starting and ending - through all these processes currently varies from 60 to 300 eight-hour days depending on work contents.

Since the previous shop capacity analysis showed that the reassembly process was a bottleneck, the shop management wanted to improve the bottleneck performance with an optimized reassembly schedule. The management also wanted to obtain the answers to the following questions: 1) “What is the expected reassembly flowtime with current manpower and workload?”, 2) “What percentage of the flowtime can be reduced if additional manpower is added?”, 3) “What is the bottleneck resource in the reassembly process?” There were five bays for reassembly, and each one was dedicated to a single helicopter. There were seventeen workers with five different skill types, and the members with the same skill type is called a crew. Currently, the five crews were required to reassemble a helicopter: six mechanical engineers (AMG), four electrical engineers (AEE), four avionics engineers (AV), two sheet metal engineers (AS), and one inspector (INSP). However, there was no written document on “who does what” information. Hence, we first observed the environment and then interviewed the domain experts to define basic tasks (operations) with appropriate level of abstraction to avoid the excessive complexities and efforts associated with the data collection. The basic task is a unit process for which the process time is observed to decide the schedule. The PROSIM® [3] software was used to define basic tasks since this software supports the IDEF3 process description method and provides a convenient user-interface to capture resource requirements.

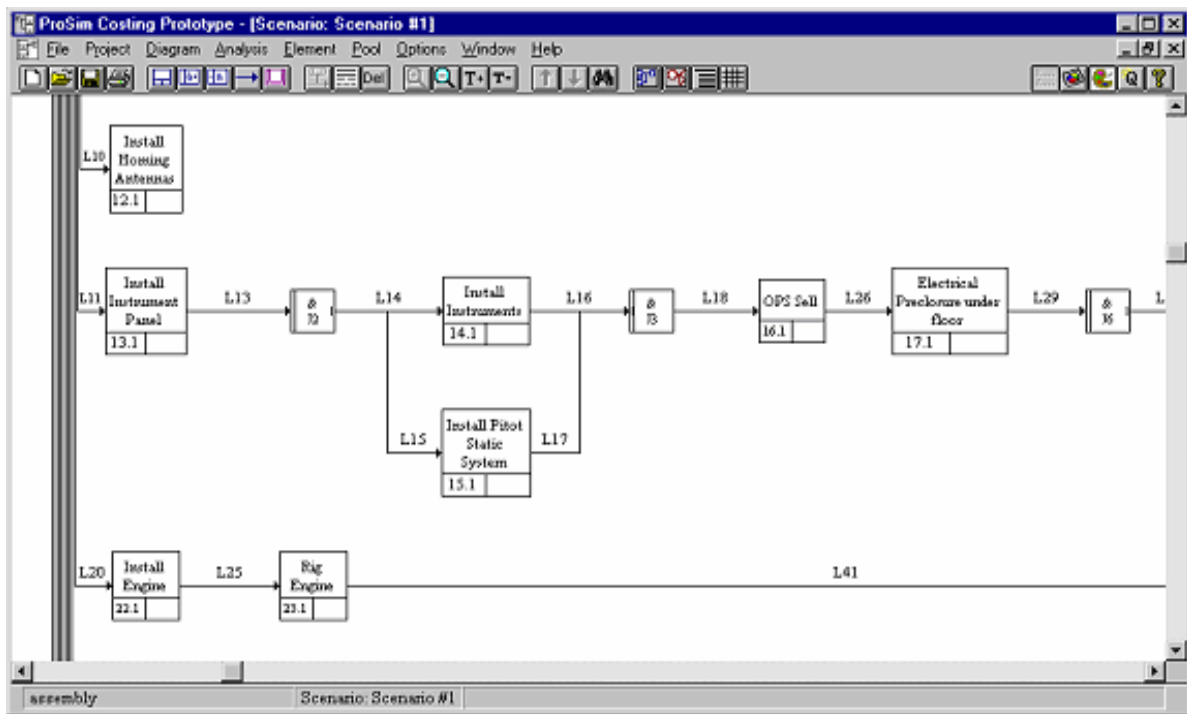


Figure 1. An Example of Helicopter Reassembly Process Map

In the IDEF3 schematics, a UOB (unit of behavior) shown as a rectangular box represents a process or a task. The temporal, logical, and timing relations between the processes are captured by three types of junctions: “AND”, denoted by “&”, inclusive OR, denoted by “O”, and “exclusive OR”, denoted by “X”. These junctions can be classified into a Fan-in type or a Fan-out type based on their role. In a Fan-in type junction, there are one or multiple incoming processes and one outgoing process to and from the junction, respectively, and in a Fan-out type junction, one or multiple outgoing processes are linked to one incoming process. The IDEF3 method graphically represents the process information using these UOBs and Junction. For detailed information on IDEF3, readers are encouraged to refer to Mayer [4].

A part of the process diagram in the reassembly shop is represented in Figure 1. According to the analysis of the IDEF3 diagram, a helicopter required 186 reassembly tasks (operations) under precedence relation constraints. As seen in Figure 1, some tasks such as “Install Instruments” and “Install Pitot Static System” could be performed in parallel by a single electrical engineer (AEE). Hence they are encapsulated by a Fan-out and a Fan-in “AND” junctions. These tasks may compete to seize the required resource. Hence, because of this competition, several alternative scheduling scenarios will be generated. Among these alternative, the shop management preferred the schedule with the shorter flowtime to reduce the total helicopter maintenance lead time.

ANALYSIS OF REASSEMBLY SHOP

The manpower scheduling problem for a single helicopter reassembly within a bay can be modeled as a resource-constrained project-scheduling problem (RCPSP), where a complete task network consists of multiple nodes (tasks) and arcs (precedence relation) among tasks, and each task is competing for limited resources. Within a bay, workers are the constrained resource. However, the bay availability also affects the flowtime and the worker’s workload since the workers are shared across the bays. Hence, each helicopter will seize a bay, and get services provided by the workers, and eventually it will release the bay, and move to the next process.

The specific requirements for the manpower scheduling system requested by the shop management were as follows: 1) It needs to provide a feasible schedule within a short period of time since the manager wants to frequently deploy it for a short term schedule – a shift and/or a day, 2) It needs to provide a near optimal schedule in terms of the flowtime, 3) It needs to provide manpower workload distribution and “what if” analysis, and 4) It is supposed to provide the user-friendly graphic interface.

Based on the shop description and customer requirements, we initially considered a simulation-based optimized scheduling system as in Paul and Chaney [5] where they combined a simulation engine with a genetic algorithm to search an optimal schedule. The simulation is a generic approach, and the genetic algorithm works as an optimizer to improve the schedule generated by the simulation. However, in our case, we are specifically interested in the manpower schedule. Hence the time consuming simulation approach is not needed since a simulation based approach takes longer execution time due to the event scheduling methods as described in Jeong [2]. Therefore, we decided to use the simulated annealing-based- approach. The main reason why we adopted the simulated annealing as our optimizer is its simplicity of implementation compared to the genetic algorithm while the performance of the simulated annealing is still as good as the genetic algorithm for many scheduling problems.

THE ARCHITECTURE OF SAMSS

This section describes the concept and architecture of the simulated-annealing-based-manpower-scheduling system (SAMSS) to implement the requirements discussed in the previous section. The SAMSS consists of three main components: “Shop Status Database” (SSD), “Task Generator” (TG), and

“Schedule Generator” (SG). The simplified architecture and information flow among these three components is described in Figure 2. The “Task Generator” (TG) provides the input to “Schedule Generator” (SG) by reading “Shop Status Database” (SSD). The precedence relations, the remaining task time and the tasks’ resource requirement are used to construct the input. The “Schedule Generator” builds a schedule based on this input.

Users can select either a feasible schedule generation option or an optimized schedule generation option. In the feasible schedule generation option, it uses popular heuristic rules, and in the optimized schedule generation option, it activates the simulated-annealing engine. The “Schedule Generator” presents a Gantt chart, manpower workload distribution and several performance metrics. The shop managers can use this information as a decision support aid to estimate the actual workload and work progress. For better results, it is important to keep consistency between the “Shop Status Data” and the reality. Hence, once a daily or shift work is finished, the progress of each task must be recorded into the “Shop Status Database”. The selection of the MS-Project® and the MS-EXCEL® interface makes this data collection and update easier since many domain experts are already very familiar with these two products.

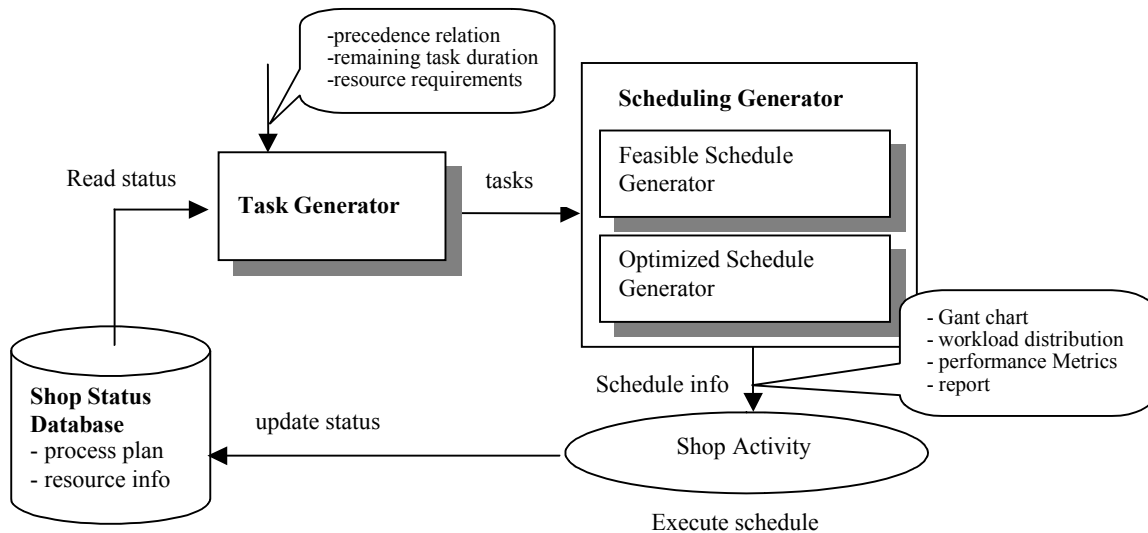


Figure 2. Concept of SAMSS

Shop Status Database

The SAMSS was designed to use an MS-ACCESS® database. A simplified data model with IDEF1X is presented in Figure 3. The IDEF1X is a graphical language to capture the information to build a data model. It captured the entities (objects) and their relations. In this case, there are six major entities: “Resource,” “Task,” “TaskResource,” “Assignment”, “Aircraft”, and “TaskPredecessor”. Each entity can be classified as either independent (rectangular box) or dependent (rounded rectangular box). A dependent entity depends on the migration of the primary key from independent entities for the definition of its own primary key. In our IDEF1X model, “TaskResource” “TaskPredecessor”, and “Assignment” are the dependent entities and the remainders are independent entities. The primary keys of each entity are represented above the horizontal grid line while the other attributes are denoted below the line. A foreign key is labeled by “FK” and the one-to-many (at least one) relation is denoted by “P”. The solid line without any label indicates a one-to-many (zero, one or more) relation. For instance, the “TaskResource” entity has two foreign keys as a composite primary key: one migrated from the “Task”

entity and the other from the “Resource” entity. The “Resource” object has at least one or more “TaskResource” objects and the “Task” object has zero, one, or more “TaskPredecessor” objects.

Task Generator

The “Task Generator” generates the input data for the “Schedule Generator” by reading the “Shop Status Database”. The input data consists of two types: task information and resource information. The task information includes the task arrival time, task duration, immediate predecessors, required resources, and required quantity of resources.

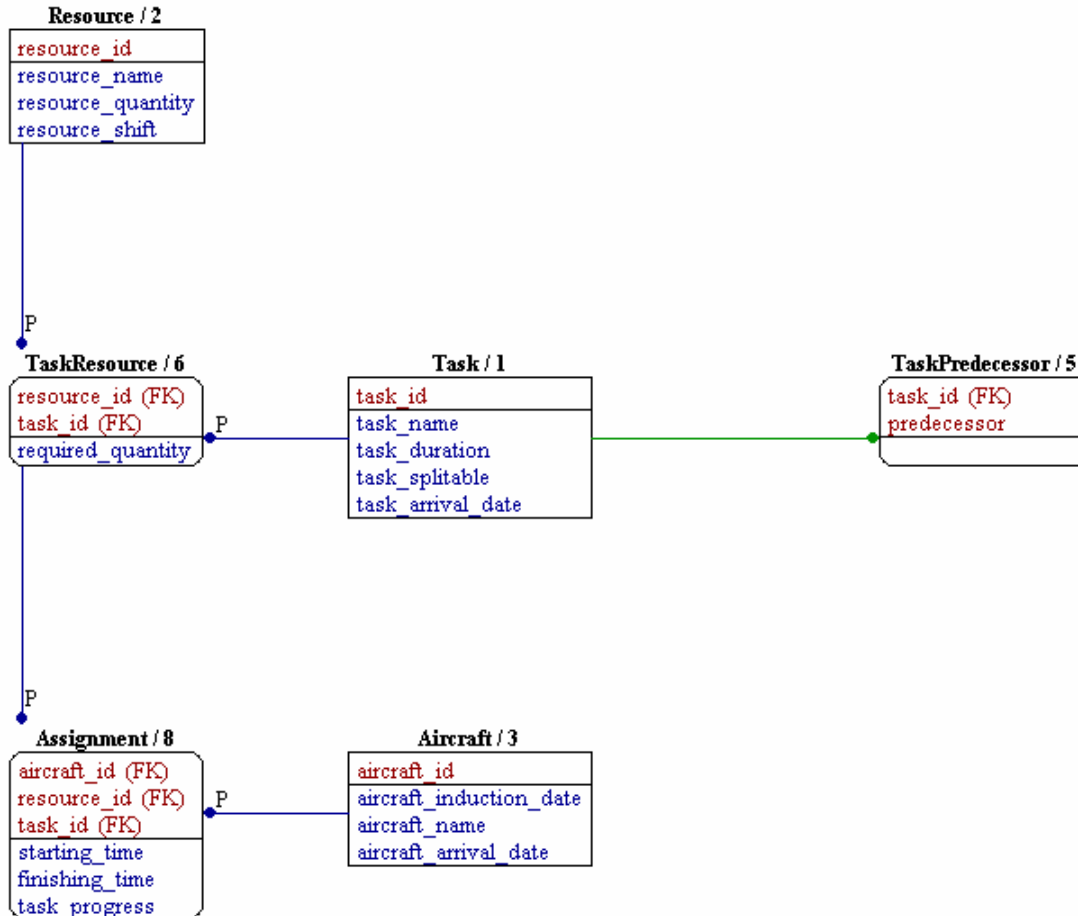


Figure 3. IDEFIX Data Model for Shop Status

The resource information includes available resources and their quantity. Note that the shop status database is periodically updated based on the task completion or progress. Hence, a task network constructed by the “Task Generator” at time $t + \Delta$, $TN(t+\Delta)$, is a sub-network of the task network constructed at time t , $TN(t)$ since $TN(t+\Delta)$ is generated from $TN(t)$ by eliminating the completed tasks during the Δ period. By the same reasoning, all task networks are a sub-network of $TN(0)$, which describes an entire task network before any reassemble work starts at a bay.

Schedule Generator

The “Schedule Generator” is a core engine of SAMSS. It consists of two main modules: a feasible schedule generator (FSG), and an optimized schedule generator (OSG). The FSG generates a feasible schedule within reasonable time using a specific dispatching rule, and the OSG generates an optimal schedule using a simulated annealing approach. In fact, the solution generated by FSG serves as an initial solution at OSG since OSG automatically calls the FSG. We define the following notations to explain the pseudo-algorithm in Figure 4.

- SEQ**: a set representing a feasible task sequence.
- $SEQ[i]$: i^{th} task in a feasible sequence of tasks.
- Pred(SEQ[i])**: a set of immediate predecessors of $SEQ[i]$.
- S**: a set of schedulable tasks.
- C**: a set of scheduled tasks.
- T_i : a task in **S**.

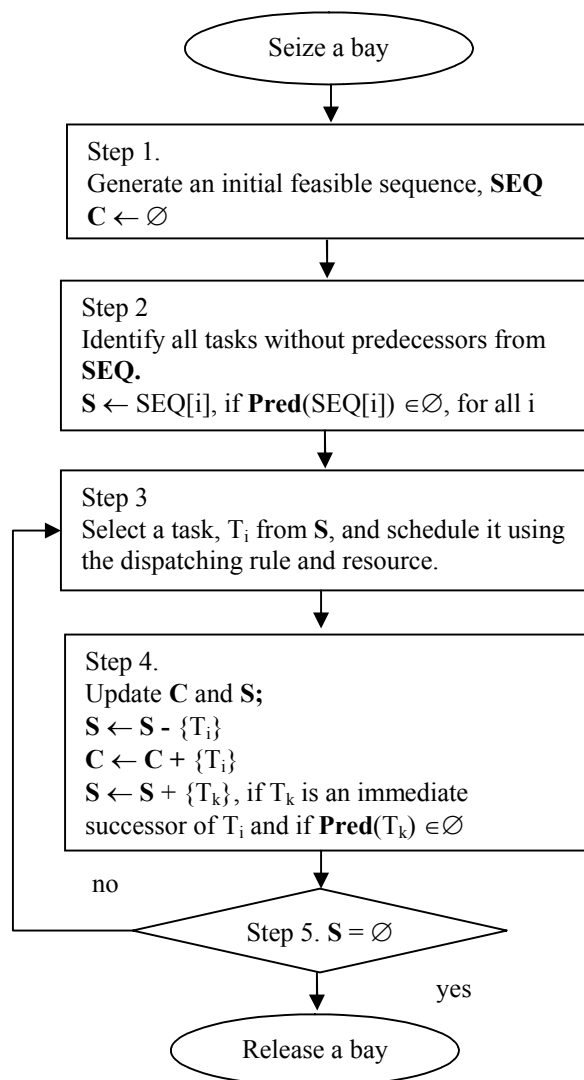


Figure 4. A Feasible Schedule Generating Algorithm

The FSG first generates a feasible sequence of tasks in terms of the precedence relations, and classifies all tasks into two sets: *Schedulable* and *Scheduled*. The scheduled task set is initially empty (Step 1). A task is considered as schedulable if either 1) there is no predecessor or 2) all of the immediate predecessors are scheduled. Initially, the only tasks without any predecessor are added to the *Schedulable* set, *S* (Step 2). Currently, the earliest possible starting time (EPST) and the largest number of successors (LNS) rules are available as a heuristic dispatching rule. The EPST computes the starting times of all schedulable tasks based on the required resource availability, and then it selects the combination of a task and a resource with the earliest starting time. In the LNS rule, a task with the largest number of successors is first selected, then, an available resource is assigned to it. When multiple available resources exist, the EPST is used to choose a resource (Step 3). Once a selected task, T_i , is assigned to a resource, the status of this task changes from the *Schedulable* (*S*) to the *Scheduled* (*C*). Note that this status change of T_i may change the status of its immediate successor, T_k , to the *Schedulable* (Step 4). The procedure is repeated until all tasks are scheduled (Step 5).

The OSG initially activates the FSG with the EPST rule to generate an initial solution - a task sequence - for the simulated annealing. It then randomly chooses two tasks within the precedence relation constraints, and exchanges their positions. Then the resource scheduling is performed in the order of the tasks in the task sequence. In other words, the solution quality is sensitive to the order of tasks in the task sequence. To generate a feasible sequence of tasks in terms of the precedence relations, we used the method described by Boctor [1]. For a task, $SEQ[i]$, in any feasible sequence, the possible movements of the task are constrained between $L_i + 1$ and $H_i - 1$, where L_i is the maximum of the positions of the immediate predecessors of $SEQ[i]$ and H_i is the minimum of the positions of the immediate successors in the sequence. According to our experiments, an optimized schedule using this approach showed 5% to 10 % performance improvement against a feasible schedule in terms of makespan - longest completion time of all helicopters, and flowtime - average time spent for all helicopters for the problem with five helicopters with three bays. With current working time - 8 hours a day, this corresponds to one to three calendar day saving.

THE IMPLEMENTATION OF SAMSS

In this section, we show the performance and features of SAMSS. We executed the SAMSS with an optimal scheduling generation (OSG) option with five helicopters for a demonstration purpose. The initial task progress information is read from the “Shop Status Database” and displayed in the Excel spreadsheet to indicate which tasks are partly or completely finished.

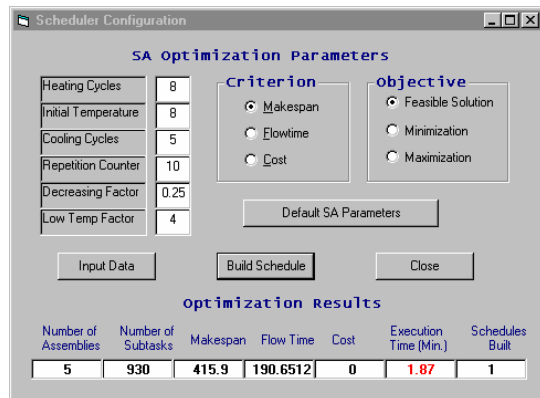


Figure 5. Parameters for Simulated Annealing

The SAMSS also generates the individual manpower schedule and workload for a crew. Users can choose the Task Generator's configuration options to define the simulated annealing parameters and objective function type as seen in Figure 5. The detailed schedule can be displayed in both the MS-Excel® and the MS-Project®. For example, the expected starting time and ending time of each task with consideration of resource are displayed in the Excel spreadsheet, and this information can be transformed into the MS-Project® using the MPX format feature in the MS-Project. This transformation feature allows users to use the diverse features of the MS-Project® including the Gantt chart and the task progress tracking etc. The Gantt chart of this case is displayed in Figure 6 as an example.

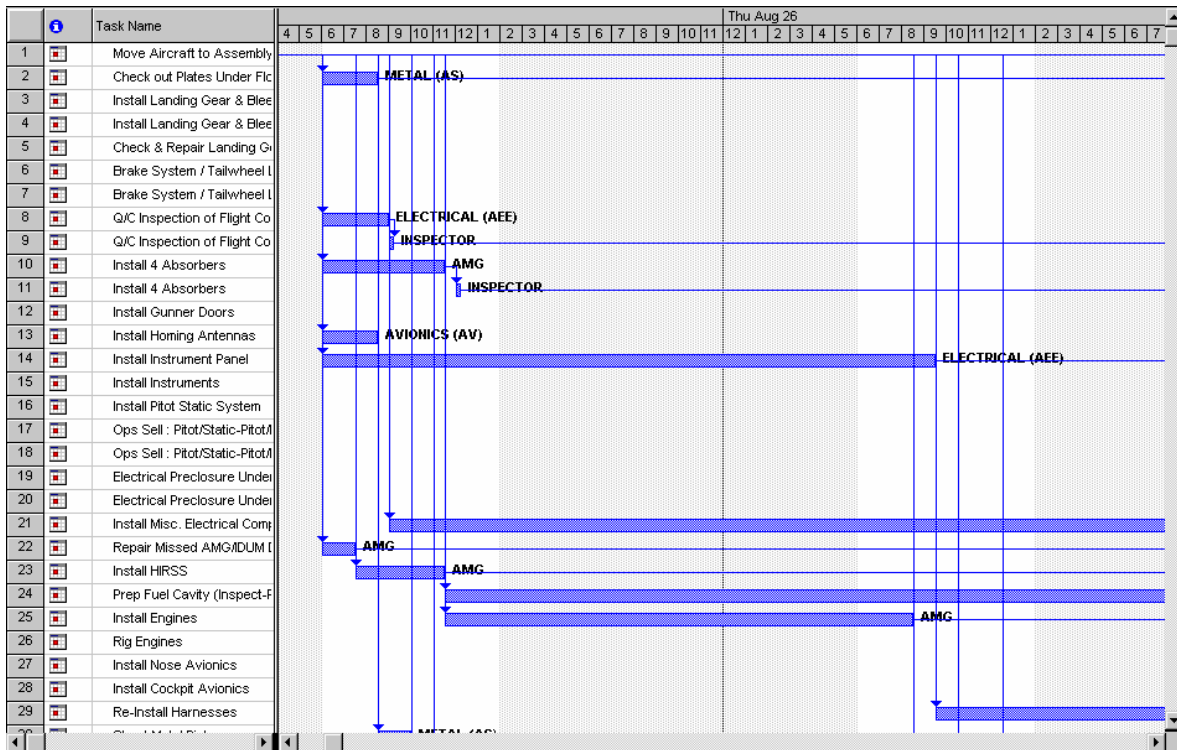


Figure 6. A Gantt Chart

The workload distribution per crew is plotted in Figure 7. The number of business days in terms of eight-hour day (x-axis), skill types (y-axis), and the number of busy workers (z-axis) are plotted in each axis. Through this visualization, the shop managers can predict who will be a bottleneck. Hence, they may attempt to resolve this bottleneck with workload redistribution. For example, we recognized that the mechanical engineers (AMG), sheet metal engineers (AS), and the inspector (INSP) were fully utilized for more than half of the reassembly period, while the AV was under utilized for all periods. This trend is confirmed in Table 1, which shows the effect of the crew size - number of workers in each team classified by skill type.

The first row shows the current crew size and the two objective function values - MSPAN for makespan and FLTIME for flowtime - using those crew size combinations. The other rows represent unit increment in the crew size and the corresponding objective function values. The columns labeled MS IMP and FL IMP show the percentage improvement of the makespan and the flowtime, respectively, compared to the current configurations in the first row. For example, if the crew size of AMG increases by one, the makespan is improved by 2.21 %, and the flowtime by 4.98 % as denoted in the second row – Note that AMG was fully utilized as seen in Figure 7. The addition of AV does not improve the objective functions

since the AV was underutilized as represented in Figure 7. That is, the workload distribution in Figure 7 provides useful insight on the bottleneck, and the resource addition problem.

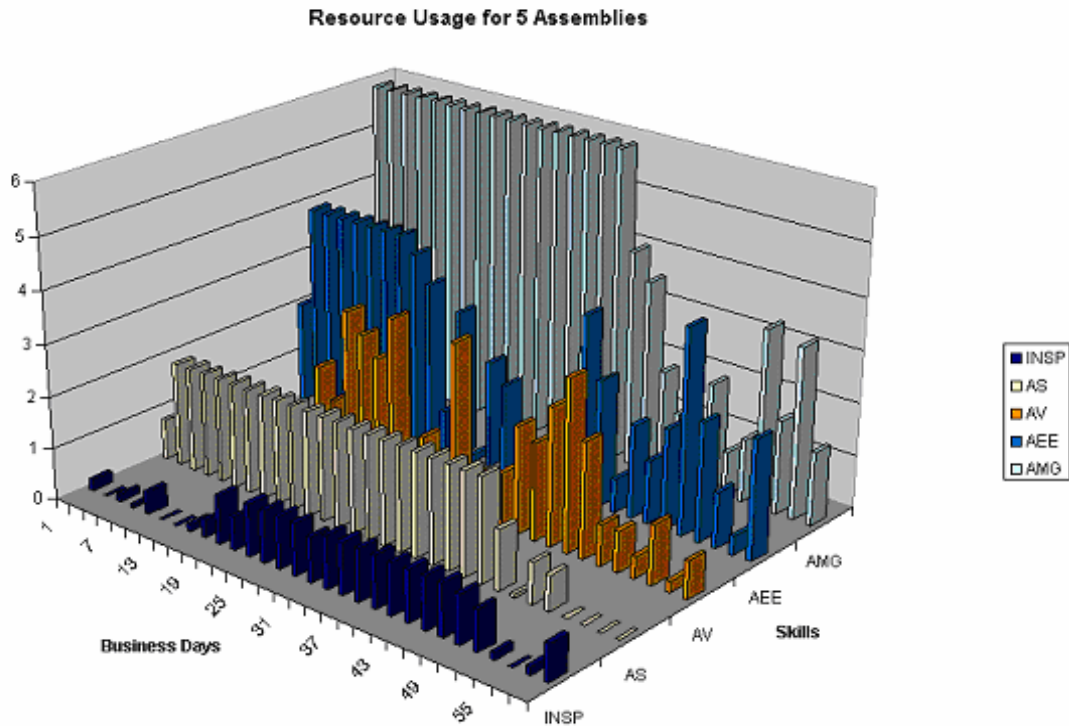


Figure 7. Workload Distribution per Crew

	AMG	AEE	AV	AS	INSP	MSPAN (hours)	MS IMP	FLTIME (hours)	FL IMP
Current	6	4	4	2	1	415.9	0 %	190.6	0 %
AMG INC	+1	0	0	0	0	406.7	2.21 %	181.1	4.98 %
AEE INC	0	+1	0	0	0	410.2	1.37 %	185.7	2.57 %
AV INC	0	0	+1	0	0	418.4	-0.60 %	190.6	0.0 %
AS INC	0	0	0	+1	0	428.7	-3.08 %	183.4	3.78 %
INSP INC	0	0	0	0	+1	392.9	5.53 %	182.5	4.25 %

Table 1. Performance Summary

More extensive tests were performed and their results were displayed in Figure 8 where the x-axis shows the crew size increments, and y axis shows the percentage improvement in the objective function values. The “current” in x-axis represents the current crew size combination. In many cases, both flowtime and makespan were improved when we increased the crew size. However, there was a threshold value in the increment. For example, the flowtime was improved up to three AMG additions (AMG FLTIME) while the makespan was improved up to two AMG additions (AMG MSPAN). Beyond those threshold values, none of the objective functions changed or it was slightly reduced. It was also interesting to see that the threshold values of both flowtimes were higher than those of makespans - note that INSP MSPAN had two additions until it reached the threshold value while INSP FLTIME steadily increased within the selected range of these tests. That is, when we increased either AMG or INSP, both flowtime and the makespan were improved until the number of addition reached the first threshold value (for makespan), and after that, only flowtime was improved until the addition reached the second threshold value.

It should be noted that the Figure 8 does not provide any optimal combination of crew sizes – note that we attempted to obtain an optimal schedule at a given combination of crew sizes, and the optimal number of the crew size should be independently solved by adding more complexity to this problem. However, this information can still provide many useful insights to the shop management. For example, they can decide who is the bottleneck and mostly required at any given time, and who is underutilized. They can also identify the optimal manpower schedule to minimize the flowtime and/or makespan. If appropriate data is provided, this can also provide a long term capacity planning function too.

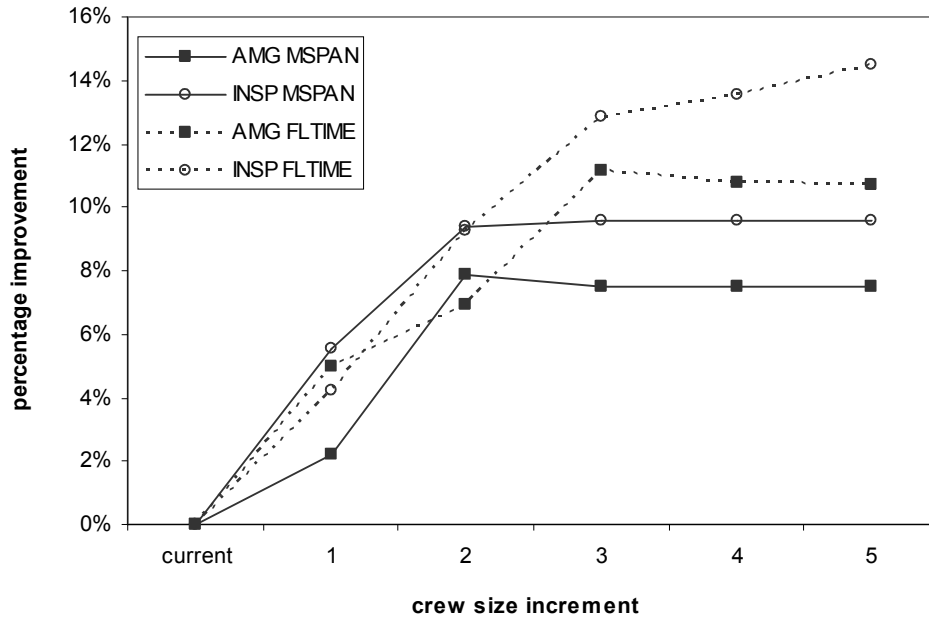


Figure 8. Effect of Crew Size

SUMMARY AND CONCLUSIONS

We have described the brief concept, architecture and application of the SAMSS for the short term manpower schedule at the labor-intensive helicopter reassembly shop in Southern US. SAMSS consists of “Shop Status Database”, “Task Generator”, and “Schedule Generator”. The operational feasibility of the SAMSS was tested during implementation in the helicopter reassembly shop. The shop managers could get “who does what at which time” information to minimize flowtime and/or makespan, which can significantly improve the visibility and quality of managerial decisions. For example, before starting actual tasks, they can set reasonable target progress by executing the SAMSS, and adjust the actual status in the shop by filling out the forms in SAMSS. The managers could also compare the heuristic dispatching rules and see the effect of crew size on the objective functions. The convenient graphical reports are another advantage that helps users to identify the bottleneck resources without time-consuming simulation study. The use of MS-Excel® and MS-Project® interfaces increases the flexibility and user-friendliness of this decision support system. The access to SAMSS via a world-wide-web is under development, which can significantly increase the information sharing between shop crews and manager.

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A Branch and Bound Algorithm for Solving the Binary Bi-level Linear Programming Problem

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1 Introduction

The standard mathematical programming problem involves finding an optimal solution for just one decision maker. But many planning problems contain an hierarchical decision structure, each with independent, and often conflicting objectives. These types of problems can be modeled using a multilevel programming approach. Bilevel programming is the simplest class of multilevel programming problems in which there are two independent decision makers. An upper level decision maker and a lower level decision maker. One example might be the CEO of a company as the upper level decision maker and the head of a division of the company as the lower level decision maker.

Algorithms have been proposed to solve the bilevel linear programming problem and the mixed integer binary bilevel linear programming problem. In this paper, we develop an branch and bound algorithm for solving the binary bilevel linear programming problem. In section 2, we present the formulations for the various bi-level linear programming problems and discuss previous results. Section 3 contains results we use to establish upper bounds for the branches of the branch and bound tree. Our algorithm is contained in section 4 and

section 5 contains computational results.

2 Bilevel Programming

Bilevel programming problems are characterized by two levels of hierarchical decision making. The top planner makes its decision in full view of the bottom planner. Each planner attempts to optimize its objective function and is affected by the actions of the other planner. The properties of bilevel programming problems are summarized as follows: [2]

1. The system has interacting decision making units within a hierarchical structure.
2. The lower unit executes its policies after, and in view of, the decisions of the higher unit.
3. Each level maximizes net benefits independently, no compromise is possible.
4. The effect of the upper decision maker on the lower problem is reflected in both its objective function and set of feasible decisions.

This idea was further developed by Bard and Falk in a 1989 paper [1] where they considered the following mixed integer bi-level linear programming problem. We use BLPP to denote bi-level linear programming problem.

Let x^1 be an n_{11} -dimensional vector of continuous variables and x^2 be an n_{12} -dimensional vector of discrete variables, where $\mathbf{x} \equiv (x^1, x^2)$ and $n_1 = n_{11} + n_{12}$. Similarly let y^1 be an n_{21} -dimensional vector of continuous variables and y^2 be an n_{22} -dimensional vector of discrete variables, where $\mathbf{y} \equiv (y^1, y^2)$ and $n_2 = n_{21} + n_{22}$.

This leads to

$$\max_x F(\mathbf{x}, \mathbf{y}) = c^{11}x^1 + c^{12}x^2 + d^{11}y^1 + d^{12}y^2 \quad (1a)$$

subject to

$$\max_y f(\mathbf{y}) = d^{21}y^1 + d^{22}y^2 \quad (1b)$$

subject to

$$g(\mathbf{x}, \mathbf{y}) = A^1 x^1 + A^2 x^2 + B^1 y^1 + B^2 y^2 \leq b \quad (1c)$$

$$\mathbf{x} \geq 0, \quad \mathbf{y} \geq 0 \quad x^2, y^2 \text{ integer.} \quad (1d)$$

Definition 1 For $\mathbf{x} \geq 0$, x^2 integer, let $\Omega(\mathbf{x}) = \{\mathbf{y} : \mathbf{y} \geq 0, y^2 \text{ integer}, g(\mathbf{x}, \mathbf{y}) \leq b\}$ and $M(\mathbf{x}) = \{\mathbf{y} : \arg \max\{f(\mathbf{y}') : \mathbf{y}' \in \Omega(\mathbf{x})\}\}$.

Definition 2 If $\bar{\mathbf{y}} \in M(\bar{\mathbf{x}})$ then $\bar{\mathbf{y}}$ is said to be optimal with respect to $\bar{\mathbf{x}}$; such a pair is said to be bi-level feasible.

Definition 3 A point $(\mathbf{x}^*, \mathbf{y}^*)$ is said to be an optimal solution to the BLPP if

- a. $(\mathbf{x}^*, \mathbf{y}^*)$ is bi-level feasible; and,
- b. for all bi-level feasible pairs $(\bar{\mathbf{x}}, \bar{\mathbf{y}})$, $F(\mathbf{x}^*, \mathbf{y}^*) \geq F(\bar{\mathbf{x}}, \bar{\mathbf{y}})$.

The three normal fathoming rules when using a branch and bound method for a general mixed integer programming problem are:

Rule 1 The relaxed subproblem has no feasible solution.

Rule 2 The solution of the relaxed subproblem is no greater than the value of the current best feasible solution.

Rule 3 The solution of the relaxed subproblem is feasible to the original problem.

Bard and Falk [1] showed that when solving the BLPP only rule 1 can be applied. They produced counter examples to show that rules 2 and 3 do not always apply when solving the (mixed) integer BLPP. Thus a new branch and bound strategy needed to be developed to solve the (mixed) integer BLPP.

In this paper, we consider the following (purely integer) binary bilevel linear programming problem.

$$\max_{x^1} f_1(x^1, x^2) = c^{11}x^1 + c^{12}x^2 \quad (2a)$$

subject to

$$\max_{x^2} f_2(x^1, x^2) = c^{21}x^1 + c^{22}x^2 \quad (2b)$$

subject to

$$A^1x^1 + A^2x^2 \leq b^2 \quad (2c)$$

$$x^1 = \{x_1^1, x_2^1, \dots, x_{n1}^1\} \quad (2d)$$

$$x^2 = \{x_1^2, x_2^2, \dots, x_{n2}^2\} \quad (2e)$$

$$x_j^1 \in \{0, 1\}, \quad j = 1, 2, \dots, n1 \quad (2f)$$

$$x_i^2 \in \{0, 1\}, \quad i = 1, 2, \dots, n2. \quad (2g)$$

Note that the leader's variables are chosen first and thus become a constant in the followers objective function and do not affect its optimization. In 1990, Wen and Yang [3] developed a branch and bound algorithm to solve the mixed integer binary bi-level linear programming problem. In their formulation, the followers variables were not required to be binary but were continuous variables only restricted to be non-negative. Their algorithm used upper and lower bounds to prune off the tree but did not use upper bounds to decide which were the the most efficient branches to chose in the tree. The algorithm proposed in this paper generalizes many of the ideas originally proposed by Wen and Yang and will impose a preferential choice on which branch to take in the tree based on calculating upper bounds for the leader's objective function.

Wen and Yang utilized a particular notation for the value of the leader's variables at any level in the branch and bound tree. This notation will also be used in this paper.

This notation is defined as follows:

k : the order number of the current node in the branch-and-bound tree:

$$J_k^0 = \{j | x_j^1 \text{ is a free binary variable, } j = 1, 2, \dots, n1\};$$

$$J_k^+ = \{j | x_j^1 \text{ is fixed at 1, } j = 1, 2, \dots, n1\};$$

$J_k^- = \{j | x_j^1 \text{ is fixed at } 0, j = 1, 2, \dots, n1\}$;

This allows for the formulation of the binary problem (TP_f) in terms of fixing of some of the leader's variables as follows:

$$(TP_f): \quad \max_{x^1} f_1 = \sum_{j \in J_k^0} c_j^{11} x_j^1 + \sum_{j \in J_k^+} c_j^{11} + \sum_{i=1}^{n2} c_i^{12} x_i^2 \quad (3a)$$

subject to

$$\max_{x^2} f_2 = \sum_{j \in J_k^0} c_j^{21} x_j^1 + \sum_{j \in J_k^+} c_j^{21} + \sum_{i=1}^{n2} c_i^{22} x_i^2 \quad (3b)$$

subject to

$$\sum_{j \in J_k^0} a_j^1 x_j^1 + \sum_{i=1}^{n2} a_i^2 x_i^2 \leq b - \sum_{j \in J_k^+} a_j^1 \quad (3c)$$

$$x_j^1 \in \{0, 1\}, \quad j \in J_k^0 \quad (3d)$$

$$x_i^2 \in \{0, 1\}, \quad i = 1, 2, \dots, n2 \quad (3e)$$

where a_j^i is the j^{th} column of the matrix, A^i .

Relaxing the TP_f by removing the follower's objective function creates a problem denoted as P_f . It appears, after minor rearrangement, as follows:

$$(P_f): \quad \max_{x^1} g = \sum_{j \in J_k^0} c_j^{11} x_j^1 + \sum_{j \in J_k^+} c_j^{11} + \sum_{i=1}^{n2} c_i^{12} x_i^2 \quad (4a)$$

subject to

$$\sum_{i=1}^{n2} a_i^2 x_i^2 \leq b - \sum_{j \in J_k^+} a_j^1 - \sum_{j \in J_k^0} a_j^1 x_j^1 \quad (4b)$$

$$x_j^1 \in \{0, 1\}, \quad j \in J_k^0 \quad (4c)$$

$$x_i^2 \in \{0, 1\}, \quad i = 1, 2, \dots, n2 \quad (4d)$$

3 BOUNDING THEOREM AND LEMMA

In their paper Wen and Yang proved the following:

Lemma 1 [3]

Given two linear programming problems:

$$(P) : \max Z = \sum_{j=1}^n c_j x_j$$
$$st : \sum_{j=1}^n a_j x_j \leq b$$
$$x_j \geq 0, \quad j = 1, 2, \dots, n$$

and

$$(P^1) : \max Z^1 = \sum_{j=1}^n c_j x_j$$
$$st : \sum_{j=1}^n a_j x_j \leq b + \theta$$
$$x_j \geq 0, \quad j = 1, 2, \dots, n$$

where θ is a $m \times 1$ parameter vector.

Then, if

Z^ is the optimal objective value of P ,*

Y^ is a $1 \times m$ vector, denoting the dual optimal solution of P ,*

Z^{1} is the optimal objective value of P^1 ,*

then $Z^{1} \leq Z^* + Y^* \theta$.*

Theorem 1 *Consider the following problem denoted problem B :*

$$(B) : \max Z_B = \sum_{i=1}^{n2} c_i^{12} x_i^2$$
$$st : \sum_{i=1}^{n2} a_i^2 x_i^2 \leq b$$

$$x_i^2 \geq 0, \quad x_i^2 \leq 1 \quad i = 1, 2, \dots, n2$$

Let Z_B^* be the optimal objective function value for problem B above. Also let Y^* be the optimal dual solution of problem B . Then an upper bound, Z^U , is established for the leader's objective function value in problem TP_f where:

$$Z^U = Z_B^* + \sum_{j \in J_k^+} (c_j^{11} - Y_B^* a_j^1) + \sum_{j \in J_k^0} \max\{(c_j^{11} - Y_B^* a_j^1), 0\} \quad (5)$$

That is $f_1^* \leq Z^U$.

Proof: Relax problem P_f by replacing the constraint

$$x_i^2 \in \{0, 1\}, \quad i = 1, 2, \dots, n2 \quad \text{with} \quad x_i^2 \leq 1, \quad x_i^2 \geq 0, \quad i = 1, 2, \dots, n2.$$

This relaxation produces a problem we denote as LP_f .

$$\begin{aligned} (LP_f) : \max \quad & g = \sum_{i=1}^{n2} c_i^{12} x_i^2 + \overbrace{\sum_{j \in J_k^0} c_j^{11} x_j^1 + \sum_{j \in J_k^+} c_j^{11}}^K \\ \text{st} : \quad & \sum_{i=1}^{n2} a_i^2 x_i^2 \leq b - \overbrace{\sum_{j \in J_k^+} a_j^1 - \sum_{j \in J_k^0} a_j^1 x_j^1}^\theta \\ & x_j^1 \in \{0, 1\}, \quad j \in J_k^0 \\ & x_i^2 \leq 1, \quad x_i^2 \geq 0 \quad i = 1, 2, \dots, n2. \end{aligned}$$

Let g^* be the optimal objective function of the above LP_f with optimal values $\{x_j^{1*}\}$ of the variables $\{x_j^1\}$. Then we obtain the following linear programming problem.

$$\begin{aligned} (LP_f') : \max \quad & g = \sum_{i=1}^{n2} c_i^{12} x_i^2 + K' \\ \text{st} : \quad & \sum_{i=1}^{n2} a_i^2 x_i^2 \leq b - \theta' \\ & x_i^2 \leq 1, \quad x_i^2 \geq 0 \quad i = 1, 2, \dots, n2 \end{aligned}$$

where K' is a constant determined by evaluating $\sum_{j \in J_k^0} c_j^{11} x_j^1 + \sum_{j \in J_k^+} c_j^{11}$ using the values $\{x_j^{1*}\}$ and θ' is similarly a constant calculated from $\sum_{j \in J_k^+} a_j^1 + \sum_{j \in J_k^0} a_j^1 x_j^1$ once again using $\{x_j^{1*}\}$.

Then by applying Lemma 1 to LP_f' and B :

$$\begin{aligned} g^* - K' &\leq Z_B^* - Y_B^* \theta' \\ g^* &\leq Z_B^* + \sum_{j \in J_k^0} c_j^{11} x_j^{1*} + \sum_{j \in J_k^+} c_j^{11} - Y_B^* \left(\sum_{j \in J_k^+} a_j^1 + \sum_{j \in J_k^0} a_j^1 x_j^{1*} \right) \\ &= Z_B^* + \sum_{j \in J_k^+} (c_j^{11} - Y_B^* a_j^1) + \sum_{j \in J_k^0} (c_j^{11} - Y_B^* a_j^1) x_j^{1*} \\ &\leq Z_B^* + \sum_{j \in J_k^+} (c_j^{11} - Y_B^* a_j^1) + \sum_{j \in J_k^0} \max\{c_j^{11} - Y_B^* a_j^1, 0\} \end{aligned}$$

Hence $g^* \leq Z^U$.

But since problem P_f is less constrained than problem TP_f , $f_1^* \leq g^*$ and so also $f_1^* \leq Z^U$.

■

4 ALGORITHM

In the algorithm, N is the current level in the tree, k is the counter for evaluated nodes and

$$T_j = \begin{cases} 0 & \text{if both branches from the current node at level } j \text{ have not been examined} \\ 1 & \text{if one branch from the current node at level } j \text{ has been examined} \\ 2 & \text{if both branches from the current node at level } j \text{ have been examined} \end{cases}$$

Step 1 *Initialization*

$$N = 0, k = 0$$

$$J_k^0 = \{1, 2, \dots, n1\}, J_k^+ = J_k^- = \emptyset$$

$$T_j = 0, j = 1, 2, \dots, n1.$$

This indicates that all the leader's variables are free.

Solve problem F :

$$\begin{aligned}
 (F :) \quad & \max \sum_{j=1}^{n2} c_j^{22} x_j^2 \\
 \text{st :} \quad & \sum_{j=1}^{n2} a_j^2 x_j^2 \leq b \\
 & x_j^2 \in \{0, 1\} \quad j = 1, 2, \dots, n2
 \end{aligned}$$

Let the optimal solution be x^{2*} and let $x^{1*} = (\overbrace{0, 0, 0, \dots, 0}^{n1})$ and let Z^* be the value of the leader's objective function f_1^* , evaluated using the values x^{1*} and x^{2*} .

Step 2 Solve problem B :

$$\begin{aligned}
 (B) : \quad & \max \quad Z_B = \sum_{j=1}^{n2} c_j^{12} x_j^2 \\
 \text{st :} \quad & \sum_{j=1}^{n2} a_j^2 x_j^2 \leq b \\
 & x_j^2 \geq 0, \quad x_j^2 \leq 1 \quad j = 1, 2, \dots, n2
 \end{aligned}$$

This problem results in Z_B^* , the optimal objective function value and Y_B^* , the optimal dual solution. Calculate $H(j) = c_j^{11} - Y_B^* a_j^1$, $j = 1, 2, \dots, n1$.

In order to maximize the efficiency of branching, we establish an upper bound on the path chosen in the tree. This is the function of step 3, the branching step. The value Z_N^U is determined by finding the largest of Z_N^{U+} , the upper bound on the objective function when setting $x_N^1 = 1$ and Z_N^{U-} , the upper bound on the objective function when setting $x_N^1 = 0$.

Step 3 Branching

$$\text{From Theorem 1,} \quad Z^U = Z_B^* + \sum_{j \in J_k^+} H(j) + \sum_{j \in J_k^0} \max\{H(j), 0\}.$$

$$\text{Let} \quad S = \sum_{j \in J_k^+} H(j) \quad \text{and let} \quad W = \sum_{j \in J_k^0} \max\{H(j), 0\}$$

$$\text{and} \quad N = N + 1 \quad k = k + 1.$$

Calculate the upper bound of the leader's objective function Z_N^U for the branch down-tree for $x_N^1 = 0$. This will be denoted as Z_N^{U-} .

Loop 1: Set $S = W = 0$
 For $i = 1$ to $n1$
 If $x_i^1 = 1$
 $S = S + H(i)$
 else
 if $x_i^1 = 0$
 $W = W + \max\{H(i), 0\}$
 else
 end for loop
 end loop

$$Z_N^{U-} = Z_B^* + S + W$$

Calculate Z_N^{U+} , the branch where $x_N^1 = 1$.

This is achieved in a very similar manner to the calculation of Z_N^{U-} . Set $x_N^1 = 1$ then execute Loop 1 and finally $Z_N^{U+} = Z_B^* + S + W$.

If $Z_N^{U+} \geq Z_N^{U-}$ then the upper bound $Z^U = Z_N^{U+}$, $x_N^1 = 1$ and $T_N = T_N + 1$, otherwise $Z^U = Z_N^{U-}$, $x_N^1 = 0$ and again $T_N = T_N + 1$

Of course, the upper bounds need to be checked against the current best solution of the objective function, Z^* . If the upper bound on that particular branch is not greater than the current best solution then that branch is fathomed.

Step 4 Fathoming Check

If $Z^U \leq Z^*$ then set $T_N = 2$, go to Step 6.
 else go to Step 5.

The next step checks if $N = n1$, that is if all the leader's variables have been assigned a value. Then the follower's problem, L , with the given values of the leader's variables and if feasible the solution, Z^L , is compared to the current best solution.

Step 5 Calculate Feasible Solutions

If $N \neq n1$ then go to Step 3

else solve problem L

where

$$(L:) \max \sum_{j=1}^{n2} c_j^{22} x_j^2 + \sum_{j \in J_k^+} c_j^{11}$$

$$st: \sum_{j=1}^{n2} a_j^2 x_j^2 \leq b - \sum_{j \in J_k^+} a_j^2$$

$$x_j^2 \in \{0, 1\} \quad j = 1, 2, \dots, n2.$$

Let the current values of the leader's variables be x^{1L} and the solution of problem L be x^{2L}

Let Z^L be the leader's objective function value evaluated using x^{2L} and x^{1L} .

If $Z^L > Z^$ AND problem L is feasible,*

then update Z^ , x^{2*} and x^{1*} from Z^L , x^{2L} and x^{1L} respectively , go to Step 6;*

else go to Step 6.

The algorithm now proceeds back up the tree, examining branches and their upper bounds. Each upper bound is compared to the current best solution to determine whether the branch can be fathomed or must be considered further. This is performed in the next step.

Step 6 *Backtracking*

If $T_N = 2$ then set

$$T_N = 0, x_N^1 = 0, N = N - 1$$

If $N = 0$ then go to Step 7.

else go to Step 6;

else $T_N = T_N + 1$.

If $x_N^1 = 0$ then $Z^U = Z^{U+}$, $x_N^1 = 1$, go to Step 4.

else $Z^U = Z^{U-}$, $x_N^1 = 0$ go to Step 4.

All that remains is to terminate the process at the point where all viable branches and leaves have been utilized.

Step 7 *Terminate*

Stop execution of the algorithm and output the solution.

5 COMPUTATIONAL RESULTS

To evaluate the results of the algorithm it was coded into a SAS program and bi-level problems were constructed randomly using the following guidelines.

The leader's objective function coefficients were chosen randomly between the limits of -30 to +30. The follower's objective function coefficients were chosen randomly between -12 and +12. The constraint matrix coefficients were chosen randomly between -18 and +18 and the b_j , or resource values were restricted to be within the range 0.5 to 0.75 of the sum of the a_j for the j^{th} constraint. This was to insure a high probability of feasibility.

In both table 1 and table 2 the column headers represent

- evaluated nodes = number of nodes where an upper bound was established as a percentage of total nodes in the tree.
- lpcalls = number of LP problems solved as a percentage of leaves in the tree.
- kstar = the node number where the optimal solution was obtained as a percentage of nodes in the tree.

In Table 1, 10 randomly constructed problems were solved for each problem type.

n1	n2	evaluated nodes	total nodes	lpcalls	leaves	kstar
5	5	55%	62	39%	32	27%
5	8	72%	62	62%	32	36%
5	10	75%	62	73%	32	34%
8	5	37%	510	23%	256	13%
8	8	43%	510	31%	256	25%
8	10	64%	510	58%	256	30%
10	5	15%	2046	7%	1024	4%
10	10	51%	2046	41%	1024	11%

Table 1: Results of 10 samples for each $n1 \times n2$ problems

The results in Table 2 are from randomly constructing 100 problems for each problem type. This set of computations was mainly performed to check the statistical validity of the results in Table 1.

Several conclusions may be drawn from these computational results. In their paper Wen and Yang [3] suggested in their conclusions that there may well be a correlation between the effectiveness of their bounding function and the ratio of the number of leader's variables, $n1$, to the number of follower's variables, $n2$. The results seem to confirm this. It is apparent from the tables that when the numbers of both leader's and follower's variables are similar both the evaluated nodes percentage and the kstar percentage figures are larger. However if $n1 > n2$ then both these percentages, which measure the effectiveness of the bounding

n1	n2	evaluated nodes	total nodes	lpcalls	leaves	kstar
5	5	51%	62	36%	32	30%
5	8	69%	62	57%	32	35%
5	10	71%	62	64%	32	33%
8	5	23%	510	14%	256	12%
8	8	49%	510	37%	256	17%
8	10	57%	510	45%	256	20%
10	5	13%	2046	8%	1024	7%
10	10	52%	2046	42%	1024	21%

Table 2: Results of 100 samples for each $n1 \times n2$ problems

function at finding a tight upper bound for the optimal feasible solution, are significantly lower. In the case of the 10×5 problem these values drop to very low levels indicating excellent performance by both the bounding function and the algorithm in general. On the other hand it would seem that if $n2 > n1$ the effectiveness deteriorates giving the highest percentages.

Examining the performance of the algorithm and the use of the upper bounds at each level in the tree to choose branching means examining kstar. It would appear from the low values of kstar, all lower than 35%, that the addition of controlling the decision by utilizing the Z_N^U was an effective measure in tightening the bounds in the solution of the problem.

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COMPARING SUPPLY CHAIN PERFORMANCE METRICS WITH ORGANIZATIONAL EXCELLENCE PERFORMANCE METRICS

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ABSTRACT

AMR Research has published a list of the Top 25 Supply Chains for the past few years. These companies and the AMR criteria provide excellent examples for exploring supply chain performance metrics. The NIST publications on the Baldrige Award winners and more recent publications on the success of Six Sigma programs are benchmark examples for organizational excellence performance metrics. Performance metrics will be discussed from the perspective of both supply chain management and organizational excellence. A comparison will be made between metrics used in connection with the two different viewpoints.

INTRODUCTION

Supply Chain management (SCM) continues to be a topic of great interest to teachers, researchers and practitioners. The supply chain is vitally important to the majority of companies today and companies are constantly looking for ways to improve their supply chain performance. University curricula include Supply Chain courses in a variety of areas including engineering programs, business programs and technology programs. With this backdrop in mind, looking at companies that are very successful with their supply chain initiatives may hold many worthwhile lessons. AMR Research has assisted us in this endeavor by publishing the Top 25 Supply Chains. This list recognizes those companies that have achieved a high level of success in their supply chain performance. AMR also provides some fundamental performance metrics and descriptions of company performance along with the Top 25 list.

Organizational Excellence enjoys a similar level of interest for the same set of constituencies. There are numerous local, state, national and international awards and recognitions that use some form of “organizational excellence” as a criterion. There are also numerous examples in the literature where companies are acknowledged as being “best in class” or “best in the world.” Companies recognized in this manner again provide us with a glimpse at the metrics that are important for those businesses operating with the “excellence” mindset.

Supply Chain Management

First we discuss the fundamentals of supply chain management. Many exchanges occur in the overall process of planning, sourcing, making and delivering products, services and information. As these exchanges occur and the material moves through a series of providers and ultimately reaches consumers, the efforts of several parties need to be aligned – this is referred to as the supply chain [14].

The following definition for “supply chain management” offers further clarification:

“Supply chain management is the integration of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders” [9].

The important fact to take away from this description is the need to coordinate across the entire network of companies in the supply chain. Superior supply chain performance cannot be achieved without superior performance along each link of the supply chain.

Supply Chain Metrics

The Top 25 evaluation by AMR Research focuses very specifically on individual firm performance as they identify the best performing supply chains. While this approach is certainly counter to the definition of supply chain management, there is a strong argument that individual firm success very much depends on successful “integration of key business processes” and successful execution of those business processes with all of the key organizations in the supply chain. We also suggest that if the featured individual firm has outstanding performance then we would expect to find partner firms from that firm’s supply network who enjoy similar success.

According to AMR: “The report identifies the top 25 manufacturers and retailers that exhibit superior supply chain capabilities and performance. Supply chain leaders are able to shape demand, instantly respond to market changes, and crush their competitors. According to AMR Research benchmarking data, leaders carry 15% less inventory, are 60% faster-to-market, and complete 17% more perfect orders. These advantages separate predators from prey.” As performance metrics, less inventory reduces cost for the company and the latter two metrics allow the company to exceed customer expectations and attain excellent performance in customer satisfaction. These are also basic metrics that are readily adopted by many companies seeking to monitor supply chain performance in a different manner.

The criteria for selection to the Top 25 list are as follows: “The first component of the ranking is publicly available financial data and is weighted at 60% of the total score, with return on assets and inventory turns each accounting for 25%, and trailing 12 months growth accounting for 10%. The second component of the ranking is AMR Research’s opinion, which is weighted at 40% of the total score. The opinion component is based on a structured voting methodology across AMR Research’s team of analysts” [1]. The companies in the Top 25 for 2004 and 2005 are listed in Table 1.

From the AMR discussion we list the following metrics:

- Return on assets (ROA)
- Inventory turns
- Trailing 12 months growth in revenue
- Time-to-market
- Days of inventory
- Perfect orders [1]

An approach with similarities but with more extensive coverage is the SCORcard metrics as advocated by Bolstorff and Rosenbaum [4]. They are strong supporters of the SCOR model for supply chain management. Examples of the metrics used in the SCORcard are as follows:

- Delivery performance
- Line-item fill rate
- Perfect order fulfillment
- Order fulfillment lead time
- Supply chain response time
- Production flexibility
- Cost of goods
- Total supply chain cost
- Sales, general, and administrative cost (SGA)
- Warranty/returns processing costs
- Cash-to-cash cycle time
- Inventory days of supply

- Asset turns
- Gross margin
- Operating income
- Net income
- Return on assets [Source: 4]

Another perspective comes from Bowersox, Closs and Cooper [5]. They divide measurement into three categories: Operational Assessment, Financial Assessment and Social Issues in Logistics Performance Measurement. Supply Chain Comprehensive Metrics are another of their categories and includes:

- Cash-to-Cash Conversion
- Inventory Days of Supply
- Dwell Time
- On-Shelf In-Stock Percent
- Supply Chain Total Cost
- Supply Chain Response Time.

Table 1. Top 25 Supply Chains from AMR

Rank	2004 Companies	2005 Companies
1	Dell	Dell
2	Nokia	Procter & Gamble
3	Procter & Gamble	IBM
4	IBM	Nokia
5	Wal-Mart Stores	Toyota Motor
6	Toyota Motor	Johnson & Johnson
7	Johnson & Johnson	Samsung Electronics
8	Johnson Controls	Wal-Mart Stores
9	Tesco	Tesco
10	PepsiCo	Johnson Controls
11	Nissan Motor	Intel
12	Woolworths	Anheuser-Busch
13	Hewlett-Packard	Woolworths
14	3M	The Home Depot
15	GlaxoSmithKline	Motorola
16	POSCO	PepsiCo
17	Coca-Cola	Best Buy
18	Best Buy	Cisco Systems
19	Intel	Texas Instruments
20	Anheuser-Busch	Lowe's
21	The Home Depot	Nike
22	L'Oreal	L'Oreal
23	L'Oreal	Publix Super Markets
24	Canon	Sysco
25	Marks & Spencer	Coca-Cola

Sources: [1] & [14]

SUPPLY CHAIN EXAMPLES

Proctor & Gamble (#2 on the Top 25): Proctor & Gamble is the country's leading manufacturer of household products. It has 35 manufacturing plants, 30,000 suppliers, and 5,000 retailers. Its supply chain continues to be one of the most complex and well-managed in the world. In the past, P&G used the traditional 'push' method where their products were produced and delivered in large quantities and at times that are determined by the company, and then they are shelved at retailers for immediate sale. This became a problem due to the fact that nearly 60% of P&G's products are sold by retailers under promotion (such as buy one, get one free) [12][13].

When stock outs occurred during promotions, P&G knew they had to change. They began bringing retailers and suppliers into the demand forecasting side of the business and switched to the demand driven 'pull' method of the supply chain. P&G has also put into effect an initiative the company calls "Efficient Consumer Response II." This will help them reduce cycle time to 65 days from the original 130 days seen in the 1980's. According to Steve David, Proctor and Gamble CIO, that "currently we have 4,000 internal websites, 25,000 organizational nodes, 70,000 materials, 200,000 products, 500,000 customers, and 1 million parts....but we still need to clean up our act" [8].

SYSCO (#24): SYSCO is an acronym for Systems and Services Company. Their initial public offering was in 1970 where sales were \$115 million. In the fiscal year of 2005, sales had grown to \$30.3 billion. SYSCO assists foodservice operators in providing consumers with solutions for meals consumed away from home. Today, SYSCO has sales and service relationships with approximately 390,000 customers and operates from 170 locations throughout the US and portions of Alaska, Hawaii, and Canada.

Their supply chain has become so effective because they have become a leader in reducing paper based transactions and converting them to an electronic database, which helps monitor the ordering process more efficiently and effectively. SYSCO recently partnered with EFS Network to help with this venture. This venture has allowed SYSCO to dramatically enhance their partner relationships as well as business to business trading capabilities.

By increasing customer service, providing a question and answer forum on their website, as well as tracking abilities for consumer orders, SYSCO has reached the top 25 status of most effective supply chains [16].

ORGANIZATIONAL EXCELLENCE

There are several philosophies that share "organizational excellence" as a fundamental premise. Total Quality Management (TQM), the Baldrige Award and most recently Six Sigma initiatives are the main examples of philosophies and programs that are intended to drive the company to a high level of excellent performance.

The "Hendricks and Singhal" study provides evidence that companies who receive quality awards realize a 38% to 46% higher long term stock performance when compared to a control group of companies who did not receive a quality award [6] [7]. An earlier study showed that quality award recipients outperformed the non-winning counterparts in a control group in operating income and revenue over a ten-year period [6]. NIST research has shown similar results for Baldrige Award winners when compared to the benchmark stock market standards such as the S&P 500 Index.

Outstanding stock performance lags behind the improvement that accompanies TQM initiatives with the greatest stock performance success occurring in the fifth year after TQM implementation.

One of the main claims of Six Sigma is that it improves either the top line (i.e. revenue) or the bottom line (i.e. profit). This claim certainly begs the question to explore performance metrics and performance outcomes in more detail.

ORGANIZATIONAL EXCELLENCE EXAMPLES

Toyota is recognized for achieving organizational excellence in many aspects of their operations. The Toyota Production System has been well documented by Womack, Jones and Roos [17] as well as Ohno [11]. In his recent book “The Toyota Way,” Liker [10] offers more explicit evidence in the first chapter entitled “The Toyota Way: Using Operational Excellence as a Strategic Weapon.” Among the list of accolades listed there for Toyota include the following:

- In March, 2003, the close of Toyota’s fiscal year, company profit was \$8.13 billion which was more than the combined earnings for the Big 3 U.S. automakers (GM, Chrysler and Ford).
- For the first time in 2003, Toyota surpassed one of the Big 3 U.S. companies when it outsold Chrysler in August of that year (and surpassed Ford and GM in subsequent years).
- In a span of only ten years, the Lexus luxury segment has grown to the point where Lexus outsold BMW, Cadillac and Mercedes-Benz in the U.S. for the third consecutive year in 2002.
- The “Toyota Production System” has driven major changes in manufacturing and supply chain management in industries around the world. “Toyota employees are sought out by companies in almost every industry throughout the world for their expertise.”
- Product development at Toyota takes one year or less for new product design while other automakers take two to three years for their new product development.
- Toyota serves as a benchmark as being best in the world (or best in class) in a variety of areas including: quality, productivity, manufacturing speed and flexibility. [Source: 10, p. 5]

From the Toyota example we can take the following metrics:

- Profit
- Market share
- Development speed
- Quality
- Productivity
- Cycle time
- Manufacturing flexibility

In their discussion of Logistics measurement systems Bowersox, Closs and Cooper offer “a framework that considers both operational excellence and asset utilization in logistical performance. On the operational excellence dimension, key metrics focus on improved accommodation of customers through increased customer success and on lowest total cost of service” [5, p. 388]. From this addition we take the two additional metrics of:

- Customer success
- Lowest total cost of service

From Six Sigma we can add the excellence metrics of Sigma Level with Six Sigma being the desired level of excellence (only 3.4 defects per million opportunities). Defects per million opportunities (DPMO) is another metric that can be utilized as another way to state the quality level. Defects per unit (DPU) will be an appropriate metric in some industries. And Rolled Throughput Yield (RTY) is another important metric which looks at the quality level being passed from one step of a process to the subsequent steps in

that process. From these comments one should gather that these metrics are very closely focused on the process.

- Sigma Level
- DPMO
- DPU
- RTY

From the Baldrige Award criteria we could add an extremely long list of metrics but we will limit it to just a few.

- Customer satisfaction/loyalty resulting from strategic action
- Employee satisfaction/motivation resulting from strategic action
- Success versus competitors
- Percent acceptance of process responsibilities by process responsible areas [2].

In Table 2, the complete list of metrics discussed in this paper are listed in summary fashion:

Table 2. Comparison of Metrics

SC Metrics	OE Metrics
<ul style="list-style-type: none"> • Return on assets (ROA) • Inventory turns • Trailing 12 months growth in revenue • Time-to-market • Days of inventory • Perfect orders • Delivery performance • Line-item fill rate • Perfect order fulfillment • Order fulfillment lead time • Supply chain response time • Production flexibility • Cost of goods • Total supply chain cost • Sales, general, and administrative cost (SGA) • Warranty/returns processing costs • Cash-to-cash cycle time • Inventory days of supply • Asset turns • Gross margin • Operating income • Net income • Return on assets • Cash-to-Cash Conversion • Inventory Days of Supply • Dwell Time • On-Shelf In-Stock Percent • Supply Chain Response Time. 	<ul style="list-style-type: none"> • Profit • Market share • Development speed • Quality • Productivity • Cycle time • Manufacturing flexibility • Customer success • Lowest total cost of service • Sigma Level • DPMO • DPU • RTY • Customer satisfaction/loyalty resulting from strategic action • Employee satisfaction/motivation resulting from strategic action • Success versus competitors • Percent acceptance of process responsibilities by process responsible areas

CONCLUSION

Supply chain management and Organizational Excellence have been significant initiatives over the past twenty years. This paper is intended to provide a better understanding of performance metrics associated with these initiatives. We have discussed the Top 25 Supply Chains and supply chain metrics. We have also discussed Organizational Excellence and metrics associated with that viewpoint.

Organizations exist to serve customers and supply chains are designed to deliver to customers so we would think that the metrics would be quite similar. While there are a few shared metrics there tends to some divergence in the metrics that are most important from each perspective.

The similarities tend to be in the areas where time or speed are important metrics whether it's new product development or cycle time. The differences in metrics tend to result from SCM's focus on material flow and the much broader metrics of OE which cover the spectrum of business processes.

This has been a preliminary and exploratory research attempt to look at metrics from these two different perspectives. Further research is planned and we feel there is an opportunity to further explore and compare companies that focus on Supply Chain versus companies that focus on Organizational Excellence.

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GREEN SUPPLY CHAIN MANAGEMENT AND ITS OPPORTUNITIES

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ABSTRACT

The supply chain consists of those activities associated with manufacturing from raw material acquisition to final product delivery. Because of the recently changed environmental requirements that affect manufacturing operations and transportation systems, growing attention is given to the development of environment management strategies for supply chains. A green supply chain aims at confining the wastes within the industrial system so as to conserve energy and prevent the dissipation of harmful materials into the environment. In this paper, we compare and contrast the traditional and green supply chains. Moreover, we discuss several important opportunities in green supply chain management in depth, including those in manufacturing, bio-waste, construction, and packaging.

1. INTRODUCTION

The traditional supply chain comprises of five parts: raw material, industry, distribution, consumer, and waste. Each component in the supply chain can be a source for pollution, waste, and other hazards to the environment. For example, a company may use environmentally harmful materials such as lead. However, organizations can put pressures on the suppliers to use more environmentally friendly materials and processes. Bluemhof-Ruwaard et al. [4] describe that both the product design and manufacturing processes present many opportunities to implement environmentally friendly procedures and these procedures entail reducing waste, minimizing pollution, and utilizing resources efficiently. In the distribution process organizations can minimize packaging materials and stress “reverse distribution.” An organization may encourage its end consumers to efficiently use the products by including instructions and suggestions in product manuals. In the waste, or disposal, process a company must comply with regulations regarding collection and disposal of hazardous materials [4].

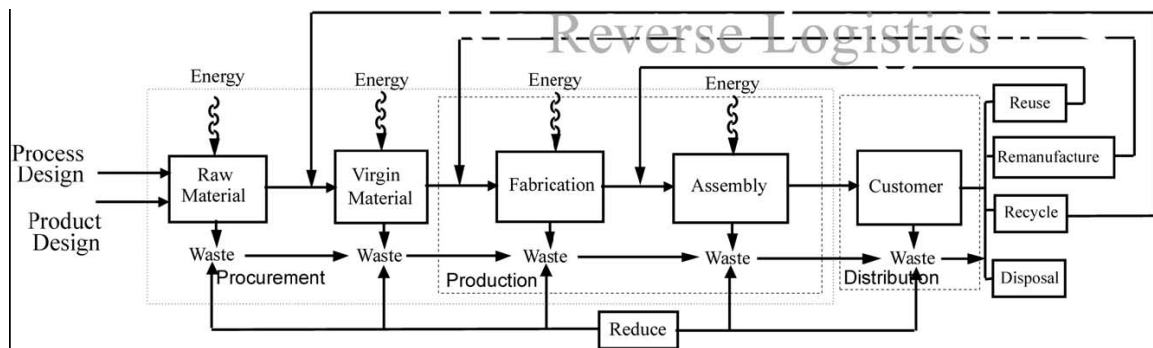


FIGURE 1: FUNCTIONAL MODEL OF AN ORGANIZATIONAL SUPPLY CHAIN WITH ENVIRONMENTALLY INFLUENTIAL PRACTICES (SARKIS [18])

As illustrated by Figure 1, the green supply chain model shows the various points where wastes occur and opportunities exist to limit waste by reuse, recycling, and remanufacturing. In a green manufacturing environment, the supply chain decisions include the possibility that a process can use certain renewable materials, the ability to utilize reusable or remanufactured materials, and the reduction of wastes. Sarkis [18] states that environmentally friendly innovations may best be utilized during the manufacturing stage

of the supply chain, as this part is the most internally focused and the organization can more directly see the benefits of implementing environmentally friendly processes.

Green supply chain management (GSCM) involves traditional supply chain management practices, which integrate environmental criteria, or concerns, into organizational purchasing decision and long term relationships with suppliers [9]. A green supply chains aims at confining the wastes within the industrial system in order to conserve energy and prevent the dissipation of dangerous materials into the environment. It recognizes the disproportionate environmental impact of supply chain processes within an organization.

Conventional and green chains differ in several ways. First, conventional chains often concentrate on economic objectives and values, while green chains also give significant considerations to ecological causes. When a conventional chain does take ecological standards into account, it is often limited in its optimization scope. For example, conventional chains merely take into consideration of human toxicological effects, leaving out the effects on environment. Furthermore, they often overly concentrate on controlling the final product, while allowing negative effects to occur during the production process.

On the other hand, green, integrated, ecologically-optimized supply chains extend the scope not only to human toxicological effects, but also to ecologically negative effects on the natural environment, as well as the entire value-adding process, resulting in low ecological impacts during production. Ecological requirements are considered as key criteria for products and productions, and at the same time the company must assure its economic sustainability by staying competitive and profitable.

The buyer and supplier selection criteria are fundamentally different in conventional and green chains. In conventional chains, the predominant standard is price. In green chains, ecological objective is a part of the supplier selection criteria. Putting these ecological criteria into practice requires careful supplier evaluation, based on long-term oriented relationships. The development of suppliers usually takes long time and only a very limited number of suppliers meet the defined criteria, so any change of supplier selection cannot be implemented in a green chain as quickly as in a conventional chain.

One of the main obstacles for successfully introducing green products in the market is their higher cost comparing to conventional ones. For the cost problems to be managed effectively, the efficiency of the entire supply chain must be evaluated. Comparing to conventional chains, which have a large number of conventional materials and suppliers, green chains are relatively inferior in terms of speed and flexibility. Table 1 summarizes the major differences between the conventional and green supply chain management.

TABLE 1: DIFFERENCES BETWEEN THE CONVENTIONAL AND GREEN SCM

Characteristics	Conventional SCM	Green SCM
Objectives and values	Economic	Economic and ecological
Ecological optimization	High ecological impacts	Integrated approach Low ecological impacts
Supplier selection criteria	Price switching suppliers quickly Short-term relationships	Ecological aspects (and price) Long-term relationships
Cost pressure and prices	High cost pressure Low prices	High cost pressure High prices
Speed and flexibility	High	Low

Corporations are typically responsible for the financial return of their shareholders but not in existence to tackle the environmental problems. However, more and more corporations have begun to employ the

green concepts to create a unique competitive edge. Beamon [2] showed that an estimated 75% of the consumers claimed that their purchase power was influenced by the company's environmental reputation and that 80% would be willing to pay more for environmentally friendly goods. By practicing just a fraction of green concepts in supply chain management, many commercial firms have achieved success. In the next four sections, we discuss green supply chain management opportunities in the areas of manufacturing, bio-waste, construction, and packaging.

2. MANUFACTURING

To create real environmental change, firms must develop innovations that consume fewer resources, produce less waste, and create less environmental harm [11]. An environmentally beneficial innovation needs new combinations of knowledge about product characteristics, process and material characteristics, and technologies. The change must come from within the firm's aims. The key to developing innovations that will be beneficial and profitable is an effective exchange of knowledge between the individual links within the supply chain. An organization requires structures that enable the firm to critically analyze and review the changes implemented. There is also a need for the capacity to accept change and modify operations at various levels when needed.

The literature points out a few common methods for making the manufacturing stage "greener": reusing, remanufacturing, and recycling. The primary difference between these processes is the extent to which the characteristics of the product are changed. While the physical characteristics of a material are maintained in reuse, remanufacturing includes some changing of parts or disassembly. Recycling may change the characteristics of the material completely including chemical and physical traits. An organization will decide which methods to employ depending on the product characteristics [18].

Literatures present many findings regarding how significant an influence the suppliers could have on the "greening" of the manufacturing stage in a supply chain. Manufactures are liable for purchasing products and services that violate environmental standards, but they may not be legally responsible for their suppliers' environmental activities. Currently there are few incentives for manufactures to be concerned with the environmental procedures of their suppliers; however there is new research pertaining to the connection between supplier's environmental practices and competitive advantages in the supply chain.

Recent environmental management literature has suggested that an informed relationship between supplier and manufacturer can lead to innovative and cost effective end-products. A recent study found that Japanese automakers were operating on a productivity twice as that of their American counterparts. The main difference in productivity was attributed to the Japanese organizations lean manufacturing systems, reducing lead-time while at the same time increasing quality [14]. However, suppliers are generally concerned with cost, quality, and delivery, while environmental safety has been taken with a lower priority. In contrast, manufactures may list environmental safety and improvement as a major priority. Manufacturing firms may need to consider their own environmental goals, social responsibilities, and reputation to consumers [19]. For instance, 1996 research surveying 212 US manufacturing firms found that over 75% of respondents identified pollution prevention as a key component to their overall company performance. Over 49% of these firms also reported that suppliers were key components to the reduction of pollution [15].

Geffen and Rottenberg [8] conclude that the greatest success between supplier and manufacturer was found in firms where suppliers were physically involved in the manufacture's plant and where manufactures were actively involved in the supplier's plant. Moreover, the study found that manufacturing firms in Taiwan had successfully implemented highly innovative and effective environmental management practice between suppliers and manufactures. The success is attributed to the relationships developed between the manufacturing firms and their suppliers.

Benefits can be generated for both supplier and manufacturer. Firms can work together to improve product design and product efficiency, which can lead to improved overall waste reduction. The manufacturing system is where the greatest amount of pollution may be generated by firms, and where the highest volume of resources is consumed [19]. This means that the supply-manufacture relationship has the ability to make significant strides towards a greener, leaner supply chain.

Simpson and Power [19] indicate that recent research finds that higher pollution prevention is found in companies that utilize lean manufacturing practice. Lean means responsible manufacturing processes that reduce consumption and waste. To achieve lean manufacturing manufacturers and suppliers must maintain a high level of communication and trust. Therefore, a lean manufacturer is more likely to be a green manufacturer. Recently there has been some research proving the link between adopting lean practices and achieving advanced pollution prevention in some industries. The likelihood of success for lean manufacturing depends on the how well the supply chain is integrated between the supplier and the manufacturer.

3. BIO-WASTE

Waste, defined as anything that adds adverse effects to the environment without adding value [12], is a byproduct in almost every type of industry. With growth in world population expected to increase by 50% from 5.7 billion (circa 1996) to 8.5 billion by the year 2030, the world's garbage is certain to increase at an unprecedented rate [10]. Some companies, especially small businesses in underdeveloped countries, have limited choices on how to handle their wastes. These businesses are often plagued by the spreading of disease due to unhealthy conditions from improper waste disposal. Eventually, these conditions lead to their closure. However, with waste management and waste prevention, companies may turn waste into profit through green supply chain management.

Waste management is an effect-directed approach that is reactive in nature and tries to reduce landfill and incinerator supporters. The reactive pressures are usually attributed to governmental and legal regulations and preservation of a status quo among corporate competitors. On the other hand, waste prevention or reduction is a "catch it at the source" approach that is proactive in nature and attempts to restrict waste generation from the outset. Proactive pressures are connected with building and maintaining favorable reputations among customers and communities in order to gain a sustainable competitive advantage in various markets [17].

Solid waste in the United States has grown in the last 30 years and it is expected to continue to grow. According to the United States Environmental Protection Agency (EPA), approximately 12 billion tons of industrial waste and 208 million tons of municipal waste are generated in the US each year. Industrial development has generated complex waste not only in terms of quantity but also in terms of their composition. Industrial waste encompasses food waste, rubbish, ashes, construction and demolition wastes, special wastes, and hazardous waste [6, 22]. Health care waste is the total waste stream from a healthcare establishment, research facilities, laboratories, and emergency relief donations [13]. Proper management of health care waste is a vital process that can help ensure proper hospital hygiene and safety of health care workers and communities. Typically, waste is disposed of in landfills and despite the intense efforts that are directed to the recycling and recovery of solid wastes, landfills still remain and will remain as part of most solid waste management plans [1].

Corporations are now under an increasing pressure from consumers, communities, and governmental bodies to consider the implications of their current waste management procedures have on the environment. Legislation and regulation has an increasing impact on production, future liability, and costs.

In today's environment, product waste management has become a central issue for cost efficiencies, especially in today's healthcare system. Global efforts are currently in place to define the parameters in waste reduction and prevention, which in turn has created a cost that some healthcare providers have not been willing to incur. The following issues should be addressed:

- Local, state, and federal requirements for the proper disposal of biomedical hazardous material.
- Current practices and procedures in the prevention of biomedical waste at a healthcare facility.
- Types of biomedical hazards produced in a local area hospital setting.
- Risks posed to people and environment by the mismanagement of healthcare waste.
- Types of disposal available and mandated by governing entities.
- Permanent transport and disposal of biohazard waste.
- Waste byproducts created from the disposal of biomedical material.
- Quality improvement procedures within the biomedical waste management supply chain.

The World Health Organization (WHO) estimates that 20% of the waste generated by medical facilities and practices can be classified as hazardous materials that may be infectious, toxic or radioactive [3]. We believe that health care professionals, who wish to improve their facilities' environmental profiles, must implement waste disposal procedures and develop criteria for the environmental screening of products.

4. CONSTRUCTION

A wide array of negative impacts on the environment and human beings is attributed to the astounding amount of debris generated by the United States construction industry. These include Sick Building Syndrome (SBS), non-renewable energy consumption, wasteful land use through abundant landfills, and ozone formation.

Sick Building Syndrome is a term used to describe a situation in which building occupants experience acute health and comfort effects that may somehow be linked to the occupancy of a building. Oftentimes, these adverse effects stem from the same construction materials used on the facility proper. The adhesives, paints, and other finish materials produce a condition referred to as off-gassing. These often contain toxins whereby regular exposure to such results in numerous health conditions such as: coughing, chills, fever, chest tightness, muscle aches, and a plethora of respiratory diseases.

Another detrimental condition is wanton disregard for the creation of landfill after landfill sites. Statistics indicate that approximately 3.7 trillion pounds of construction debris is created by Americans on a yearly basis. U.S. landfills accept 136 million tons of construction and demolition waste in 1996 [20]. The net result is a direct contribution to methane gas production among other by-products, which is a major "greenhouse" gas.

Current practices in construction material production and disposal consume vast amounts of non-renewable energy resources. An example is the production of steel, a common material in modern building construction. Coal is readily used in the production of this material. However, the manufacturing process is not the only stage where this non-renewable fossil fuel is utilized. A quick analysis of the life-cycle of this building product reveals that material extraction and recycling also use this fuel source that induces vast amounts of air pollution and its depletion as well.

Commercial buildings add significantly to energy consumption, air pollution, and solid waste creation. About 68% of total U.S. energy consumption, more than one-third of municipal solid waste streams, and 30% of greenhouse gas emissions comes from commercial buildings [21]. In addition, commercial structures use nearly 12% of the nation's potable water consumption and use approximately 3 billion tons

of raw materials globally each year [21]. Green design practices strive to significantly reduce or eliminate the negative impact of buildings, and offer many benefits for, for examples, environment - reducing the impact of natural resource consumption; economic – reducing the operating costs through a significant reduction of utility costs and liability costs; health and safety – enhancing the occupant’s comfort and health; and community - minimizing the strains put on local infrastructures.

Currently there are three major methods utilized to assess the environmental impact of buildings. Eco-labeling is the practice of branding the environmental qualities of a product or system so that consumers can make environmentally-based decisions. Life Cycle Assessment, on the other hand, is a comprehensive methodology for evaluating the environmental impact of a system or product. Finally, Leadership in Energy and Environmental Design represents a national, voluntary standard for developing high-performance, sustainable buildings and structures, and is based on accepted energy and environmental principles, practices, and emerging concepts in the construction industry.

5. PACKAGING

Packaging performs various functions in today’s society. It can be seen differently from either the producer or consumer’s standpoint. For producers, it is a way to promote and differentiate products, as well as safely transport finished goods to the market. For consumers, packaging is a way to identify the maker of the product, its usage, and important features. It should ultimately get the consumers’ attention and make them want to buy that particular product.

There are five basic objectives of the packaging process. The first objective is to physically protect the product from any damage that might occur during storage or shipping. The second objective is agglomeration of products. Smaller items can generally be packaged and shipped together for efficiency. The third objective is information transmission. This gives the important information of how to use the product, how to dispose of it properly, or even how to transport it. For example, the food industry in the United States is required to put nutrition information labels on food packaging. The fourth objective is about marketing. This includes the design of the packaging that attracts consumers to buy the product. The final objective is to reduce the theft associated with particular products. Some companies make packages larger than they need to be in order to deter people from stealing it. For example, many software companies often put small compact discs into large boxes. To think of supply chains without thinking of the packaging that goes into the chain would create a “blind-spot” in the firm. This “blind-spot” is the lack of vision of adopting ‘green’ packaging materials or creating alliances with suppliers that use “green” packaging materials. Forty-six percent of supply chain executives cited resistance to process change as the major factor that will impede their supply chain performance [5].

Packaging can exist in endless formats, designs, and chemical components. Most lay people do not consider packaging to be important or a dynamic constituent in product’s life cycle. But according to Sarkis [18], “Packaging has a strong relationship with other components of the operational life cycle.” Packaging characteristics such as size, shape, and materials have an impact on distribution because of their affect on the transport characteristics of the product. Better packaging, along with rearranged loading patterns, can reduce materials usage, increase space utilization in the warehouse and in the trailer, and reduce the amount of handling required [23]. Systems that encourage and adopt returnable packaging methods will require a strong customer supplier relationship as well as an effective reverse logistics channel.

The most common form of packaging materials that can be seen daily are the classic peanuts, bubble-wrap, Styrofoam, air bladders, and the numerous paperboard formats. Even though most products compose of either petroleum based materials, such as plastics, or paper based materials, such as cardboard and other paperboard items, a continuous effort has been made on finding new reusable materials. The

key with respect to a greener supply chain is the implementation of biodegradable materials and recycling packaging components of the standard packaging products.

Ricca [16] refers the eco-friendly packaging as “by eliminating chlorine bleaching of virgin or recycled fiber, or by eliminating hydrochloride compounds from the converting process.” The removal of various chemical compounds from ordinary packaging products can add tremendous value to the environment, customers, and shareholders.

The power of free market at times will dictate the influence of going green. Influential corporations, such as IKEA, Starbucks, and Ben & Jerry’s, set requirements for all their suppliers to comply with stricter environmental regulations including bleach-free processes [16]. Wal-Mart Stores recently announced a five-year program with its suppliers to help reduce overall packaging by 5 percent, hoping to keep trash out of landfills and global-warming gases out of the atmosphere [7]. This is a win-win initiative for the world's largest retailer, because Wal-Mart would improve not only its corporate image, but it also would save \$3.4 billion in its own costs. In the five-year plan, Wal-Mart will require its 600,000 global suppliers to use more efficient packaging methods with estimated total supplier savings of \$11 billion [7]. The key however is the actual use of the packaging and the products that need the packaging.

6. CONCLUSIONS

In recent decades, businesses have created and adopted strategies that are in better alignment with the best interests of the environment. Although EPA and other agencies have not given specific guidelines for many businesses, some operations have discovered the cost saving benefits after adopting more environmentally friendly practices. These new operations have altered the traditional supply chain that most organizations have grown accustomed to. Methods for determining a successful green supply chain management are new and are not fully developed. However, organizations can effectively and efficiently “green” the supply chain by integrating existing environmental standards and innovation uses of new materials and new manufacturing processes. In this paper, we discuss four important areas – manufacturing, bio-waste, construction, and packaging – of green improvement opportunities.

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GLOBAL ERP PROJECT MANAGEMENT: A CASE STUDY

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ABSTRACT

The velocity of global business change is challenging the management of enterprise resource planning (ERP) systems. The growing speed of business changes mandates that software be managed with flexibility and agility. At the same time, system implementation success depends on an effective project management (PM) process. Notable problems associated with the implementation of an enterprise system include scope creep, poor risk management, inconsistent measurement of project performance over time, and vendor management. These issues together pose threats to the success of a large-scale software project. This research used a case study approach to examine how poor PM can imperil the normal operation of a business.

INTRODUCTION

Adopting Enterprise Resource Planning (ERP) systems has become a global phenomenon. The market for ERP grew at a rate of 14% in 2004 to become a \$23.6 billion market globally (AMR Research, 2005). Despite the popularity of ERP, the failure rate of ERP implementation remains high. As such, in deploying an ERP system, it is critical for executives and managers to fully understand and manage the project management (PM) issues so as to address PM problems, mitigate interruptions to daily operations, and extend the life and benefits of the enormous investments made in such as system (Ng, 2001).

In order to shed lights on PM strategies, challenges and practices in ERP implementation, this research conducts a case study of a multinational company and approaches ERP implementation from a PM perspective. Accordingly, the study is structured as follows. We provide a review of the literature on contemporary PM challenges and best practices to manage large-scaled IT and non-IT projects, but with a focus on enterprise systems or ERP. Nolan's (1973) stage model is used to present the results of the case study of this multinational company during their years of ERP implementation. Successful and failed project lessons are explained within each stage of the stage model. These lessons identify important PM knowledge areas to manage during an ERP system implementation. It is expected that the findings have theoretical and practical implications to both the academic and practitioner.

CONCEPTUAL FOUNDATIONS

Existing literature cites PM as one of the critical factors of ERP implementation and encourages management to undertake good PM practices. However, previous studies do not shed much light on the specific processes of PM needed within the context of ERP. As such, this study seeks to address the gap in the literature by obtaining a deeper understanding of the practices and problems of ERP implementation through a detailed case study of a multinational company.

To provide a richer understanding of ERP implementation, this study adopts three conceptual models used in the literature to triangulate on the results obtained from the case study. First, the widely adopted PM areas of expertise (Project Management Institute, 2000) are used to assess the PM processes used at the organization in both the first and the second implementations. Second, the data collected from the case site is presented using a stage model of organizational computing (Nolan, 1973). Finally, the second phase of the ERP implementation at the case site is further explored using the IT engagement model (Fonstad and Robertson, 2006) which explains the mechanisms contributing to the successful second implementation.

Global PM Challenges

All projects, large and small, IT or non-IT, have limits on three constituents: schedule, quality, and budget. A poor control of any of these three constituents poses threats to the success of a project. Although some may argue that a large budget can meet any challenge, a 2004 Government Accountability Office report on 199 data mining projects shows that the magnitude of those constituents has little to do with the success of a project. Instead, lack of oversight on any of these constituents is the major cause of project failures (Worthen, 2006).

Five important challenges for IT PM in 2006 are global teams, management of large-scale software project, agile development techniques, vendor partners and project portfolios (Brandel, 2006). Each challenge poses varying difficulties to an IT manager. For instance, outsourcing requires global teams. This disruption of internal processes has made 24/7 IT management a scheduling problem. Local nomenclature (e.g., culture and language differences) creates cross-cultural communication problems. High turnover rates of 25-30% annually in the IT field can reduce the effectiveness of knowledge transfers, a human resource management problem. A 2005 survey by the Society of Information Management (SIM) found that “attracting, developing and retaining IT professionals” was ranked as the second highest concern of CIOs (Luftman, Kempaiah and Nash, 2006, p. 81).

A large-scale project managed at different locations, in different time zones, and by different users, creates multifaceted and multilayer managerial difficulty. Multifaceted projects can lead to creeping requirements. Multilayer projects can result in scheduling, budgeting and requirements uncertainty. Decoupling the large-scale software project into flexible and managerial modules can be a challenge, and excellence in scope, time, cost, risk and communication management is essential to cope with this challenge.

Agile development techniques such as rapid application development can induce higher risks and poorer quality than traditional development methods. Consequently, good quality and risk management of products and processes are crucial to the success of agile development methods.

Outsourcing precipitates the need for vendor teams. Outsourcing jobs differ from outsourcing responsibilities. Poor management of outsourcing responsibilities can increase risks and create integration problems. Effective procurement and integration management can help to make sure the outsourcing activity is a success.

In order to optimize the project portfolio, an organization needs to avoid PM problems, such as over commitment of PM resources to projects, establishment of subjective and immeasurable objectives, and misalignment between strategic objectives and project goals. Cost management and integration management are important cornerstone skills in the face of this challenge.

The importance of PM cannot be emphasized enough, particularly in the development of large-scale software projects. The first three PM areas – budget, schedule, and quality – have obvious implications for project success. In examining the case company this study focuses on the six other process-oriented PM knowledge areas: *scope*, *HR*, *risk*, *communications*, *procurement*, and *integration*.

Stage Model of ERP Implementations

In IT projects, design and implementation decisions made at an early stage can have an impact on activities undertaken at a later stage. For instance, a firm's strategic decision on ERP customization or business process adaptation during planning can have a profound impact on the practices used to support the system during subsequent maintenance and support (Davenport, 1998). Therefore, a time-variant view of the ERP project from different stakeholders can help enhance the understanding of the complexity of ERP maintenance and support. Nolan's (1973) stage model of organizational computing evolution has been a useful descriptive model because it 1) identifies distinct and empirically verifiable characteristics of change, and 2) provides a detailed specification of succession whereby one stage moves on to the next (King and Kraemer, 1984).

The stage model contains four stages: initiation, contagion, control, and integration. At the *initiation* stage, champions initiate a technology project with the financial and resource support of sponsors; there is also minimal planning at this stage. At the *contagion* stage, anxieties, problems, and sometimes crises, emerge to slow the progress of the project. Top management is aware of problems and searches for controls, but there is little improvement in planning. At the *control* stage, management now begins to institute controls, and planning becomes a top priority. Also at this stage, IT management's profile is often raised, priority setting becomes mandatory, and operational procedures become standardized. At the *integration* stage, controls are well established with planning and standardized procedures in place, and the adopting organization accepts the technology and assimilates it into the normal operation (King and Kraemer, 1984).

This study combines the PM knowledge areas and the stage model to provide a time and chronological view of the case study in ERP. In particular, the stage model is used to present the results gathered for the first and second ERP implementations at a multinational company (in the Results section). Then the PM knowledge areas are used to analyze and discuss the results (in the Discussion section). See Figure 1.

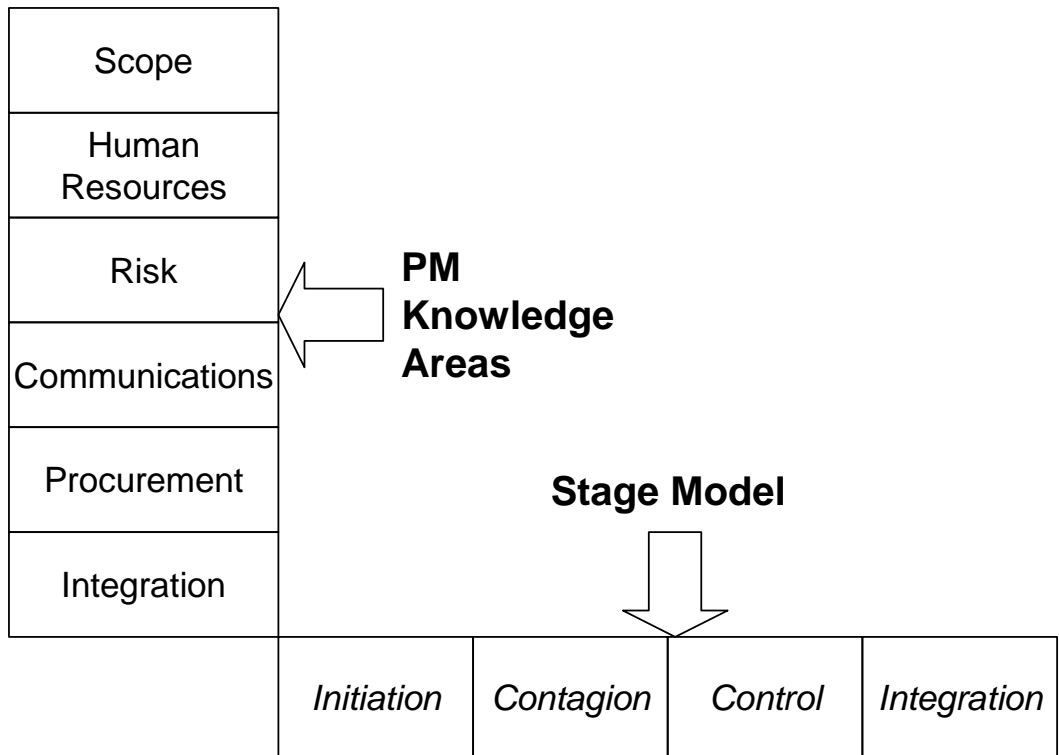


Figure 1. PM Knowledge Areas and Stage Model.

IT Engagement Model

In addition to the conceptual framework shown in Figure 1, this study uses another conceptual model – IT engagement model (Fonstad and Robertson, 2006) –to further explain why the second ERP implementation project was a success. The model emphasizes a system of mechanisms that brings stakeholders together so that they can optimize local and global objectives. The model consists of three components: company-wide IT governance, project management, and link mechanisms. In *IT governance*, top management makes decisions and allocates decision rights to make company-wide IT-related decisions. IT governance is a top-down approach. In *project management*, IT departments typically adopt a bottom-up approach and ensure that projects are coordinated and managed to achieve goals. The *linking mechanisms* refer to processes and decision-making apparatus that connect project activities to overall IT governance (Fonstad and Robertson, 2006).

The term “engagement” in the IT engagement model emphasizes that negotiation, socialization, influence, interaction, and training are required to bring stakeholders together from all parts of the organization. Bringing diverse stakeholders together requires greater than normal coordination and alignment in an organization (Fonstad and Robertson, 2006). Figure 2 shows the IT engagement model.

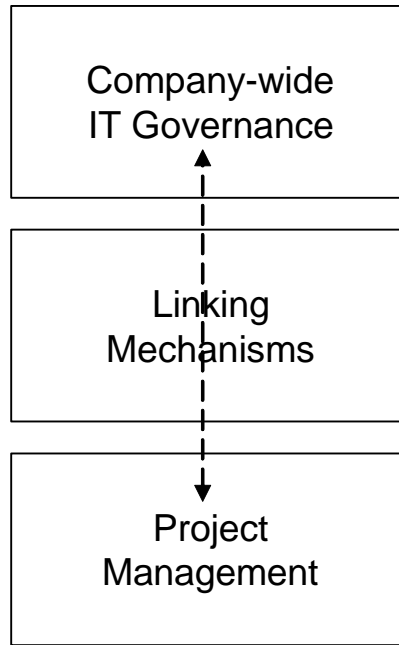


Figure 2. IT Engagement Model adopted from Fonstad and Robertson (2006).

RESEARCH METHODOLOGY

“What” and “how” aspects of ERP project failure are of major concern in this research project. Because PM is inherently process-oriented, it is determined that a case study is an appropriate methodology for investigating the PM process of ERP implementations. Since this research is more interested in the process aspect of ERP implementation, a case study has the potential of providing an in-depth investigation into these issues in a real-life context (Benbasat, Goldstein and Mead, 1987). Additionally, a case method has efficacy in uncovering topics that have yet to be well understood (Yin, 1990).

We used a California-based multinational company as the subject of this study. The company provides a total solution (including controls, instrumentation and software) for the automation needs of industrial and commercial clients. It was established in 1958 and has strategic business units (SBUs) in China, Hong Kong, Macao, Taiwan, Australia, and California. Its corporate headquarters is in California but there is a broad customer base in the Greater China region comprised of China, Hong Kong, Macao, and Taiwan.

We interviewed non-MIS executives and staff to validate information collected from their MIS counterparts. Our ideal candidates were supply chain executives because of their functional span over a wide range of operational responsibilities. All of the chosen participants used the ERP system extensively to assist them in their daily operations. Table 1 lists MIS and non-MIS personnel who participated in this study.

Table 1. List of Participants of this Study

Participant Title	Number of Participants
Director of MIS	1
Director of supply and customer services	1
Business application manager	1
Senior systems analyst	1
Warehouse supervisor	1
Procurement manager	1
Sales and marketing manager	1
Salesperson	1

CASE STUDY RESULTS

The regional headquarters of this multinational company is located in Hong Kong. It operates in the Greater China region and has annual revenue of US \$250 million. Major products sold are industrial and building control systems and spare parts. This company operates through its own sales force, joint ventures, and distributors. We analyzed the evolution of ERP implementations with the emphasis on maintenance and support areas at the international company based on the descriptive stage model (consisting of initiation, contagion, control, and integration stages).

Table 2 summarizes the experience of the first and second implementations of ERP in SBUs located in the U.S., Australia, and the Greater China region.

Table 2. Project Management Improvement

FIRST PHASE OF ERP IMPLEMENTATION	SECOND PHASE OF ERP IMPLEMENTATION
<p>Scope Management</p> <ul style="list-style-type: none"> ● Ill-defined scope planning and definition on the "vanilla" ERP ● Inappropriate allocation of technical & organizational resources ● Did not take into account of local taxation requirements in Taiwan 	<p>Scope Management</p> <ul style="list-style-type: none"> ● Strictly-defined scope management: keep 85% of business process in common ● Form prioritization committee to channel limited technical and organizational resources ● Focus on the deployment of accounting and manufacturing modules ● Drop adding previous bolt-on modules (back-to-back ordering and PM systems) ● Control scope change to meet local taxation requirements in Taiwan ● Systematize and clearly define procedures and criteria for request prioritization
<p>HR Management</p> <ul style="list-style-type: none"> ● Outsource IT human resources to global ERP vendors ● Insufficient internal IT human resource allocation 	<p>HR Management</p> <ul style="list-style-type: none"> ● Outsource IT human resources to global ERP vendors ● Outsource IT human resources to local ERP vendors for customization
<p>Risk Management</p> <ul style="list-style-type: none"> ● Lack of knowledge about the adopted enterprise system 	<p>Risk Management</p> <ul style="list-style-type: none"> ● Work side-by-side with vendors to improve knowledge transfer
<p>Communications Management</p> <ul style="list-style-type: none"> ● Estimate to please ● No user involvement across functions and SBUs 	<p>Communications Management</p> <ul style="list-style-type: none"> ● Involve users and middle managers in the prioritization committee to manage user requests
<p>Procurement Management</p> <ul style="list-style-type: none"> ● First time outsourcing to an ERP vendor ● No experience in partnership relationship management 	<p>Procurement Management</p> <ul style="list-style-type: none"> ● Require vendors to generate monthly and quarterly performance analysis reports for review by users of all functional areas ● MIS department takes on proactive roles in discovering, analyzing and managing issues resulting from ERP implementation
<p>Integration Management</p> <ul style="list-style-type: none"> ● No alignment between business strategy and ERP-enabled IT strategy 	<p>Integration Management</p> <ul style="list-style-type: none"> ● Alignment between business strategy and ERP-enabled IT strategy ● Redesign business process to "best practices" embedded in ERP system ● Minimize customization

First Phase Problems

Major problems in the first phase of ERP implementation were scattered in all six of the previously described PM areas: scope, HR, risk, communications, procurement and integration management. In the first phase, project scope was loosely defined and open for interpretations. The ill-defined “vanilla” ERP did not prevent project scope creep from occurring. Although the management felt an urgent need to replace the legacy system with an ERP system, they did not discuss with the users which modules to deploy first. To please the management, the MIS department chose back-to-back ordering and PM systems. However, they did not thoroughly analyze whether these two systems aligned with the strategic intent of the business to enhance operational visibility. Misalignment can lead to ERP implementation problems with respect to scope creep and ill-defined interfaces (Robey et al., 2006). Poor scope management also resulted in the inappropriate allocation of limited MIS resources since no mechanism existed to manage user requests based on legitimate urgency. The SBU in Taiwan had unique requirements in the taxation module, but the U.S. headquarter of this multinational corporation did not seriously consider those requirements. This resulted in the underestimation of corresponding structural changes to database schema. In addition, the management did not increase the pool of human resource talent or retrain users with skills to cope with the challenges of ERP systems implementation. Lack of in-house skills and knowledge to implement an ERP system created chaos in the face of technical troubles. At the same time, the company attempted to run the existing legacy systems while implementing an unfamiliar ERP system. Achieving functional interoperability was a challenge for this company because of the lack of knowledge and skills in ERP implementation, and the MIS department did not formulate a risk response plan to resolve unanticipated operational risks.

Implementation of ERP modules was the first outsourcing experience for this corporation. No evaluation criteria, such as weighting systems and independent estimates, were in place to screen business proposals of potential vendors. Rather, the top management selected a vendor based on its own preference and later informed the MIS department of the decision. Since no users were involved throughout the vendor selection and ERP implementation process, failure was predictable. The success of ERP implementation projects heavily depends on the “‘arduousness of the consultant-client relationship’ and the degree of ‘shared understanding’ – the similarity in work values, norms, and problem-solving approaches between consultant and client team members” (King, 2005, p. 83). These two important factors were clearly missing in the first phase of ERP implementation. Because of these problems, the ERP implementation was delayed until corrective actions could be made.

PM-Enabled Improvements in the Second Phase of ERP Implementation

The management restructured the MIS department by hiring an outside director and support team with previous ERP experiences. This action improved the long lasting problem the company had with the shortage of IS professionals.

To ensure system success, an engagement mechanism needs to be in place to involve stakeholders via three components: (1) company-wide governance, (2) project management, and (3) linking mechanisms (Fonstad and Robertson, 2006).

In terms of *governance*, the management formed a prioritization committee made of stakeholders across functions and SBUs. This committee acted as a company-wide governance body to minimize the problem of scope creep. A policy was developed to require the committee to

evaluate user requests based on their urgency and impact on the business. The goal of this committee was to ensure that the success of ERP implementation would help achieve three strategic goals: (1) aligning the ERP system with business strategy, (2) streamlining business processes and (3) minimizing the extent of customization to the native system. Back-to-back ordering and PM systems were replaced with accounting and manufacturing bolt-on modules in order to achieve the first two strategic goals. To achieve the third goal, 85% of business process and system functionalities were deliberately retained to ensure the accomplishment of a strictly “vanilla” ERP system. All these measures helped establish the decision authorities and accountabilities at all levels of the corporation.

As for the mechanism of *project management*, the scope planning and defining process was more clearly defined. This helped to manage user requests in a more systematic manner. For instance, the prioritization committee approved the mandatory change request to customize the ERP module for the taxation needs of SBU in Taiwan, but met the condition of not changing more than 85% of native system functionalities. The MIS department improved the consultant-client relationship and shared understanding by working with local vendors to customize system modules. Local vendors were chosen based on their records of accomplishment of adding the taxation module to enterprise systems. In-house employees worked side-by-side with the vendors to acquire knowledge and skills in implementing the ERP system. The on-the job training and user involvement prepared in-house employees to overcome technical problems (e.g., data incompatibility and system incompatibility) and social problems (e.g., resistance to adoption) that had emerged before.

In terms of *linking*, the MIS department proactively managed the partnership by requiring that vendors generate monthly and quarterly performance reports. Users and managers further reviewed these reports, after which the MIS department proposed solutions to resolve issues derived from these reports. In addition, the prioritization committee served as a linking mechanism to connect project-level activities to overall IT governance.

Nolan’s stage model and Fonstad and Robertson’s engagement model provide a perspective on observations of two ERP implementation instances in the same organization. Mistakes made by this company in the first phase were corrected. In the second phase, the same company primarily addressed the mistakes in at least six areas of PM: scope, HR, risk, communications, procurement, and integration management.

PRACTICAL IMPLICATIONS

Stakeholders at the project, business unit and corporate levels often are vested with divergent interests. An enterprise system can affect these users in different ways and create conflicts among these stakeholders. It is critical to manage these impacts and conflicts by incorporating PM practices into the implementation process. The presence of conflict and resentment in the first phase of the case created symptoms such as hostility, jealousy (Smith and McKeen, 1992), poor communication (Franz and Robey, 1984), frustration and low morale (Barki and Hartwick, 2001). The lack of an open forum to involve users in the system implementation process can create paralyses in effective communication, goals alignment, trust, and poor system design between management and information systems (Smith and McKeen, 1992). These issues are closely related to *communications* management. Managing the conflict between business and IS throughout a system development cycle is imperative to the successful delivery of an IS project (Robey et al., 1989). User participation has been an effective mechanism to lessen conflict (Barki and Hartwick, 1989), thereby improving the system development outcomes (Robey et al., 1993).

Many authors caution that customization would likely increase the cost and risks of ERP implementation and the difficulty for upgrades and migration to future releases (Davenport, 1998). Indeed, unchecked customization contributed to the failure of the first phase of the ERP implementation in this study. However, some customization will always be necessary to meet specific business requirements (Themistocleous et al., 2001), especially in a multinational corporation with different regional requirements as this case has shown. A prioritization committee is a successful *scope* management vehicle because it lowers the user resistance by involving users across functions and SBUs. Companies can avoid conflicts of interest by improving the degree of transparency in the decision-making process.

External (e.g., new business models and entrants) and internal (e.g., project size, duration, structure, complexity, and outsourcing) environmental changes can add uncertainties to the requirements of an enterprise system. The uncertainties are unanticipated *risks* that need to be measured and assessed qualitatively and quantitatively. To capitalize on business opportunities, changing system requirements is a viable option from a managerial perspective, but changing system requirements represents a great economic cost to any company that trades system functionalities for business agility. The implicit nature of disagreement and interference causes management and IS professionals to unknowingly enter a competing mode. This situation can spur a sense of obligation for the MIS department or an outsourcer to change system requirements to meet business needs. This agreement to make changes reinforces an unspoken commitment to adopt the “change” option, even though other alternatives (e.g., maintenance, off-the-shelf package, or no change) are also feasible. Creeping requirements often seem especially binding because of these reinforcing forces. Any changes made to honor creeping requirements will be interpreted as a reinforcement of an earlier promise or commitment – whether that is the intention of the MIS department or not. As a result, MIS is kept from committing their limited resources to what matters most to enterprise projects, such as reliability, functionality and training. The chain effect of disagreement and interference during the system requirements acquisition has engendered many devastating effects on project outcomes. This case study affirms the importance of scope management vehicle in the development of an enterprise system. Scope creep problems are prevalent in ERP implementations. Scope planning and definition skills can minimize scope creep problems and channel limited resource to key issues.

Most in-house employees have a lower level of readiness than vendors in implementing an enterprise system do. The high turnover rate of IT professionals aggravates the problem of the shortage of critical skills and knowledge in most companies. However, these *human resource* issues should not be an inhibitor of a successful implementation of an enterprise system. Rather, a company needs to pair in-house employees with vendors based on similarity in work values, norms and problem-solving approaches. The cultural fit between clients and vendors are indispensable for the long-term success of ERP projects (Ranch, 2006). A well-managed partnership can incrementally transfer vendor’s knowledge and skills to in-house employees. The ideal is to support the ERP implementation with a knowledge management mindset that can facilitate the knowledge generation, transfer and absorption process between internal and external stakeholders. In-house employees can solve problems more efficiently and effectively after acquiring system-related skills and knowledge. The complementary support of a KM system can further the success rate of ERP implementation (Li, Liao and Lei., 2006).

In *procurement* management, managing partners should be the responsibility of the adopting company, not the vendor. The adopting company needs to keep track of the progress of the vendor-client relationship and take corrective actions if necessary. In addition, *integration* management skills are the glue that directs all stakeholders at the project-, business unit- and corporate-levels toward the same direction. Staying focused in the same direction can not only

lower the extent of impacts on these stakeholders, but also create concerted efforts in accomplishing business goals.

CONCLUSION

ERP is one of many information systems solutions an international company can use to stay competitive in the face of volatile global business dynamics. However, the implementations of a global ERP project pose many PM challenges, including but not limited to, management of a virtual team, scope management, international vendor management, risk management, cross-cultural communications, and integration management. The inclusion of PM skills to manage these challenges can greatly improve the likelihood of ERP implementation success. This case study affirms this proposition by presenting evidence for progress from the first phase to the second phase where the company leveraged PM skills. This process-based view of ERP implementations shows that the inclusion of PM skills enabled this multinational distributor to transform a failed ERP implementation into a successful one.

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ORGANIZATIONAL EXCELLENCE: EXAMPLES IN THE CAROLINAS

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ABSTRACT

Organizational excellence has been a corporate level performance metric dating back to the book by Tom Peters in the 1980s. Organizational excellence continues to be a main focus of the Baldrige Award and other similar state-based awards such as the South Carolina Governor's Quality Award, the Oglethorpe Award in Georgia, and the Quality Forum Award in North Carolina. This paper will highlight several companies located in the Carolinas that are recognized for organizational excellence in one of several organizational areas.

INTRODUCTION

The concept of organizational excellence will be described in the context of the state awards along with a brief comparison with major national and international awards. Excellence within the Carolinas will be described in terms of specific organizational functions and accomplishments that warrant recognition for Organizational Excellence.

We start with the Baldrige Award criteria. Organizations are judged in seven different categories: 1). Leadership, 2). Strategic Planning, 3). Customer and Market Focus, 4). Measurement, Analysis and Knowledge Management, 5). Workforce Focus, 6). Process Management and 7). Results. The Baldrige Criteria are designed around a distinct set of Core Values and Concepts:

- _ visionary leadership
- _ customer-driven excellence
- _ organizational and personal learning
- _ valuing employees and partners
- _ agility
- _ focus on the future
- _ managing for innovation
- _ management by fact
- _ social responsibility
- _ focus on results and creating value
- _ systems perspective" [1]

Many of the state awards are based on the same criteria as the Baldrige Award. The North Carolina Excellence Award and South Carolina Governor's Quality Award are among the state awards that do follow the Baldrige criteria. In South Carolina, the Governor's Quality Award "recognizes organizations who achieve excellent performance in developing, implementing and deploying a quality management system based on the Baldrige Criteria" [7].

The Shingo Prize which is an award that recognizes manufacturing excellence. There is a North American Shingo Prize and then many states also offer the prize. Utah State University manages the North American Shingo Prize process. As one state example the North Carolina Shingo Prize is awarded to companies, divisions and plants operating in North Carolina that exhibit "excellence in manufacturing practices" [4]. South Carolina recently added their name to the list of just fourteen other states offering the Shingo Prize at the state level. The first applications

were solicited in July through August of 2006. The first recipients are yet to be named for the state award but Timken Corporation in Gaffney and Bridgestone-Firestone in Aiken are previous North American Shingo Prize winners [8].

The following sections highlight some of the achievements of those companies pursuing excellence in the Carolinas.

Profiles of North Carolina Companies

Eaton Electrical is a past winner of the North Carolina Shingo Gold Level Award Prize. Eaton was the only company to receive this recognition in 2005. According to John Schmitzer, North American Shingo Prize Examiner and the Director of the North Carolina Shingo Prize, “The Asheville Eaton plant has embraced lean manufacturing practices for many years, and we were impressed with their facility. ... It is clean, organized, and easy to navigate. Their employees are empowered and motivated, they have very little inventory, and their work is done in cells, which reduces waste and improves productivity. They has also taken lean into the office, a much more difficult process, and they are having good success with this, too” [6]. Eaton Electrical worked with the N.C. State University Industrial Extension Service, the University of Tennessee and a consultant to facilitate their lean, world-class journey [6].

We also suggest that we should look for excellence among companies that have not won an official recognition and perhaps they simply haven’t applied for that recognition. We think that anecdotal evidence supports this suggestion and we offer a few examples.

Caterpillar, Inc. in Sanford, NC is one example that we offer. This Caterpillar location is solely responsible for producing CAT’s skid steer loaders. In 2003 through 2004 this facility launched new product model series and to support this effort, new initiatives were implemented by their Logistics Planning Department. In particular improvements were made to shipping information, the parts information management received significant attention and improved processes were implemented [3].

We offer three other NC candidates with very brief highlights for those locations. These are further anecdotal examples:

Caterpillar, Clayton, NC

- The Caterpillar Product System (CPS) is the adaptation of the Toyota Production System (TPS).
- Implementation of new manufacturing cell arrangement.
- Further application of Lean Manufacturing.

Moen Corporation, Distribution Center, Kinston, NC

- Safety program and safety record.
- Growth through added technology.
- Outstanding growth in distribution volume processed.

BSH Home Appliances Corp., New Bern, NC

- Quality standards.
- Demanding customer expectations.
- Highly competitive market.

Profiles of South Carolina Companies

For 2006, the South Carolina Governor's Quality Award had two winners. Roche Carolina, Inc. was the Gold Achiever and Bon Secours St. Francis Health System won as a Silver Achiever. Other winners over the past eight years are included in the following Table:

Table 1. South Carolina Governor's Quality Award

Year	Winner
2004	Wackenhut Services, Inc. – Savannah River Site
2003	Robert Bosch Corporation Standard Corporation
2002	Bridgestone/Firestone South Carolina of Aiken
2001	Dana-Wix Filtration Products of Dillon
2000	McLeod Regional Medical Center of the Pee Dee, Inc.
1999	Allied Signal Greer Repair and Overhaul

[9]

Again we offer one anecdotal example with a very unique set of operating circumstances. Caterpillar, Inc. operating in Sumter, South Carolina. “The state of South Carolina now includes Caterpillar’s Sumter, SC factory in its’ Environmental Excellence Program. The program recognizes companies committed to preserving and protecting South Carolina’s environment. Caterpillar’s plant also won the company’s own highest environmental excellence award, the ‘Platinum’, which recognizes extraordinary efforts to recycle all manufacturing by-products generated.

These tremendous accomplishments were achieved by a motivated team of Caterpillar people who built a factory that reuses and recycles virtually everything in the facility. Caterpillar’s vision for this new facility was to recycle all manufacturing by-products in a responsible manner that preserves and protects the environment. The plant succeeded, it eliminated the need to landfill 350 tons of material and recycles all of its’ solid manufacturing by-products” [2]. This is certainly an example of excellence in an area that is not often recognized.

CONCLUSION

The Shingo Prize, the Baldrige Award and the state versions of those awards are useful for identifying organizational excellence. In this paper we have used those awards to learn a little more about excellence in those organizations.

We also suggest that excellence exists in many forms and we have offered some anecdotal examples of companies that we feel exhibit the characteristics of organizational excellence despite the lack of any official recognition from the major awards. We would also suggest that further work should look to find additional examples of excellence in a similar manner.

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ETHICS, EXPECTATIONS AND GENERATION Y: A PROPOSAL TO EXAMINE WILLINGNESS TO FABRICATE ON RESUMES

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ABSTRACT

Our target population of interest is the Generation Y students in a school of business in the southeastern United States. This group is slightly larger than the BabyBoomer group that is nearing retirement, and it has been widely studied over the last few years. This proposed research will contribute to the extant literature by looking at African-American Generation Yers at a Historically Black College or University (HBCUs) within the “Bible Belt” of the southeastern United States. Do these students who chose an HBCU, in part because of the strong underlying religious cultural values and are exposed to ethics training through their course work have the same attitude toward job search “mis-information” as current professionals and other Generation Yers? Does their level of self-monitoring impact the likelihood that they will embellish on their resumes or other aspects of their job search?

INTRODUCTION

In 1979, the Association to Advance College Schools of Business/International Association for Management Education (AACSB-IME) made ethics instruction mandatory for all students in business education programs. Since that time, AACSB-IME has encouraged that all schools of business provide even more attention to the breadth and depth of the ethical education and training to which their students are exposed. This organization encourages member schools to ramp up their commitment to and focus on ethics awareness and development (2004).

Part of this renewed fervor and attention is because this is “the right thing to do”; part is because of the well-publicized scandals in the popular press and literature around scandals and malfeasance in large and small corporations. These scandals range from deliberate mis-reporting of financial data (number of companies are having to “re-state” their data); corporate spying on executives and members of Boards of Directors (e.g., Hewlett-Packard); insider trading (e.g., Martha Stewart) and other unethical practices (e.g., Enron); sexual misconduct (e.g., U.S. Congressman, church leaders of major church associations); accounting sleight of hand (e.g., Dr. McGuire, CEO of United Health Group backdating stock option); accepting bribes and racketeering (New Haven, CT Mayor Joseph P. Ganim). The former CEO of Tyco International, Dennis Kozlowski was accused of tax evasion and personal use of corporate funds (Daft, 2005).

Punishment of these corporate misdeeds have not always resulted in jail terms, loss of income, etc., for the individuals involved, but they have led to some level of devastation to the company and its

shareholders. In some instances, criminal legal action has been pursued (e.g., Enron); in others, restitution has been required (Dr. McGuire), while further legal action may be pursued. The scandals at Enron and other businesses have created the consequence of more and more governmental oversight (e.g., Sarbanes-Oxley and additional proposed legislation) to legislate ethical behavior in the workplace. The U.S. Founding Fathers could hardly have envisioned that the “pursuit of happiness” meant for those in corporate (and other) leadership roles, a virtual cessation of moral values and ethical conduct.

As a result of these reported scandals and questionable business practices, business students may have a distorted view of the reward/ethics balance. Business students may be experiencing cognitive dissonance. That is, they are being taught what is “right, fair and honest” in ethics courses and ethics modules embedded in other business courses but observe unethical behaviors and the rewards or lack of punishment associated with said behavior. As a result, it is likely that they will see a greater reward for unethical behavior than for ethical behavior. If the punishment for unethical behavior is less than the perceived reward, students may be influenced to make choices that violate the ethical standards and principles that are being taught.

The “hand slaps” given to individuals who have been caught with their hands in the proverbial cookie jar may not be sufficient deterrent for this behavior. While several high-profile individuals have received somewhat harsher punishments, they do not equate with what similar behavior might be among the rank and file. For example, an individual embezzling millions from a corporation might receive a short jail sentence at a “country club” jail, while an individual robbing a 7-Eleven of \$100 might receive 3-5 years in prison.

Additionally, recent anecdotal evidence suggests that there is a high level of cheating in the classroom, even at the “better institutions” of higher learning. A recent article in the Raleigh, NC, News and Observer stated that reported cheating was on the rise at Duke University. In a USA Today survey, 82% of CEOs said that they lied about their golf scores. While this may seem insignificant, it does suggest that there is a slippery slope when it comes to honesty – little acts of dishonesty may push the envelope and blur the boundaries. Individuals may then engage in more significant acts of dishonesty.

RELEVANT LITERATURE

The literature on ethical behavior and the formulation of ethical values is rich, varied, and exhaustive. The purpose of this brief literature review is to identify the framework in which the reported study was conducted.

Ethics can be defined as the underlying value systems of individuals, groups and organizations. These value systems, whether or not articulated, but certainly as operationalized, have a significant impact on society. The individual’s level of moral development impacts his capacity to make moral choices.

It may be argued that what individuals observe and see rewarded has more of an impact on what is perceived as the lower echelons of society, since these individuals occupy the lowest positions of power and have fewer options available. For example, recent statistics indicate a disparate application of law and harsher sentencing for the same crime when comparing African-Americans and Latinos with Caucasians (with socioeconomic level held constant). Additionally, the latest information from the Department of Labor indicates that the wage/salary levels for women and racioethnic minorities, while improving, still lag behind their Caucasian (male) counterparts even when the same human capital investment is made (Calasanti & Smith, 1998, 2002).

The mentoring literature provides many examples of differential impact of mentoring by race and gender (Smith & Calasanti, 2005; Smith, Smith, & Markham, 2000). Livers and Caver (2003) discussed the impact of race and gender on the career and psychosocial success of managers and reported the miasma

that African-American managers experience in the U.S. workplace. Racioethnic minorities tend to have a lower return on their investment in their own futures than the corresponding investment among their Caucasian counterparts (Smith & Calasanti, 2005).

These phenomena create an interesting environment in which individuals' ethical values are further formulated and shaped. Kohlberg (1984, 1987) suggested that moral reasoning (defined by Kail & Cavanaugh (2000:346) as "the rules of ethical conduct that people bring to bear on a problem to justify their solution to the problem") develops over an individual's lifetime in a universal, invariant sequence of six stages. Criticism to his research counters that Kohlberg's theory is most applicable to Western-like civilizations but has less applicability to the moral reasoning in other cultures (Snarey, 1985; Lei, 1994). Gilligan (1982) presented an alternative conceptualization of the developmental progression by including the variable "care and responsibility in interpersonal relationships", particularly with women. Over the course of a lifetime, individuals progress in their growth in understanding of caring and responsibility.

In a study by Tsui (1996), an examination was made between ethical reasoning and ethical behavior of 50 Hong Kong and United States auditors who were either partners or managers. These auditors were placed in an audit conflict situation/dilemma. Their results reflected that the higher the level of the individual's ethical reasoning, the more likely they were to engage in independent behavior. The auditors with high levels of ethical reasoning were less likely to give into a client's request to "modify" the audit.

Another study with accounting-related samples was conducted by Allen and Ng (2001), where they examined the relationship between 123 AICPA members' ethical position and the Federal Trade Commission's (FTC) reversal of the bans imposed on commission, referral and contingent fees. CPAs' ethical positions were not related to the reversal of the bans; however, when the relationship between the CPAs professional level and their affect toward the bans, they found that CPAs at higher levels were more opposed to the bans. Allen and Ng concluded that the CPA partner-level professionals favored the ban removal, which would then lead to an increase in their personal income levels.

Mangan (2006) found that 81% of MBA students surveyed believe that businesses have an obligation to improve society; and 78% of them want the concept of "social responsibility" integrated throughout their business courses. Mangan further reported that while 89% of the MBA students believed that social and environmental effects should be factored into corporate business decisions and 60% of them felt that this would be a profitable approach, only 18% of them felt that businesses were currently working to better society.

In a study conducted by Mujtaba & Sims (2006), informal social processes to shape ethical attitudes of full-time employees were less effective than those of their managers who were socialized using a formal approach. Additionally, Mujtaba & Sims reported that employees were not as bothered by unethical behavior as their managers were.

There is some evidence to suggest that women and racioethnic minorities experience the workplace differently than their Caucasian male counterparts; that ethical values are formed through our family of origin, religion, life's experiences, education, and training; and that there may be differences based on race and gender. Our contribution to the literature is through our examination of the self-reported ethics of individuals in Generation Y. This generation has been widely analyzed and studied. Again, we provide a brief sketch of our target population and will describe several propositions that we will make concerning them.

FABRICATION ON RESUMES

People lie on their resumes for various reasons – some want to portray themselves in the best possible light; others see it as a competitive advantage; still others think it's a little “white” lie, and no real harm is done. Others utilize career counseling and resume writing assistance, often crossing the line from honest self promotion into misrepresentation, exaggeration, and even outright lying about their backgrounds and what they have accomplished (Brown 2004; Sabatini, 2006).

There are a number of high-profile stories of individuals lying or providing mis-information about their backgrounds. These examples include David Edmondson, CEO of RadioShack who claimed to have two college degrees, when in fact he had none (Sabatini, 2006); Ronald Zarrella, CEO of Bausch & Lomb and Ken Lonchar, CFO at Vertitas Software (now Symantec), who lied about having MBAs; David Swanson, CEO of R.H. Donnelley Corporation and telephone-directory publisher in Cary, NC, was found to have misleading news releases stating that he had a college degree, which he did not (Wall Street Journal, September 12, 2006). Some of the individuals were fired or resigned; others kept their jobs but had tarnished reputations.

A recent on-line study by the Society for Human Resource Management (SHRM) that was reported by the New York Times found that 44% of the 2.6 million respondents said they had mis-stated their work experience (Vinocur, 2006). In their 1998 survey, SHRM found that 90% of respondents said that they found fabricated references during reference checks (Haskell, 2006). In addition, more than 50% of the applicants checked either regularly or sometimes lied about length of employment (53%) and past salaries (51%). Others lied about criminal records (45%), former employers (44%), former titles (44%), their driving record (33%), academic degrees (30%), credit history (25%), schools attended (22%), and social security number (14%). The 2003 findings by the Risk Advisory Group showed that 65% of curriculum vitae submitted by job applicants contained lies, which was a rise of 16% over those reported in 2002 (Hartley, 2004).

In response to this known embellishment, a new industry has been spawned. According to SHRM, third-party screeners have expanded rapidly over the past ten years (Cullen, 2006). InfoLink Screening Services, a background-checking company, estimates that 14% of job applicants lie about their educational background, and ResumeDoctor.com, a resume-writing business found 43% of resumes it screened over a six-month period had one or more “significant inaccuracies” (Cullen, 2006).

It is in this corporate environment that students trained in schools of business aspire to work. Our target population of interest is the Generation Y students in a school of business in the southeastern United States. This group is slightly larger than the BabyBoomer group that is nearing retirement, and it has been widely studied over the last few years. This reported research will contribute to the extant literature by looking at African-American Generation Yers at a Historically Black College or University (HBCUs) within the “Bible Belt” of the southeastern United States. Do these students who chose an HBCU, in part because of the strong underlying religious cultural values and are exposed to ethics training through their course work have the same attitude toward job search mis-information as current professionals and other Generation Yers?

Another possible variable that may impact an individual's propensity to embellish their qualifications during the job search may be their level of self-monitoring. A review of the extant literature by Gangestad & Snyder (2000) indicates that “high self-monitors may be highly responsive to social and interpersonal cues of situationally appropriate performances,” whereas “for those low self-monitors, expressive behaviors are not controlled by deliberate attempts to appear situationally appropriate; instead, their expressive behavior functionally reflects their own inner attitudes, emotions and dispositions.”

Freeman (2006) suggests that high self-monitors pick up cues from their external environment and reframe their behavior to impress other people. On the other hand, low self-monitors who do not change their behavior either resist or are unable to do so (Day, Schleicher, Unkless & Hiller, 2002; Gangestad & Snyder, 2000; Turnley & Bolino, 2001).

Further, in their study of employed Executive MBA students, Barrick, Parks & Mount (2005) found a relationship between self-monitoring and the Big Five personality traits. When self-monitoring was high, the relationships between Extroversion, Emotional Stability, and Openness to Experience and supervisory ratings of interpersonal performance were attenuated (Freeman, 2006).

In addition, Flynn, Chatman, and Spatero (2001) found that the more demographically different people were from their coworkers (e.g., citizenship, race, etc.), the more negatively they were perceived than individuals who were more similar to their co-workers. However, the impressions were more favorable when the individuals were either high self-monitors or more extroverted (Flynn, Chatman & Spatero, 2001). Finally, Kilduff and Day (1994) tracked MBA graduates over a five year period and found that high self-monitors were better able to adapt to circumstances and opportunities, thus resulting in more successful managerial career strategies than low self-monitors. One would then argue that because the high self-monitors are more aware of acceptable and unacceptable behavior within the environment, they will present their positive traits and minimize their shortcomings and reduce the need for embellishment.

Generation Y Characteristics

Generation Y consists of individuals who were born between 1979-1999 and would currently be teenagers and in their 20s (en.Wikipedia.org, 2006). In general, Generation Yers expect the following benefits as part of their employment: Group medical insurance, paid vacation, 401(k) retirement plan, personal/sick time, flexible work schedules and awards. In addition, the values that their potential employer/company should have are social responsibility, loyalty to the individual employee, and integrity (Armour, 2006; Dougherty, Harder, Hill, Kirk & Miller, 2006).

Generation Yers need public praise and to be constantly rewarded. They are accustomed to constant feedback and compliments. They expect promotions frequently or sooner and want to be at the top of the chain of command right away. This group prefers to work in teams whenever possible, is tolerant towards diversity, and is comfortable working with innovative technology. They are open to the use of mentors and have high expectations of themselves/higher value of self fulfillment. On average, members of this group need customized career paths, are multi-taskers, and look for ongoing training. In addition, they want jobs with telecommuting options and to have the ability to work part-time. Members of Generation Y are also future-oriented regarding employment and avoid, if possible, working overtime (www.vlerick.be, 2006).

Method

Sample

Undergraduate students in the School of Business of a Master-Level I HBCU in the southeastern United States. Approximately 90% of the students are African-American.

Research Measures and Methods

In response to a request by the local human resource management association, a survey was completed on 300 undergraduates who were matriculating at three local universities, two of which were HBCUs with African-American populations of 80% and 94%; the third university was a majority institution where 14% of its students were African-American, and 25% were international students. The association wanted a quick look at areas where students would fabricate data, in rank order. The survey was completed over a 5-year period with a convenience sample. During the intervening period, the devastations of 9-11 and Hurricane Katrina occurred, significantly impacting both the economy and the student population.

The preliminary study examined student attitudes toward being less than truthful in their job search. We asked students from three different universities to identify what, if anything, they would lie about as they pursue professional career opportunities. In particular, they were asked to rank several items in order in which they would be most likely to embellish the truth.

Three hundred and one subjects participated in the study. The subjects were almost all undergraduates from three universities in the southeast. Only five graduate students participated. Forty-four percent were men and 56% were women. A total of 205 subjects completed usable questionnaires, resulting in a response rate of 68.1%. However, nearly half of the subjects did not rank the items or ranked only a few of those items, leaving the remainder blank.

There were problems inherent with the rankings because it provided ordinal data which does not provide the most meaningful statistical analysis. In addition, there was no scale given on the questionnaire on how to rank these items. It was also not clear whether the subjects were willing to fabricate or whether they were unwilling to provide the information. The "0's" currently in the database may or may not have indicated a willingness (or lack thereof) to be creative.

Data entry was also a problem, as there was a lot of missing data even in the demographic data, and some of the observation entries appear to be in inappropriate columns. The integrity of the data entered needed to be (and was) rechecked for accuracy. There was also the opportunity for individuals to provide qualitative data, but because of the mis-entry of data, it was difficult to attribute the qualitative comments to the appropriate individual or to then analyze the data.

With those lessons learned and our unwillingness to further the chaos by massaging the data or interpreting information for which the support is suspect or lacking, we have chosen to re-start this research and develop the following propositions:

Future Research Questions/Propositions:

Question 1: To what extent, if any, do the members of Generation Y engage in job search strategies that include fabrication of information?

Proposition 1: Members of Generation Y will report significantly high levels of job search fabrications.

Proposition 2: There will be differences between the reported levels of fabrication by Generation Yers and those of other generations.

Question 2: If there is fabrication, what factors impact their willingness to fabricate information?

Proposition 1: There will be differences, by race and gender, in the numbers of areas in which individuals are willing to fabricate.

Proposition 2: Women will fabricate less than men.

Proposition 3: There will be differences, by race and gender, in the incidence of the top 5 areas in which individuals are willing to fabricate.

Proposition 4: Individuals who are high on self-monitoring will engage in lower levels of job search “mis-information” than individuals who are low on self monitoring.

Proposition 5: The report of significantly high levels of fabrication behavior by members of Generation Y will vary by race and gender.

Proposed Sample and Measure

An on-line survey will be created and distributed via e-mail to the entire School of Business undergraduate student population. We will use a Likert scale, with ratings 1 to 5: “For each of the items below, use the following scale to indicate the possibility or likelihood that you would exaggerate or “be creative” on your resume, where 1 = not at all likely, 2 = slightly likely, 3 = somewhat likely, 4 = very likely, and 5 = highly likely.”

The variables of interest are: self-monitoring, GPA, work experience, extracurricular activities, organizational activities, awards and honors, references, career objective, length of employment, former titles, criminal record, academic degrees, past salaries, driving record, credit history, reasons for leaving prior job, results/accomplishments, and age.

With modifications made to this study as a result of the pilot study, we believe that we will be able to provide further insight into the characteristics of Generation Yers, as well as to contribute to the literature on career search from an applicants’ perspective and the self-monitoring literature.

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FOOD: COMMUNICATION OF CULTURE

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FOOD: COMMUNICATION OF CULTURE

ABSTRACT

Much of the study of food and man depends upon the approach. The story or narrative of human history and the lists of food preference for each culture begins to describe how communication, culture, and food can be blended together to satisfy curiosity about what people ate, what they felt about food, how they communicated celebration, and how it varied from century to century, country to country and finally region to region. This essay will be separated into two parts. The first part will provide a chronological history of what people ate and the second part will encompass how social habits and culture have been formed around food, and finally why this is a good starting point for the investigation of how cultures have changed according to food supply.

Keywords: food service, Peking man, farming revolution, belief system, co-culture

Introduction

Even the briefest look at a collection of medieval recipes will reveal the ingenuity and creative skills of medieval chefs. But then, perhaps this should come as no surprise. In the changing history of the world, the need for food, and for certain observances tied to its consumption, has been one of the most constant, elements in human life. As moral attitudes have altered, whole structures of religious, economic, social, and sexual behavior have changed with them. Food, like sleep, has remained a basic, daily human requirement: more necessary in most climates and in history than clothing and shelter. In fact in many periods food has been more important than family life, religion, love, or sex. From Homeric times onwards, most social gatherings of any importance have revolved around the dispensation of food and its often-required accompaniment or substitute, alcoholic drink. Most religions include or have included some form of ritual sacrament or sacrifice involving food, many of these meant as a direct thanksgiving for present supplies and a propitiation of the natural and unnatural forces controlling the supplies for the future (Brash 1995). The deprivation of food, by means of famine, war poverty, or neglect, is as terrible an experience today in Africa and other, disturbed parts of the world as it was for the tribesman of Palestine and Egypt in the last chapters of the book of Genesis, or for the poor in rural England and Ireland at the time of the corn shortage and potato blight of the 1840's.

The representation of food in graphic art for instance, in medieval depictions of cooking and eating in rustic feasts, can convey something of satisfying nature of life in which good, simple food is in regular supply. The emotional and social romances

connected with food which we find in novels, poetry, and drama, biography and autobiography, and diaries and letters, are more various and complicated than those found in graphic art, if in general more casually incidental to the main subject matter. Pushkin, in Eugene Onegin, proudly drew attention to his habit of writing about banquets and exciting things to eat, and compared himself as he did so with “godlike Homer”. Some novelists, playwrights, and poets have managed to avoid any mention of cooking and eating, or describing meals have barely indicated the presence of food on the table. It is in Shakespeare’s comedies and history plays, not in his great tragedies, that we find most copious references to food. Tolstoy, on the other hand, filled his greatest novel, Anna Karenina with references to food, and conveyed the character of its hero, Levin, partly by describing his simple eating-habits in comparison with those members of the Russian landowning gentry, and bringing into narrative from time to time the kind of wholesome foods which Levin most enjoyed when at home in the country (Kagen 1987).

Understanding the humanities through food, or satisfying curiosity about individual’s eating-habits is an activity that few rhetorical scholars undertake. If, however, we associate food with communication generosity, persuasion, social movements, and the basic texture of life itself, it becomes a matter of more than disciplinary interest. Much of the study of food and man depends upon the approach. The story or narrative of human history and the lists of food preference for each culture begins to describe how rhetoric, food, and the humanities can be blended together to satisfy curiosity about what people ate, what they felt about food, how they communicated celebration, and how it varied from century to century, country to country and finally region to region.

Chronological History of Humanities and Food

Why study the history of food? A number of reasons come to mind. Food is the most basic of human needs, and obtaining enough of it has been the most persuasive human activity since the beginning of humanity. No history that claims to recapture the lives of the mass populations of mankind can ignore it. Moreover, the need for adequate nutrition in our own time and in the century ahead has made the study of food more than an object of historical and humanistic curiosity. The question arises; does knowledge of the past provide us with and tools or warnings for the future? At the very least it demonstrates how our ancestors have dealt with production, distribution, and consumption of a commodity that almost always has been in short supply. Finally, for the historian, anthropologists, sociologist, and social psychologist, a study of food habits in the broader sense serves as a useful point of entry into an investigation of a wider culture. The study of food in the humanities may grant some cohesion to a very diverse group. Historians have stressed the need to establish relationships or rapports among many long-run trends in history. Food has been studied from a climatic, demographic, productive, technological and cultural perspective. Food serves as an indicator of broader social and cultural phenomena. Food habits simply reflect other situations or patterns of behavior in a given society. As an integral part of a wider popular culture, dietary customs and the attitudes and values they embody are active agents in their own right, helping to fashion the peculiar tone and direction of society. In short, food is one of the ties in the intricate seam of history. The best way to approach a chronological history of food is to outline it

from economic, nutritional, and sociological. All of these perhaps could be summed up as simply cultural history.

Almost the first thing Homo sapiens did when they appeared on the stage of history was to exterminate their predecessor the Neanderthal in disagreement about the allocation of the dwindling food supplies. The search for spices helped bring about the collapse of the Roman Empire and Western civilization. When that civilization was reborn at the Renaissance, it was to begin the process of colonization and enslavement all over again which was still on the hunt for spices. The sugar to sweeten European tea and coffee was grown only at the cost of black slavery. Indians were ruthlessly pushed off their prairie hunting grounds so that the white men could grow wheat and corn, their buffalo slaughtered to make room for cattle. Yet, though it is possible to regard the story of food and humanities as one disastrous course after another, we ought to remember that, while some of the guests have behaved very badly, the long banquet has given others an opportunity of behaving equally well. It is not what you eat but how you eat it. Or as the philosopher Epictetus remarked, even an ordinary event like a dinner can be carried out in such a way friendship and brotherhood with other men (Lowenberg, 1968).

Many of those bidden to the human feast have behaved in this spirit. Men like Sir Philip Sidney, who was offered a cup of water while he lay dying after the battle of Zutphen, but who handed the cup to a wounded soldier lying beside him said, "Friend, your need is greater than mine". We can sympathize with those who saw hunger as an opportunity for doing practical good, such as the American born Sir Benjamin Thompson, Count Rumford, who spent his life looking for ways of enabling the poor to cook their food more economically and invented packet food as a sort of by-product

process. We can certainly find inspiration in the lives of great pioneers like Captain Cook, who tried to eliminate the dreadful disease scurvy by giving seaman lemon juice and sauerkraut. Food is very much the mainspring of human watch. No one can live without eating, along with the ordinary body functions; it is the only universal attribute of all humanity. There seems some evidence that food has been a total part of all histories (Brigid 1994).

Birth of Cooking

The birth of cooking resulted from the need to start cooking meat. The wood fire that, “Peking Man” had apparently invented was a consequence of his ability to manufacture flint tools. Vegetarians had little need to cook their food. Most vegetables can be grated and eaten raw. But there arose the psychological feeling of well being engendered in us by hot food. The greatest impact in the chronology of food history was formed out of the merchandizing revolution. The aspect of food history and export truly changed the way man thought and acted on food. Originally food was consumed for pleasure and survival. With the rise of the merchandizing revolution, food became both economical and social. For many countries, however, food imports had become not a matter of customer choice, but an affair of necessity. The cooking surely improved for example Alexandria sauces for fish and gourds passed into Roman cook-books the best banquets were spectacular, and although one of the Ptolemies kept pheasants without eating one, he crossed them with quinea-fowl and ate the result instead. Egypt’s cabbage was so bitter that seed was imported from Rhodes to combat it. Greeks introduced chick-peas from Byzantium into Egypt, and better wheat almost drove out the old husked grain.

One interesting resource that was developed or cultivated in early Greece was the “olive”. Olives are delicious when eaten raw or pickled in brine. They also yield oil, rich in calories capable of enhancing the driest hunk of bread. Unfortunately, olive oil was the only illuminant known to the ancients other than candles or torches. Olive oil burned in every home in receptacles ranging from the earthenware lamp of the philosopher Epictetus (he had substituted a pottery lamp for the iron one which had been stolen. Olive oil greased the limbs of the Greek as he issued from his bath and kept his muscles supple in the gymnasium. It produced the principal fuel that burned his dead body on his funeral pyre, and was poured on his ashes in the form of perfume (Hobsbam 1983).

No wonder there was not enough olive oil to eat in Greece; but even if there had been enough oil, there was no longer enough barley bread to pour it on. Though the Greeks tried to extend their bread with dry fruits and tunny fish, it was obvious enough, by 600 B.C., that there was not enough fertile land left in the peninsula to grow barley, and hardly enough land at all suitable for raising cattle.

In an attempt to stop the food catastrophe, the Greeks started to export themselves to established colonies overseas, while they also imported food in return for their own luxury exports. These luxuries included Greek olive oil, which was of high quality, and Greek wines, which had the finest reputation of any in the Mediterranean. These valuable vintages were exported in what we would consider to be very unstable containers of glass. These glass bottles were made in very small sizes, while the wooden barrel had not been invented by the Gauls in France, so the Greeks used pottery containers for their wines from Chios and Lesbos. These pottery containers were known as amphorae

(singular: amphora), and they were gigantic man-size jars with two lugs but no flat bottom. Their pointed base had to be thrust into soft sand, or into a specially made rack.

Amphorae must have been very difficult to carry when full of wine. Corks were an invention of the Middle Ages. They were cut from the bark of the cork oak in Portugal. Before corks were invented, Amphorae were plugged with a stopper made of pottery, packed around with a rag and secured with pitch. These stoppers did not always do their job very efficiently, and an amphora of wine would be likely to arrive in Italy from its homeland in Greece, tasting both of seawater that had seeped in around the stopper and also bitter because of the product that had melted off the end of the stopper into the wine (Dalby, 2000)

It is amazing how soon food additives became an acquired taste. Because consignments of rice were held up to one Chinese city, and arrived tasting very musty, the rice consumers of this particular town acquired a taste for musty rice. Geek wine soon began to demand additives. The wine merchants obligingly added salt water or turpentine to the shipment to give it the right flavor. The resinated taste of much Greek wine, still noticeable today, is due to the resin-treated goat wineskins in which much of it was stored.

In an attempt to secure for their needy citizens the daily porridge and barley bread that were their staple fare, the leaders of the Greek city-states now gave consultation. Westland lay many countries where the Farming Revolution had not spent its full effect. Many of the people in Hesperia, as the Greeks called the west, had not evolved an elaborate agricultural civilization, or were not agricultural capable of change. So the Greeks spread to begin the wine-growing region that was in what we now call France.

This Greek expansion was necessary in-order for the Greeks to expand export of their wine.

Foods From Around The World

Culinary art is one of the most ancient forms of cultural expression. This portion of the study will examine intercultural communications and foods from around the world. A wide range of intercultural communication concepts will be utilized to examine several fascinating cuisines from Europe and North America. An intercultural communication approach was chosen for this particular food study because cultural diversity, perception, and cultural adaptation are vital components in the study of culture, food, and communication.

When choosing foods from around the world, a wide range of cultural history and individual perceptions help shape our personal eating habits. These food preferences are defined in our culture and because of this; we reluctantly explore other culture's foods. Every cuisine has some form of *art as culture*. By using artistic expression through food, we are able to see how many cultures promote their *belief systems*, attitudes, and personal values through the foods they prepare and eat. As stated previously, for most people, a *cultural history* or background of a culture has some relevance to the selection and origins of food. The selection techniques and origin of ingredients both play a major role in determining what items are considered to be popular foods within a culture. In addition, culture describes many food *rituals* by defining the regular eating habits and *roles* that are portrayed when preparing cultural foods. A cuisine may also define a

culture by communicating its rules about flavoring, preparing and combining foods, meal and table manners, taboos and ceremonial foods.

Dean C. Barnlund's article, "Communication in a Global Village" explains that individuals have a collective unconscious. Barnlund recognizes that we form *cultural norms* and *cultural myopia* because every culture has its own way of viewing the universe and forming a collective unconscious about set rules and behaviors. This collective outlook helps many cultures cope with reality. Cultural myopia occurs not so much as a coping mechanism but because of habit. Many everyday actions, such as eating, are performed as habit without any individual conscious decision being made. For British people, cereal with milk is clearly a proper breakfast item and a collective unconscious decision made from cultural history. No one needs to be reminded. Certain cultural habits and decisions are already made for us, and all we have to do is learn about them and follow *cultural traditions*.

Eating habits, as with other aspects of culture, are learned. We use cultural *filtering* and cultural *screening* when we decide what to eat. This is significant because when we filter out a culture and its cuisine, we are screening and interpreting information based on that particular cuisine. We decide before we try it if we are going to like it. Another very interesting thing we do when choosing food is practice *avoidance behavior*. This aversion to trying new cuisines has created a great deal of culinary *ethnocentrism* in the United States. While we have had increased immigration and new cuisines, many Americans are still unwilling to try these different cuisines. From an ethnocentric standpoint, avoidance behavior becomes the deciding action for many cultures when trying different cuisines from around the world. A person's cultural eating habits occur

through the process of *acculturation* or a long- term socialization and adaptation to a host culture. We initially learn this process through a family setting. Since infants and young children depend upon adults for food, the parents act as a *co-culture* by controlling the foods that the children are exposed to and consume. The parents are the dominant group or the macro-culture that acts as an important medium for communicating cultural values and attitudes towards food and cultural identity.

Integration of Historical Food Rituals

It is difficult to say where and when the luxury of eating and dining began. It has been integrated throughout history in a variety of literary contexts and individual memoirs. But, if you were to go back in Greek and Roman history, you would learn that both of these cultures had not only eaten for sustenance, they both had an extravagant and organized style of dining within their cultural framework:

There was a banquet and people were talking, and so often in accounts of banquets at this period, Socrates was there. The topic was language: the origin of words and their true meanings, their relationships with other words. In particular, according to Xenophon, who described the scene in his memoirs of Socrates, they were talking about the labels applied to people according to their behavior. This was not in itself an uninteresting subject, but failed nevertheless to absorb Socrates' complete attention. What distracted him were the table-manners of another guest, a young man who was taking no part in the discussion, too much engrossed in the food in front of him. Something about the way the boy was eating fascinated Socrates. He decided to shift the debate in a new direction: "And can we say, my friends," he began, "for what kind of behavior a man is called an opsophagos?" An opsophagos, according to this ancient authority at any rate, was someone with a distinct predilection to fish (Davidson, 1998).

The Greeks were fond of fish and integrated it into most of their meals and banquets. What the literature of pleasure for Greeks manifests time and time again is that they had a maddening addiction to and an obsession for fish. In one

particular work known as Gastronomy, Dinnerology or The Life of Luxury, written by Arcestratus, the Greeks made reference to pleasure and eating fish; this delicacy was integrated and accepted as a cultural norm for all of the Greek culture.

Sicily also produced and integrated cookbooks and cuisine into their culture. Among the earliest of these treaties was one by Mitaecus of Sicily, a famous chef mentioned by Plato and described by one writer as the Pheidias of the kitchen (Davidson, 1998). The mention of fish and the custom of having fish were documented all through his writings. What this suggests is that fish had a universal identity that was recognized and organized through cultural consensus and had its appropriate place at the table. Because sufficient food is pivotal to the existence of society, most human beings have devoted a great deal of time integrating an adequate food supply into their culture. Through cultural awareness, we learn about foods through dialogues similar to those mentioned above; Socrates banquet describes such a dialogue. Food involves sharing a table with companions, that is sharers of bread. Food assembles and integrates an organized manner for the family, a class division, a religious perspective, and finally, assembly in the form of a civic banquet. Food also integrates organized cultural distinctions of status, power, and wealth. By saying this, we have made the transition from the preparation and selection of food to actually presenting it at the table. Our dining rituals arise from a unique cultural and communication perspective and expression and also, our biological necessity. In the classic formulation of structuralism, Claude Levi-Straus stated that “food and ritual

express fundamental human attitudes.” Their meanings are written in code, and to understand and integrate the code, one can penetrate the deep cultural meanings of an entire society. The cooking and food preparation of a society is a language within itself; this enables us to deconstruct a society’s organizational culture through the language of its consumption. While this may seem extreme, you can understand a culture and the way they eat by separating the way they eat and how they organize and practice both group separatedness and cultural belonging.

The structure of the Roman meal as a unit can also be deconstructed to show how the integration of food and manners are developed within this particular culture. Roman dining rituals composed food in such a way that the meal became more civilized from the beginning to the end. It begins with the Gustation, tasting of pure roots, vegetables, fish, and eggs, all the requirements of early life. Next came the Cena proper, a sacrificial meat dish; this is eaten to give thanks, and finally, the Secundae, a small pastry that the Romans referred to as the luxury reserved for peaceful nations. All these foods and rituals were integrated through organization of a culture to exhibit shared meaning. For the Romans, these rituals also suggest that parallels were made between events in citizens’ lives and the structure of Roman history.

Conclusion

While many food studies have been done in the past, and many will surface in the future, researchers should consider framing their studies through organizational and cultural methodologies. Of course, people have been thinking

about the humanities and food and how people organize their consumption of foods, but future studies could include the relationships between food and their human place within a certain time frame. The ancient Greeks or the early Romans approached their foods from their historical past and present. We can study these times and have a growing understanding of how language and beliefs influenced the choices people made. A cultural perspective, an historical perspective, a sociological perspective, and often a psychological perspective were involved in the choices individuals made. What might be interesting for future research is applying this approach to modern food rituals to see where people organize themselves in relationship to their culture.

Their differences may exclude them from the main culture; their differences may include them into the main culture. Adaptations for the purpose of inclusion or exclusion into a community may be the underlying factors when making decisions about dining rituals. This is most evident when one goes to a wedding. But that is another research project.

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AN OPTIMIZATION MODEL FOR HEALTH CARE RESOURCE PLANNING IN NORTHEAST NORTH CAROLINA

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ABSTRACT

This research looks at the problem of remoteness and accessibility of healthcare services for the at-risk population who reside in the designated distressed counties of northeast North Carolina including Bertie, Gates, Halifax, Northampton, Perquimans, Tyrrell and Washington. The geography of these distressed counties is such that it hinders the development of healthcare facilities that are economically viable and that can respond adequately to meet the needs of the at-risk population. Without an optimal spatial distribution of healthcare facilities in harmony with the distribution of demand, greater travel efforts are required, imposing a burden on the meager resources of the at-risk population. To arrive at an “optimal” solution, a facility location and resource allocation model is utilized. The routine employed for the location/allocation optimization model is based on algorithms used for solving the p-median or min-sum multi-center network design problems. Data collection from various databases is currently underway with an anticipated completion timeline of nine to ten months.

INTRODUCTION

Health care planners and public policy makers are searching for new approaches to delivery of healthcare services that will simultaneously reduce costs and improve access. In light of this, a public-private partnership is often discussed as a vehicle for improving short term and long term outcomes of the health care network. The overall intent of this approach is to promote sustainable community development. Recently, economists of various persuasions have also promoted public-private partnerships (PPPs) as a means of promoting economic growth, per capita income, and social welfare both on a domestic and international scale (Burd and Currie, 2004). Others including the Canadian Community Economic Development Network (2007) see this process as a means of promoting community economic development (CED) where the emphasis is on building community-based enterprises in cooperation with public sector agencies.

Implicit in the idea of community development and resource allocation is a reasoned expectation that healthcare planners and policy makers can add to “Pareto optimality” and thereby maximize community welfare. Health care planners in rural areas must contend with balancing resource efficiency vis-a-vis maximizing community welfare. Since Pareto optimality is more idealistic than practical, Pareto improvement is often the preferred approach. It is based on the idea that distribution of resources over a large number of projects is likely to benefit more constituents than concentrating them in a few locations or in a few projects. Of course, the underlying premise is that resource allocation decisions systemically seek to obtain the greatest benefit at the least cost. This approach, which is the position of many economists, argues that the projects should improve the welfare of society as a whole. Palmer and Torgerson (1999) contend that strict adherence to such criterion is in practice difficult. Consequently and with few exceptions, health care planners in rural areas are being forced to redesign the facilities so that they will be equitably and fairly distributed across the different geographic areas and also provide a high quality of service to the constituents at the lowest possible cost. We need more facilities to provide a high quality service. But the resources are limited and we have to accomplish our goals with the lowest possible cost, which implies that we need to cut down the number of facilities. It is clear that we are dealing with multiple conflicting objectives (Johnson, Gorr, and Roehrig, 2002).

THEORETICAL BACKGROUND

An overview of the literature suggests that integration and aggregation of health care delivery in rural areas can prove to be especially challenging and time consuming. As a result, defining the exact nature of the problem can help us understand not only the rationale of the study, but also the validity of the assumptions essential to a study's underlying purpose. Toward this end, this study is developed with concepts originating in socioeconomic theory and optimization models rooted in graph theory and management science methods. These origins are the basis for the study's analytic inquiry and interpretations. With this approach, there is a greater probability that the qualitative and quantitative aspects of both the spatial and geographic patterns will be reflected in the design of a more efficient and effective health care network. To support this line of reasoning, the inquiry relies heavily on an evaluative process that incorporates several aspects of location and geographic proximity analyses. These lay the foundations from which health care planners can examine the conflicting multiple objectives and formulate policies to obtain optimal solutions

Role of Internet

For rural communities, the problems of remoteness and access are acute because spatial consequences matter, even when transportation costs are zero and knowledge is assumed to travel across space freely. In other words, without adequate access to internet technologies (knowledge), at-risk populations may be at a disadvantage merely because of their remoteness. In this instance, social interactions are circumscribed by physical distance and therefore tend to reinforce strong offline social ties among clusters of underserved participants. On the health care provider side of the market, internet technologies also play an important role, since providers have to consider internet-based technologies as a part of their criteria in location decisions. Hence, assuming adequate access to internet-based networking technologies, one might reason that knowing more can pay off for all participants, especially with respect to education enrichment afforded through a structure of relationships similar to that suggested by Putnam (2000). Ostensibly, this appears to be a significant ingredient for a more effective and efficient health care network, especially as it relates to reallocation effects in a rural health care network with inherent spatial distribution related inequities.

From the viewpoint of the health care network, one can reason that health care-seeking household/individuals on the demand side (i.e. preferences with a social component) and health care providers on the supply side of the market (i.e. technology in a knowledge-rich environment) are highly dependent on internet-based knowledge and information as a basis for participation and allocative efficiency. Thus, awareness of and access to internet-based knowledge in an environment of education and personal responsibility is critical for health care planners in minimizing health care costs. Without sufficient attention of planners and policy makers to these effects, future outcomes especially in rural underserved areas remain in a state of uncertainty. For that reason, there is an apparent likelihood that the implications for decision and policy makers will continue to require multi criteria considerations.

Although a knowledge-based infrastructure can to a large extent mitigate problems associated with accessibility and remoteness, it does not alleviate the challenges faced by planners and policymakers concerning the optimization of the physical location of facilities in conjunction with the distribution of demand and travel requirements. As a result, physical location of facilities and a knowledge-based infrastructure are complements and are increasingly becoming mutually supportive in an optimized healthcare network. In this research, there is an attempt to recognize and incorporate such mutual dependency.

Graph Theory

In the social sciences, optimization models based on graph theory have been used as a means of expressing the relations in social networks, which can also integrate the concept of location proximity. These include research on the interactions between individuals and also the interactions between groups and how these interactions affect location proximity and resource allocation. Another example based on graph theory can be found in engineering network theory and related mathematical concepts where a network is defined as an entity with vertices or nodes connected by lines or edges. The study of network flow models is crucial to understanding the health care network as a configuration of routes connecting various locations through which people/services move. Network-based optimization models are some of the most utilized techniques in operations management and serve as a basis for decision support systems in the private sector.

Problems of this sort can be illustrated by utilizing a network of arcs and nodes. Business operations in a distribution network comprising warehouses, delivery points, connected by various roads are good examples. In primitive form as defined in mathematics, engineering, and the sciences, a network is nothing more than a set of nodes connected by arcs or lines. In high level networks such as the health care network, these concepts can be illustrated utilizing applications of graph theory where compilations of nodes (vertices or locations) together with arcs (links) connect to form an application of location theory. As a graph (Diestel, 2000), the health care network can be described as an undirected (connected) graph where $G = (V, E)$ and the set V of vertices (locations) is the set of all locations and the set of edges E (lines) coupled with some value (weight or distance) that connect the locations (Hoelting, Schoenefeld and Wainwright, 1995)

LOCATION THEORY AND OPTIMIZATION

Many geographical locations lack the necessary facilities to support the needs of the at-risk populations, which creates the necessity to travel to another location in order to gain access to a desired service (Kaiser, 2000). The travel route becomes the edge in the terminology of Graph Theory. Edges can also have varying degrees of distance...say the distance between two locations A and B (health clinics) in a geographical sense. From an allocation perspective, one can assume a set of locations in V from which every other location in V is covered or alternatively an optimal location where the at-risk household/individual is assigned to the nearest facility.

Since problems of this type decide the location of facilities and allocation of the demand points, they are generally referred to as location-allocation problems, and the healthcare network design problem falls in the class of problems known as the p -median problem. More specifically, the p -median problem belongs to a larger class of problems referred to as min-sum location-allocation problems that can be further distinguished as the p -center problem (Hakimi, 1964) and the p -median problem (Hoelting, Schoenefeld and Wainwright, 1995). Our primary focus here is the p -median problem. Fundamentally, the p -median problem determines p facilities in a predefined set of V with m ($m > p$) candidate facilities. The goal is to minimize the Euclidian distance (or some other linear function of distance) between each demand point and its nearest facility. From the point of view of the healthcare network, the goal is to identify the locations that provide greatest access to the n demand points (vertices) where clusters of the at risk population reside (Kaiser, 2000). Each of the p points selected serves as a health care facility where each of the n vertices is served by one of the p service facilities located in the network. The optimal set of p points will minimize the sum over all vertices of the path lengths from a vertex to the nearest health care facility (Hoelting, Schoenefeld and Wainwright, 1995).

In this case, the assumption is that edge cost is expressed as the weighted Euclidean distance where health care centers p are necessarily points in the set V . Total cost is established by summing the weighed distances from each vertex to each of the healthcare facilities. These problems belong to a class of optimization problems (more precisely Integer Programming Problems) involving 0-1 variables where a value of one indicates that a facility is selected and a value of zero indicates that it is not. An added advantage to this approach is that they can accommodate numerous variables making them almost ideal for solving facility location problems involving several potential site locations. If there are, for example, thirty potential locations, then there are thirty decision variables in which a decision must be made for each potential site (Stevenson and Ozgur, 2007).

Formulation of the Healthcare Network Problem as a p -Median Problem

The task is to ascertain locations for a given number of service facilities that will satisfy the demand when the spatial distribution and the demand (user, at-risk population) at a particular point are known. To describe the p – median problem, a set of linear constraints and a linear objective function are utilized. Fundamentally, the mathematical formulation of the p – median problem can be summarized as follows (ReVelle and Swain, 1970):

$$\text{Min} = \sum_{i=1}^m \sum_{j=1}^n w_j d_{ij} x_{ij} \quad (1)$$

Subject to:

$$\sum_{i=1}^m x_{ij} = 1 \quad j = 1, 2, \dots, n. \quad (2)$$

$$x_{ij} \leq y_i \quad \forall i, j, \quad (3)$$

$$\sum_{i=1}^m y_i = p, \quad (4)$$

$$x_{ij} = 0 \text{ or } 1 \quad \forall i, j, \quad (5)$$

$$y_i = 0 \text{ or } 1 \quad i = 1, 2, \dots, m. \quad (6)$$

Where:

n Total number of demand points,

m Total number of potential sites,

- x_{ij} 1 if demand point j is assigned to facility located at point i , 0 otherwise,
- y_i 1 if point i is allocated as a facility, 0 otherwise,
- w_j Demand at point j ,
- d_{ij} Distance from point i to point j ,
- p Desired number of facilities to be located.

In the optimization process various configurations can be generated with each configuration having exactly p facilities. Each such configuration also provides a feasible solution to the p – median problem. Although at least one optimal solution exists for every p – median problem, others can exist if more than one configuration has a minimal cost. The p -median problem discussed above assumes only one type or kind of service facility. However, in practice we may encounter a hierarchical system in which levels of services are managed based on the complexity of service. Solving the p -median problem itself is hard since it belongs to a class of problems known as NP-hard problems (Garey and Johnson, 1979). Here, we will limit our analysis just to one type of service facilities and focus only on the solution of the basic p -median problem

POPULATION DATA AND SAMPLING TECHNIQUE

The research domain chosen for this study includes the rural counties of northeast North Carolina. This region is made up of seven contiguous counties including Bertie, Gates, Halifax, Northampton, Perquimans, Tyrrell and Washington. They are located in an economically distressed area aggravated by lack of economic development opportunities, high unemployment, poor rural populations who contend with inadequate health care services and long-distance-travel requirements. The northeast region is typical of economically distressed rural areas on the margins of financial viability but with potential for significant economic development. The North Carolina Department of Commerce generally defines so-called tier one distressed counties as those in need of economic development. Specifically, several criteria determine the distressed designation. Those include average rate of employment, per capita income and population growth. In recent testimony before a forum presented by the Agency for Health Care Research and Quality, the Director, Office of Rural Health and Resources Development, North Carolina Department, of Human Resources reported that the state’s economic poverty is a major challenge. The director presented data that showed that 50 of North Carolina’s 100 counties had 40 percent or more of families earning incomes below 200 percent of the poverty line. Even more revealing were the data that all but three of the one hundred counties were rural.

These economic circumstances have been exacerbated by the steep decline in the manufacturing sector and the increasing outsourcing activities of American industry in the past decade. Another factor that has an adverse impact on the at-risk population is the influx of immigrants. According to the Federation for American Immigration Reform, which quotes several studies in a published article “Lower Wages for American Workers”, contributes to depressed wages for the underserved population. Currently, these include Bertie, Gates, Halifax, Northampton, Perquimans, Tyrrell and Washington all of which are located in northeast North Carolina. Their geographic location is such that they do not have the required health care facilities adequate to support the at-risk population. These counties also constitute a region that has great potential for development because it offers a wide range of location options available to health care resource planners for improving the efficiency, effectiveness and equity of health care delivery.

Since the optimization of health care service locations necessitates highly reliable input data, careful selection of datasets is extremely vital. Kitchin and Fotheringham (1997) found that aggregation can corrupt the solution results of a location problem and decrease the quality of the solution. Others, including Murray and Gottsegen (1997), report stable resolutions with the p – median problem, when aggregated data is utilized. Besides, since the p – median problem is based on spatially distributed demand values and total population is utilized for demand, it is reasonable to assume that demand can be specified more accurately in most instances. This is particularly the case when travel distance to a service facility can be lengthy and an optimization analysis can provide greater accessibility (Kaiser, 2000). For this study, it is estimated that the data collection and generation of the “optimal” solution will require approximately nine to ten months. Optimization of health care service locations is very sensitive to input data indicating that solving the p – median problem requires careful use of datasets especially where data is sparse or missing and aggregated demand data is utilized.

SUMMARY

Some issues related to the accessibility of healthcare services for the at-risk population in the distressed counties of northeast North Carolina are discussed. The geography of these distressed counties is not conducive to the development of economically viable healthcare facilities that can respond adequately for the needs of the at-risk population. The goal of this study is to develop an “optimization” model that would help in the design of a network of healthcare facilities that can be accessible to the at-risk population. To arrive at an “optimal” solution, a facility location and resource allocation model based on the algorithms used for solving the p -median or min-sum multi-center network design problems is utilized. Data collection from various databases is currently underway with an anticipated completion timeline of nine to ten months.

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GATHERING SENSITIVE HEALTHCARE INFORMATION USING SOCIAL ENGINEERING TECHNIQUES

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ABSTRACT

Social engineering can be viewed as a low-tech attack method or acknowledged as one of the most effective and easily perpetrated forms of attack. Hackers can use this method to gather personal information such as passwords or access codes or even more innocently seeming a birthday or pet's name. With the predominance of mass media's coverage of hackers and security intrusions, the prevailing question becomes whether or not the general population is aware of the damage that may occur should they or their health care organization be subjected to a social engineering attack? This research in progress study will attempt to identify the personal information that employees will supply as they enter into their place of employment. The results of our study will be provided at the conference. In addition to the results, the authors will also make recommendations that health care companies can incorporate into their policies in order to protect their employees as well as systems from intrusion-based social engineering attacks.

INTRODUCTION

Most hackers rely on employees to inadvertently help them to attack company networks and systems. Today, most health care agencies have intrusion detection/prevention systems that can be used to alert organizations in the event of a security incident, firewalls to protect their internal network, and virtual private networks to ensure individuals connecting from the outside are authorized and have a secure connection. Username and passwords can be provided by the organization as a security method, and is the most common form of authentication [2]. But with all of these methods in place, the question still remains of how much information might an employee provide to a stranger?

Organizational controls, such as processes and procedures, are put in place by an organization to control or protect its assets which can include physical goods, buildings, and money or intangible assets such as a firm's reputation and image. Of the many types of controls, one of the most fundamental is access control. Access controls are put in place to allow or restrict access to only those authorized personnel who should have the authority to view or work within that system.

Passwords for most health care organizations are one of the most prevalent types of access controls. One weakness of passwords is the difficulty to remember long and complicated passwords thus leading people to create passwords that are easy for them to remember [1]. Individuals due to their short-term memory also tend to reuse their passwords for multiple accounts, making the danger of a weak password greater as it can compromise multiple systems [3].

Currently, most networked systems rely on the username/password combination to grant access. As such, obtaining this information is the equivalent of hitting the jackpot for a hacker. When a hacker is attempting to break into a system, they want to find the quickest and easiest point of entry. This is why many hackers rely on social engineering techniques [4], to gain access to a target, since in many cases it is a lot easier to exploit a human than a system [6].

The social engineer can and often does utilize an arsenal of methods allowing him or her to leverage the emotions of a victim in aiding in an attack. The social engineer can flirt with the victim in an attempt to get him or her to release information; make the victim feel guilty so they divulge information they would not have otherwise; or even convince the victim that their job could depend on giving the attacker the requested information [6]. No matter the type of scenario employed, if relevant and meaningful information is supplied the entire network along with all of its information is placed at risk.

METHODOLOGY

A survey was created and will be administered in Fall 2007 to gather data and to establish how many people would disclose personal types of information to a stranger. As close as possible, we will attempt to simulate the type of information a social engineer would attempt to gather in order to gain entrance into a system (whether personal or within the organization). Shown in Appendix A is the survey we plan to use.

The first section of the survey was designed to gather personal non-identifying information, such as a favorite movie, television show, place of birth, or pet. These categories were chosen based on research performed by Medlin et al. [5]. In their research, they found 19.3% of passwords gathered were based on family, 2.1% were based on being a fan, 5.7% were based on faith, and 1.3% was based on places.

Some personal demographics will also be gathered for informative purposes in order to support the research. This type of information can be used to create a personal profile of the employee that can be used to guess or use password cracking software to determine the strength of their password.

The last piece of information that will be gathered is related to the employees own password. This is especially important in the event of a true social engineering attack. This would give an attacker the company's name, possible login information from the email address, and the password in the event it was provided by the employee.

The survey and demographics will be kept separate for two reasons. The first is to protect the respondents as well as the researchers from possible privacy breaches. The second reason is to put them at ease with filling out the survey to facilitate a greater percentage of respondents disclosing their

password by giving the impression the survey was truly anonymous. For ethical reasons, the researchers will keep everyone anonymous exactly as promised, however it would be a simple matter for a social engineer to combine the data.

Survey Implementation

In order to assess the current awareness of information security within today's health care climate, the survey is aimed at employees within a health care setting. However, in order to better represent what a social engineer might be able to accomplish, we will set up a survey booth outside the entrance of a major hospital, rather than have the hospital ask their employees to participate. The employees were targeted due to the sensitive information about patients and the organization to which they have access such as medical history, social security numbers, drugs administered and next of kin. Additionally, they may have access to the intellectual property of their employer.

Individuals will be asked to fill out a survey in exchange for candy and the opportunity to win a free gift card to a local restaurant from a drawing. All personal information for the drawing will be filled out on a separate piece of paper in order to protect and provide anonymity to all persons involved.

Results, future discussion, recommendations, and future research will be discussed at the time of presentation.

CONCLUSION

If a single piece of information such as an employees name and their department or a password can be gathered or information combined to guess or crack a password from social engineering techniques, a hacker has done the first step of their job. With this information the hacker has been doors opened to them.

Employees, in order to be the first line of defense must be educated in social engineering attacks, and have the knowledge to spot and protect against these attacks. Even if a single password could be gathered that should indicate to health care organizations the distinct need for more training and awareness among its employees.

As more and more information becomes digitalized, there needs to be a greater increase in security awareness for both the protection of the organization as well as the employee personally. This awareness on the part of the organization and its employees can be the difference between an organization falling victim to an attack or ensuring the security of their information. This potential weakness in guarding health information is a critical ethical issue the public sector should address.

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APPENDIX A - Condensed Survey

Gender: [] Male [] Female Place of Birth: _____
Favorite TV Show: _____ Favorite Movie: _____
Favorite Sport and Team: _____
Favorite Singer/Band: _____ Favorite Song: _____
Favorite Type of Pet: _____ Pet Name(s): _____

Do you have kids: [] Yes [] No

Please list the first names of the *one (or two)* most important person (or people) in your life:

To help with our research study, please tell us a little about your organizations security

How often do you use a password to access systems?

[1] Very Often [2] Often [3] Occasionally [4] Not Often [5] Never

How often do you change your passwords?

[1] Very Often [2] Often [3] Occasionally [4] Not Often [5] Never

Most people use the same password on multiple accounts. How often do you do this?

[1] Very Often [2] Often [3] Occasionally [4] Not Often [5] Never

Does your employer offer password security training?

[1] Yes [0] No

Does your employer offer any other security awareness training?

[1] Yes [0] No

When was the last time you participated in either a password or another security awareness training program?

[1] Last week [2] Last month [3] Last 6 months [4] Last Year [5] Never

On average, do you choose your own password or have one assigned?

[1] Choose Own [0] Assigned

Most passwords fall into the following categories, please mark if yours fits in any of these (select all that apply):

- | | | |
|----------------------------------|----------------------------------|----------------------------------|
| <input type="checkbox"/> Family | <input type="checkbox"/> Cryptic | <input type="checkbox"/> Numbers |
| <input type="checkbox"/> Fan | <input type="checkbox"/> Faith | <input type="checkbox"/> School |
| <input type="checkbox"/> Fantasy | <input type="checkbox"/> Place | <input type="checkbox"/> Other |

How many characters are in your most commonly used password?

[1] 1-3 [2] 4 [3] 5 [4] 6 [5] 7 [6] 8 [7] 9 [8] 10+

Do your passwords contain any numbers?

[1] Yes [0] No

Do your passwords have any special characters in them (@, #, %, &, etc...)

[1] Yes [0] No

In order to facilitate creation of solid data, we would appreciate if you would provide one of your passwords. This information will be held in the strictest of confidence, and will be used only to generate a number that describes the characteristics of your password and then destroyed.

My Home/Work/Both password is: _____

Comments:

U.S. HEALTHCARE

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ABSTRACT

Healthcare in the United States is in a crisis state. With annual expenditures in excess of two trillion dollars, 45 million uninsured, and 83% of insured unhappy with their coverage, there is need for urgent action. Unable to bear the burden of ever-escalating healthcare costs, employers are increasingly scaling down their contributions, adding to the workers' woes. The issue is featuring with growing prominence in congressional and presidential election debates. The paper takes a look at the different stakeholders in the healthcare debate, and examines some potential choices to alleviate the current situation.

INTRODUCTION

After studying the healthcare systems of 191 prominent countries in 2005, World Health Organization placed U.S. in the 37th place. As a country, the US spends over \$7,000 per capita on healthcare, which adds up to over 2 trillion dollars for a 300 million population. That spending is more than twice the expenditures of any country. Despite the monies spent, 15% of the population remains uninsured, and most of the population fears lack of healthcare more than the war with Iraq or potential terror plots. The U.S. system has always been heralded as the system driven by private enterprise. However, a recent world report showed that almost 60% of the cost of the U.S. healthcare system was borne by the taxpayers.

Businesses are starting to complain loudly about the escalating cost of healthcare. With yearly increases in healthcare premiums averaging several times the adjustment in the cost of living index, the impact on the bottom line is being felt across the board. Firms like General Motors have shut down plants and scaled back operations, in part because of skyrocketing healthcare costs. Cost of healthcare for the workers is rumored to add over a thousand dollars to the cost price of each vehicle!

Cost of pharmaceuticals is also a big problem for the U.S. population. Even those with healthcare insurance often find the "discounted" prices for their prescriptions at the local pharmacy to be ridiculously high. Some find cheaper deals across the border in Canada, and a lot better deals south of the border – in Mexico. With scam artists in bordering countries selling bogus medicines at bargain prices, the federal government is erring on the side of caution and legally curbing the flow of pharmaceuticals. At the same time, however, several state governments facing budgetary crisis in their healthcare spending are defying the federal government and actually encouraging U.S. residents to shop for the best deals.

Why is the U.S. healthcare system so expensive? Where does all the money go? Is it true that one out of three dollars goes towards paperwork? If so, can't this be cut? Can't we have one standard form for all reimbursements? Who are all the stakeholders in the system, and how does the money flow between them? How are the federal, state, and local governments playing a role in healthcare via Medicare, Medicaid and other programs? Is technology, or lack thereof, to blame? If so, what are some potential technologies and techniques that hold promise?

Since the U.S. is the most litigious nation in the industrialized world, some people blame the frivolous lawsuits and potentially exorbitant judgments. To what extent is that true?

Can't this be addressed through legislative means? Some suggest that doctors are paid too much in the U.S. compared to the rest of the world. Are doctors simply trying to compensate for high medical college and liability insurance costs? Are the high bills caused by preventive healthcare tests done to thwart potential lawsuits? There are some who suggest that some doctors have colluded with the pharmaceutical industry to raise the costs of healthcare by focusing on expensive patented drugs only. The doctors allegedly receive "points" for every prescription, which may be later traded for trips to exotic destinations or sporting events. Is this true?

There is also the question of regulations. Some suggest that the healthcare industry is overly regulated. Is that the case? Are laws like HIPAA chipping away at the very system they are supposed to safeguard? Are illegal or uninsured patrons who show up at emergency rooms the problem? Are medical schools too expensive and the specialist training they impart ineffective for the U.S. system of healthcare? Do we need more primary-care physicians, especially in rural America, where small town-people are often times large distances away from a well-equipped hospital?

Should the U.S. simply import cheap doctors from other countries? Is that a realistic solution? Will \$4 for all generic prescriptions at Wal-Mart present a potential solution? Should the government join hands with Wal-Mart in delivery of healthcare using trained nurses that are not doctors, but are authorized to dispense prescriptions? Will this mean the demise of the U.S. healthcare system?

The paper will examine all of the questions cited above. In addition, it will look at alternate healthcare systems in the world. Most notably, the Canadian, British, and Swedish healthcare systems will be examined. Their pros and cons will be studied and some proposals shall be made to modify the existing U.S. healthcare system. Since the U.S. has more than 15% of its population living in poverty, some lessons from the Central American and Caribbean healthcare systems will also be pointed out. The paper will also examine use of technology, not just for delivering traditional healthcare, but also for exploring Internet use for healthcare delivery to alleviate costs.

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(Available upon request)

AN ANALYSIS OF “FAMILIARITY” AS IT RELATES TO ATTITUDES TOWARD GAYS AND LESBIANS

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ABSTRACT

The results confirms the conventional wisdom that in terms of familiarity family and friendship relations tend to be more important predictors of attitudes than work relationships. However, the sex of the person you are familiar with appears to have no effect.

This paper examines the concept of “familiarity” in attitudes toward gays and lesbians. We define familiarity as being in personal contact with gays and lesbians. There are many examples of familiarity including having gay/lesbian friends and family or working with them. This effort is a continuation of past research [18,19,20,21] that has focused on the attitudes toward gays and lesbians as managers.

These previous efforts examined the influence of the sex and religion of the perceiver. The sex of the object of perception was also studied. Familiarity was a small part of previous research. It was found that women had a more positive attitude toward gays/lesbians as managers than did men. Those who were more regular church goers had more negative views and that those with some familiarity with gays/lesbians had more positive views.

What is missing is the impact of the sex the person with whom the respondent was in contact. Research has shown that people tend to have a higher opinion of lesbians than they do of gay males. Thus if a man works with a lesbian does this moderate his views on gays in general and on gays/lesbians as managers? In essence this research attempts to determine if the sex of the person you are in contact with influences attitudes toward gays and lesbians.

LITERATURE REVIEW

Most studies of attitudes toward gays and lesbians are found in the psychology and social psychology literature. [For example see 1,2,7,8,9] Much of this work attempts to identify the factors that influence bias toward gays and lesbians. In general, the conventional wisdom is validated. Those with less contact with homosexuals are more likely to hold negative attitudes. [1,2,10] Individuals who are heavily involved in religious activities and especially of a fundamentalist nature, are more prone to negative attitudes. [21] The view that homosexuality is biologically determined, not a preference but an orientation, is associated with more positive attitudes. [6,12,14] Also, a general view that the cultural values of the gay “community” are against majority values, leads to negative attitudes. [6,7,14]

The literature also noted differences in attitudes depending upon the demographics of the perceiver and the object of that perception. Males tend to be more negative about homosexuality than are females. It was also noted that people had more negative attitudes about male homosexuals than lesbians.[2,7,8,9,12,16,17] This effect was especially true for male perceivers. It has been noticed that the race of the homosexual plays a role in the perceivers’ attitudes. [3] However, this effect is smaller and less pronounced for lesbians than for gays. [3] While it appears in the literature that attitudes differ depending on the sex of the person being perceived there is little if any research devoted to the sex of the person with whom you are familiar.

SAMPLE

Data were collected in the summer and fall of 2004. The respondents were students attending a mid-sized regional university. All were undergraduate students in the College of Business, taking the introductory management course. The sample which had an average age of 21.4 years, was composed of 293 usable responses. Table One displays the sample demographics. Tables two and three display the number and percent of the “familiarity” data.

TABLE ONE
Sample Descriptive Statistics

Variable	Percentage
Male	61
African-American	11
White	85
Regular church attendee.	24
Have a gay/lesbian family member or friend.	46
Have a gay/lesbian co-worker or fellow dorm resident.	60

We are interested in the 46% with a gay/lesbian friend or family member and the 60% who have lived in the dorm with or worked with a gay/lesbian person.

TABLE TWO
Sex of Gay- Lesbian Friend/Family Member

	Number	percent
No gay/lesbian family members or friends	157	54
Gay male family member or friend	71	24
Lesbian family member or friend	22	8
Both a gay male and a lesbian family member or friend	43	15

TABLE THREE
Sex of Gay- Lesbian Co-Worker/Fellow Dorm Resident

	Number	percent
No gay/lesbian co-workers/fellow dorm residents	120	40
Gay male co-workers/fellow dorm residents	83	28
Lesbian co-workers/fellow dorm residents	23	8
Both a gay male and a lesbian co-workers/fellow dorm residents	66	22

It should be noted that among those who reported having a friend or family member or a fellow dorm resident or co-worker who was gay or lesbian the highest percentage is for those who know a gay male and the lowest for knowing a lesbian only.

The overall study included a variation of the Blacks in Business Scale [22] to access the attitudes toward Lesbians as managers. (The demographic questions are displayed in Appendix One.)The attitudinal questions in the survey are displayed in Table four-below) concern attitudes toward homosexuality in general and will form the basis of the main analysis for this paper. These questions get to the core of beliefs about homosexuality. They are basically moral judgments. Thus how the responses are affected by familiarity will be an important step in our understanding of attitudes toward gays/lesbians.

ANALYSIS

TABLE FOUR
Attitudinal Questions related to Homosexuality

<p>With one (1) being strongly disagree and ten (10) being strongly agree please indicate your response to the following question:</p> <p>I believe the homosexual lifestyle is wrong. _____ [LIFESTYLE]</p> <p>I believe homosexuals should have the same rights as anyone else. _____[RIGHTS]</p> <p>I don't care what homosexuals do, I just don't want to be told all about it. _____[TALK]</p> <p>Being homosexual is a preference not biologically determined. _____[PREFERENCE]</p>
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The responses to the above questions were subjected to a one way ANOVA by a variable that combined the two familiarity questions. Thus the independent variable was:

- No contact with gays or lesbians
- Family/friend contact but not work/dorm
- Co-worker/dorm resident contact but not family/friend
- Both family and co-worker

The variable did not attempt to identify the sex of the contact person but only that there was one. Several of the relationships among the types of familiarity indicated significant differences in the means, these are displayed in Table Five.

TABLE FIVE
Means of Attitudinal Questions by Types of Familiarity

QUESTION	MEAN
Type of familiarity	
LIFESTYLE	
No contact with gays or lesbians	6.91*
Family/friend contact but not work/dorm	5.88
Co-worker/dorm resident contact but not family/friend	5.34
Both family and co-worker	4.93*
* different at the .05 level	
RIGHTS	
No contact with gays or lesbians	6.32*
Family/friend contact but not work/dorm	6.97
Co-worker/dorm resident contact but not family/friend	7.92
Both family and co-worker	8.25*
* different at the .05 level	

TALK		
	No contact with gays or lesbians	7.53
	Family/friend contact but not work/dorm	7.55
	Co-worker/dorm resident contact but not family/friend	6.36
	Both family and co-worker	7.26
No relationships significantly different at the .05 level		
PREFERENCE		
	No contact with gays or lesbians	7.34*
	Family/friend contact but not work/dorm	6.95
	Co-worker/dorm resident contact but not family/friend	5.98
	Both family and co-worker	5.84*
* different at the .05 level		

When the attitudinal questions were analyzed by one way anovas only one relationship was found to be statistically significant with regard to the sex of the contact person in terms of family/friend contact. There were no differences among the work/dorm dimension.

The only difference was that those who reported a gay family member or friend were more inclined to believe that homosexuality was a preference than those with a lesbian friend or family member.

DISCUSSION

While familiarity does seem to affect attitudes toward homosexuals the magnitude of that effect appears slight. Only three of the four attitudinal questions showed differences related to familiarity and those were all between having no contact and contact in family/friend groupings and work/dorm environments. Thus those people were assumed to have much more contact. While research has indicated that attitudes are affected depending on the sex of the perceiver and the perceived no relationship was found relating to the sex of the contact person. So it would appear that the effects of familiarity would not be related to the sex of the person in contact. Study limitations might also account for the lack of measured differences. Further studies will need to inquire as to family and friend status with separate questions as it would seem likely that contact with family members would lead to more acceptance. Further the family relationship will need to be enumerated. It would seem likely that the closer the family ties the more the acceptance.

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APPENDIX ONE
RELEVANT PORTION OF THE OVERALL SURVEY

The following demographic is being collect for analysis purposed only; nothing here can be used to identify you.

SEX: MALE	_____	FEMALE	_____
AGE:		_____	
I attend church regularly?		YES	NO
		_____	_____
RACE: WHITE _____; AFRICAN AMERICAN: _____; ASIAN _____			

I have a homosexual friend or family member?		YES	NO
		_____	_____
This family member-friend(s) is/are: MALE _____; FEMALE _____; BOTH _____			
This family member-friend(s) is/are:			
WHITE _____; AFRICAN AMERICAN: _____ ASIAN _____			

I have worked with or have lived in the same dorm with homosexuals?

YES___ NO___

This/these person(s) is/are: MALE____; FEMALE____; BOTH____

This/these person(s) is/are:

WHITE____; AFRICAN AMERICAN____; ASIAN

With one (1) being strongly disagree and ten (10) being strongly agree please indicate your response to the following question:

I believe the homosexual lifestyle is wrong. _____

I believe homosexuals should have the same rights as anyone else. _____

I don't care what homosexuals do, I just don't want to be told all about it. _____

Being homosexual is a preference not biologically determined. _____

ECONOMIC DEVELOPMENT OF SOUTH CAROLINA'S I-95 CORRIDOR: A PRELIMINARY EXAMINATION

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ABSTRACT

Eleven counties situated along I-95 in South Carolina have been dubbed the "Corridor of Shame" by film producer Bud Ferillo because of their poor economies, health and education relative to the rest of the state. In this preliminary study we examine the economies of the counties along the I-95 Corridor region to understand why the region has lagged behind the rest of the state and to gain insights into how the region can foster a more healthy level of economic development.

INTRODUCTION

The I-95 Corridor Region of South Carolina consists of the 11 counties through which the I-95 Interstate passes. This region as a whole has not developed economically at the pace of the state, although having interstate-level highways is generally felt to foster economic development. The lack of economic progress in the region is reflected in the fact that in four of the counties more than 10 percent of the White population and more than 30 percent of the Black population had incomes below the poverty level in 1999.

This region is in contrast to three other regions of South Carolina that have enjoyed healthy economic development during recent decades. These three regions are The I-85 Corridor through the northwestern part of the state, the region around the capitol of Columbia, with I-20, I-26, and I-77, and the coastal counties, with tourism and retirement communities. In this paper we examine two aspects of this problem. First, we look at some characteristics of the counties of the I-95 Corridor Region to show how the economic development of this region has lagged behind the development of the state as a whole. Second, we outline the initial steps in a long-range research program to foster economic development in the I-95 Corridor Region.

I-95 CORRIDOR ECONOMIC DEVELOPMENT IN PERSPECTIVE

The economic development progress in the 11-county I-95 Corridor Region during recent decades is evident through examining two basic measures of economic progress: population and per capita income. Economic progress for an area such as a county is closely associated with population increase. Intuitively this makes sense, since if the economy of an area is improving fewer people will leave and more will move into the area; and, in addition, this relationship between economic progress and population growth is supported by the statistical evidence. Per capita income also is a comprehensive measure of economic well-being for an area. The product of population and annual per capita income is a measure of the annual income of the individuals in an area and the year-to-year changes in an area's income provides a comprehensive measure of economic progress.

Analysis of Population Change

Tables 1 and 2 provide population data for the I-95 Corridor counties for the decennial census years in the 40-year period 1960-2000. Table 1 provides population levels and Table 2 shows the population of the I-

95 region counties as a percent of the South Carolina population in the specified years. From Table 1 it is seen that South Carolina's population increased from about 2.38 million in 1960 to 4.01 million in 2000, which represents an increase of 68.4 percent over that 40-year period. Over the same period the 11 county I-95 Corridor region increased from 0.45 million to 0.66 million, representing a 45.8 percent increase. Thus, there was substantially slower population growth in the I-95 Corridor region than in the state as a whole. Dorchester County showed the highest growth rate with 295.4 percent, and this is probably due in large part to the county's proximity to rapidly growing Charleston County and the Charleston metropolitan area. The second fastest growing county is Jasper County with a population increase of 68.9 percent during the 1960-2000 period. Jasper County has probably benefited from its proximity to rapidly growing Beaufort County and the Savannah metropolitan area. Four counties in the region showed good growth: Florence with 48.9 percent, Sumter with 39.6 percent, Colleton with 37.5 percent, and Orangeburg County with 33.6 percent. Three counties showed a more moderate rate of growth: Darlington County with a 27.3 percent increase, Hampton with a 22.7 percent increase, and Clarendon with a 10.2 percent increase. The lowest growth rates were shown by Marlboro County with a 1.0 percent increase and Dillon County with a 0.4 percent increase.

Table 1. Population of I-95 Corridor Counties: 1960-2000 (in 1,000).

County	1960	1970	1980	1990	2000
Clarendon	29.49	25.60	27.46	28.45	32.50
Colleton	27.82	27.62	31.78	34.38	38.26
Darlington	52.93	53.44	62.72	61.85	67.39
Dillon	30.58	28.84	31.08	29.11	30.72
Dorchester	24.38	32.28	58.76	83.06	96.41
Florence	84.44	89.64	110.16	114.34	125.76
Hampton	17.43	15.88	18.16	18.19	21.39
Jasper	12.24	11.88	14.50	15.49	20.68
Marlboro	28.53	27.15	31.63	29.36	28.82
Orangeburg	68.56	69.79	82.28	84.80	91.58
Sumter	74.94	79.42	88.24	102.64	104.65
Total	451.33	461.55	556.78	601.67	658.17
South Carolina	2382.60	2590.50	3121.8	3486.7	4012.00

Table 2 is based on the same population data as Table 1, but provides a different perspective by showing the population of the I-95 Corridor Region counties as a percent of the state's population. Again it is apparent that the I-95 Corridor Region did not grow as rapidly as the state since as shown in 1960 the region had 18.9 percent of the state's population but by 2000 had only 16.4 percent. From Table 2, it also is clear that only Dorchester County and Jasper County grew faster than the state as a whole.

Table 2. Population of I-95 Corridor Counties as a Percent of South Carolina Population

County	1960	1970	1980	1990	2000
Clarendon	1.2	1.0	0.9	0.8	0.8
Colleton	1.2	1.1	1.0	1.0	1.0
Darlington	2.2	2.1	2.0	1.8	1.7
Dillon	1.3	1.1	1.0	0.8	0.8
Dorchester	1.0	1.2	1.9	2.4	2.4
Florence	3.5	3.5	3.5	3.3	3.1
Hampton	0.7	0.6	0.6	0.5	0.5
Jasper	0.5	0.5	0.5	0.4	0.6
Marlboro	1.2	1.0	1.0	0.8	0.7
Orangeburg	2.9	2.7	2.6	2.4	2.3
Sumter	3.1	3.1	2.8	2.9	2.6
Corridor Total	18.9	17.8	17.8	17.3	16.4

Analysis of Per Capita Income Changes

Tables 3 and 4 provide information on the per capita income of the I-95 Corridor counties. From Table 3, the per capita income of the region was \$20,539 in 2000, well below the South Carolina per capita income of \$23,988. In 2000 only Florence County, with a per capita income of \$24,517, exceeded the state per capita income. In addition to Florence County, only Darlington County and Dorchester County exceeded the region’s per capita income of \$20,539. From Table 4, the per capita income of the I-95 Corridor Region in 2000 is only 85.6 percent of South Carolina’s level. It is useful to summarize the levels of per capita income for 2000 as follows:

Percent of South Carolina’s

<u>Per Capita Income</u>	<u>Counties</u>
More than 100	Florence
90, but less than 100	none
80, but less than 90	Darlington Dorchester Orangeburg Sumter
70, but less than 80	Clarendon Colleton Dillon Hampton
60, but less than 70	Jasper Marlboro

From this summary it is clear that six, more than half, of the region’s counties have a per capita income less than 80 percent of the state’s per capita income.

Table 3. Per Capita Income of I-95 Corridor Counties: 1960-2000 (in dollars)

County	1960	1970	1980	1990	2000
Clarendon	\$593	\$1,339	\$4,175	\$8,181	\$17,727
Colleton	\$766	\$1,763	\$4,633	\$9,193	\$18,672
Darlington	\$943	\$2,103	\$5,141	\$10,510	\$21,038
Dillon	\$692	\$1,613	\$4,162	\$8,077	\$17,580
Dorchester	\$911	\$2,063	\$6,013	\$11,884	\$20,906
Florence	\$997	\$2,218	\$5,526	\$11,007	\$24,517
Hampton	\$805	\$1,732	\$4,827	\$8,578	\$19,028
Jasper	\$703	\$1,522	\$4,312	\$7,984	\$16,716
Marlboro	\$759	\$1,743	\$4,483	\$7,948	\$16,546
Orangeburg	\$830	\$1,820	\$4,713	\$9,004	\$19,619
Sumter	\$1002	\$1,970	\$4,774	\$9,943	\$20,493
Total	\$870	\$1,915	\$4,987	\$9,943	\$20,539
South Carolina	\$1,142	\$2,312	\$5,886	\$11,897	\$23,988

Table 4. Per Capita Income of I-95 Corridor Counties as a Percent of South Carolina per Capita Income (in percents)

County	1960	1970	1980	1990	2000
Clarendon	51.9	57.9	70.9	68.8	73.9
Colleton	67.1	76.2	78.7	77.3	77.8
Darlington	82.5	91.0	87.3	88.3	87.7
Dillon	60.6	70.0	70.7	67.9	73.3
Dorchester	79.7	89.2	102.1	99.9	87.2
Florence	87.3	95.9	93.8	92.5	102.2
Hampton	70.5	74.9	82.0	72.1	79.3
Jasper	61.5	65.8	73.2	67.1	69.7
Marlboro	66.4	75.3	76.2	66.8	69.0
Orangeburg	72.7	78.7	80.0	75.7	81.8
Sumter	87.7	85.2	81.1	84.0	85.4
Total	76.2	82.8	84.7	83.6	85.6

LONG-RANGE ECONOMIC DEVELOPMENT STRATEGY

In regional economic development there are two generic strategies. The most basic approach focuses on addressing the human or social needs of the area population by investing in improving education, medical services, social services, and in other improvements to bring the well-being of the population to an acceptable level. In the long run these improvements in the human factors of the area and its residents will lead to increases in the population level and per capita income, as well as other measures of economic progress. This approach requires a long time horizon, but the approach has the merit of focusing on improving the quality of the lives of the residents of the area. The second approach focuses directly on creating jobs. This is accomplished most frequently by attracting business firms to locate facilities in the area, and this often requires making improvements in infrastructure required by the incoming businesses. In addition, businesses are often given incentives such as tax relief for some period of time to encourage their relocation to the area. The jobs created are usually filled by a combination of local residents and workers moving into the area, often as relocated employees of the incoming firm.

These new businesses and the associated employment increase the area's tax base and its general economic well-being. Over time these improvements from job creation lead to improvements in the human and social conditions of the area residents.

In the I-95 Corridor Region there is a need to pursue both of these economic development strategies simultaneously. The resident population is largely rural, and the area is below an acceptable level with respect to human factors. Thus, there is an urgent need to address directly the human and social needs of the region's resident population. However, this strategy alone would take a very long period and the resources required to pursue this strategy over a very long period, say decades, will likely not be available. Thus, there is a need to pursue the job creation strategy in parallel with the improvement of human factors strategy. In the early years of implementing the improvement of human and social needs strategy resources from the government and grants will be required. However, over time the expectation is that as the population reaches an acceptable human factors level the job creation strategy will be strong enough to generate the resources to promote further improvements in the human factors level of the population.

During the current year, the underpinning is being established for developing and implementing this two-pronged economic development strategy. This involves pursuing the two complementary parts of the strategy in two different ways. First, an assessment is being undertaken of the human factors needs of the I-95 Corridor Region. Second, some preliminary research in the job creation strategy is being undertaken.

Human Factors Needs Assessment

South Carolina State University and Francis Marion University are jointly sponsoring a study of the human factors needs of residents in counties along the I-95 Corridor. The study will use information from a variety of sources. Similar studies conducted within the past ten years in other areas of the country should help establish a framework. State and federal data bases and other documents will set the statistical foundation for the study. Town meetings will be held in the affected counties. Interviews with economic development leaders, leaders in health care, and leading educators will help to establish this list of human factors needs.

The study should provide recommendations on:

- Working within the state government to gain the most benefits for the I-95 residents
- Coordinating local government efforts for the benefit of the region
- Working with federal government agencies to assist the process
- List advantages for future development
- List disadvantages of the region
- Using students to help with research and carrying out policies

Preliminary Job Creation Research

The job creation research projects currently ongoing are broad in nature with the expectation that this will pave the way for more targeted job creation research in the next phase of this research. Three of the current projects are related to attracting retirees to the I-95 Corridor Region as an approach to job creation. Another project deals with the feasibility of biodiesel production in the I-95 Corridor. The final project focuses on South Carolina's need for additional seaport capacity and approaches to achieving it. The thrust of these projects is described below.

Project #1: Retirement Migration Patterns: Recent and Future

The general purpose of this research is to examine the migration of the 60+ population into South Carolina and into South Carolina's counties or county groups. The results from this research are intended to provide the empirical basis for examining the potential role of attracting retirees as a component of the economic development strategy for South Carolina and its counties. In this research emphasis will be focused on the 11 counties of the I-95 Corridor Region, which is a focus of our policy analysis. This research will rely on data from the 2000 decennial census and other published works.

Project #2: Strategies and Tactics for Attracting Retirees

The purpose in this project is to identify policies and actions that can be instrumental in attracting retirees to live in South Carolina and in the 11 counties of the I-95 Corridor Region in particular. These policies and actions may be strategic, being broad and longer-term, or of a tactical nature, being shorter-term and operational. To the extent possible literature and other evidence should be brought to bear on the discussions of policies and actions. For example, if Mississippi has implemented a program to attract military retirees to their state, it is of interest to describe the specific actions taken, the success of those actions and the program, and related information. Some of the questions that come to mind are: (1) Which states represent South Carolina's competitors in attracting retirees from other states? (2) What do retirees, or different groups of retirees, want (need): transportation (highways, air service, etc), medical facilities, financial services, recreational opportunities, restaurants, etc. (3) What are the competitive advantages of South Carolina and the counties of the I-95 Corridor in attracting retirees? (4) What areas of the South Carolina I-95 Corridor Region offer what retirees want (need)? (5) What strategic and tactical initiatives could the prime areas of the I-95 Corridor Region employ that have potential for attracting retirees?

Project #3: Feasibility of Retirement Communities

In recent decades there has been strong growth in the development of retirement communities in many parts of the country. This growth continues, and it promises to accelerate with the baby boom generation moving into retirement. These communities often are located in regions of the country that have a mild climate, and in areas of those regions that can provide the housing, transportation, medical services, and other things that families need in the retirement phase of their life. While retirement communities are located in all regions of the country, they are more likely to be located in the milder climates of the southeastern states, the southwest, and California. South Carolina with its mild climate has attracted a number of retirement communities, including Sun City at Hilton Head (developed by Del Webb), Country Lakes in Little River (developed by Jensen Residential Communities), and Wyboo Plantation on Lake Marion (developed by Wyboo Plantation, Inc). The purpose of this study is to assess the feasibility of attracting the development of additional retirement communities to South Carolina and to the counties of the I-95 Corridor Region in particular. A number of questions come to mind: (1) What types of retirement communities would best fit the counties of the I-95 Corridor Region? (2) Given the types of retirement communities that fit into the I-95 Corridor Region, what are the requirements the developers of such communities need, in terms land, size of development in term of numbers of housing units, water and sewer infrastructure, availability of transportation services, medical services, recreational opportunities, and others? (3) Which counties or parts of the I-95 Corridor counties meet the basic requirements of developers as these requirements were identified in Step 2? (4) Do the counties that seem to be likely candidates to be retirement community sites have the economic development leadership capability to provide assistance to developers?

Project #4: Feasibility of Biodiesel Production

In recent years a strong interest has developed in fuels that are alternatives to petroleum derived fuels. These alternative fuels include ethanol, natural gas, propane, hydrogen, biodiesel, electricity, and methanol. On a worldwide basis, these fuels already are being used in a variety of vehicle applications. The attractiveness of alternative fuels are: (1) their use generally reduces pollutants and exhaust emissions and (2) many of them can be domestically produced from renewable sources. One possible strategy for South Carolina in alternative fuels is to grow agricultural products, such as soybeans and switch grass, and to attract companies to build plants to convert these products into biodiesel or ethanol. The I95 Corridor Region has competitive advantages that can support this strategy: (1) ample farm acreage for producing crops that can be converted to biodiesel fuels, (2) experienced farmers that already grow soybeans and that can readily move into growing other crops suitable for biodiesel fuel, (3) proximity to the I-95 Interstate that provides the effective transportation linkages to market biodiesel products, and (4) communities that can support the infrastructure and service needs of biodiesel plants. Questions that come to mind are: (1) What requirements do biodiesel firms have for establishing a plant in an area: land requirements, infrastructure (water, electricity, etc), labor force, and community attributes (services, schools, entertainment, etc)? (2) Which I-95 corridor counties are suitable for growing the crops, such as soybeans and switch grass that can be converted into biodiesel fuel? (3) Related to the first two questions there are questions about the trade-offs between the types of processing plants and the agricultural product that plants process. (4) How should an agreement be negotiated between a biodiesel firm and a county in the I-95 Corridor Region to build and operate a biodiesel plant in the county.

Project #5: South Carolina Port Capacity

East Coast and Gulf ports in the US are in the midst of a strong increase in traffic volume, particularly container cargo volume. In South Carolina the Port of Charleston is experiencing this surge. Already Charleston is the busiest container port in the Southeast and Gulf Coasts and ranks fourth nationwide in container cargo volume. Charleston ranks as the nation's sixth largest port in the dollar value of international shipments. Global Insights, a firm specializing in trade data, projects that the cargo volume passing through Charleston will increase 257 percent over the next 15 years. The Port of Charleston is the principal port in South Carolina. Shippers from more than 20 states use Charleston's port to access foreign customers and suppliers, but about 45 percent of the tonnage through the port is on behalf of more than 700 South Carolina businesses. Thus the Charleston port is a major competitive advantage for the state. South Carolina must increase port capacity during the next decade in order to retain their competitive advantage. Two types of proposals have been made to increase port capacity: (1) inland ports and (2) a new port on the Savannah River. Inland ports specialize in the staging and transfer of container seaborne freight. The objective in inland ports is to position container facilities at uncongested inland locations where rail or truck access is easy, where land is more readily available, and where economic development is desired.

CONCLUSION

Improving health, educational, and economic conditions along the I-95 Corridor of Shame is critical to the region. The strategies reported here may be the start on the road to success. The authors will provide updates on the progress of these and other efforts to help the region grow and prosper.

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[2] Fields, Bill, "Shame on school assumptions." *Times & Democrat* (Orangeburg, SC), January 31, 2007, 7B.

[3] Wooten, Nancy C. "The wrong side of the tracks: Senator looks at Orangeburg's position on S.C.'s 'poverty corridor.'" *Times & Democrat* (Orangeburg, SC), January 7, 2007, 1A, 8A.

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Travel Advice for the Voyage to Microsoft's Vista and being Office 2007 Fluent

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ABSTRACT


This will be a panel discussion led by four faculty and will include those in the audience as each shares respective experiences of using and teaching students about the new Microsoft offerings. These include the Vista operating system along with Word, Excel, PowerPoint and Access in Office 2007. The intent is to provide useful information for those who are currently using these products and those deciding whether to make the transition or not.

SESSION DESCRIPTION

Many who have adopted the new Microsoft packages have initially found the transition to be a real trip and not just a walk in the park. The session will be an open forum led by individuals with trip experience. The purpose is to provide helpful information for those who are currently on this voyage and for those who are considering undertaking it. The panelists will present their experiences and members of the audience will also be encouraged to contribute.

OFFICE 2007

Office 2007 has been redesigned. No more menus, submenus toolbars and hidden dialog boxes. The tasks that existed in 2003 are still there, however learning the new navigation may take awhile. But for many the learning curve is not so great that is isn't worth the trip. One must be aware that there are different versions of Office 2007 and when purchasing a computer an upgrade to get the desired applications.

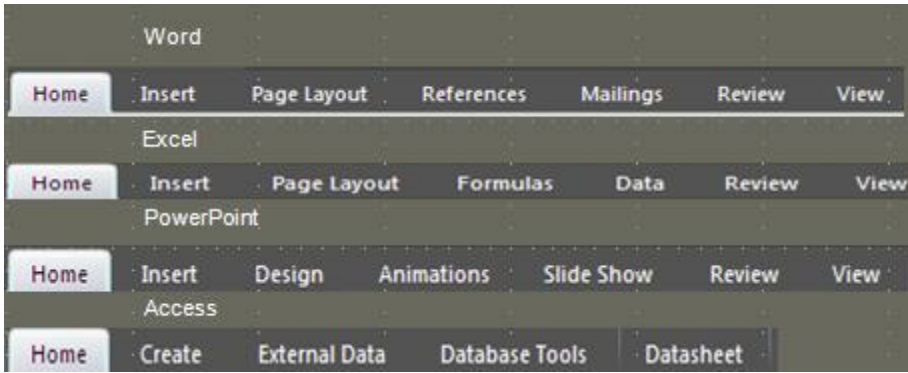
	Microsoft Office Basic 2007	Microsoft Office Home & Student 2007	Microsoft Office Standard 2007	Microsoft Office Small Business 2007	Microsoft Office Professional 2007	Microsoft Office Ultimate 2007 <i>NEW!</i>	Microsoft Office Professional Plus 2007	Microsoft Office Enterprise 2007 <i>NEW!</i>
Microsoft Office Word 2007	●	●	●	●	●	●	●	●
Microsoft Office Excel 2007	●	●	●	●	●	●	●	●
Microsoft Office PowerPoint 2007		●	●	●	●	●	●	●
Microsoft Office Outlook 2007	●		●				●	●
Microsoft Office Outlook 2007 with Business Contact Manager ¹				●	●	●		
Microsoft Office Accounting Express 2007 ²				●	●	●		
Microsoft Office Publisher 2007				●	●	●	●	●
Microsoft Office Access 2007					●	●	●	●
Microsoft Office InfoPath 2007						●	●	●
Microsoft Office Groove 2007						●		●
Microsoft Office OneNote 2007		●				●		●
Microsoft Office Communicator 2007 ¹							●	●
Integrated Enterprise Content Management						●	●	●
Integrated Electronic Forms						●	●	●
Advanced Information Rights Management and Policy Capabilities						●	●	●

To collaborate with other users still using 2003 there is a free compatibility download from Microsoft that allow opening of 2007 files in the 2003 application. The easiest way to find the download is to Google “**Microsoft Office Compatibility Pack for 2007 Office**”.

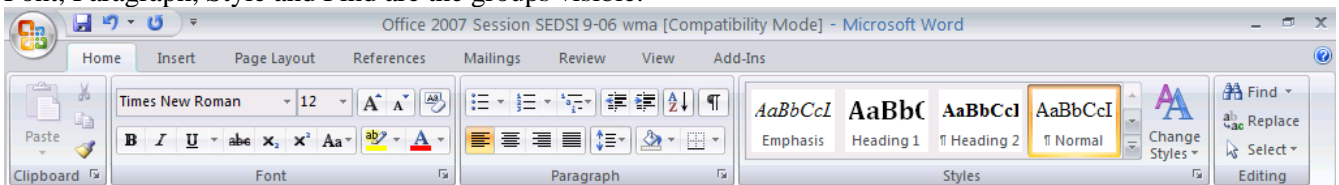
NEW COMMON 2007 FEATURES

The Ribbon

The Ribbon is the navigation feature of the new User Interface used in Word, Excel, PowerPoint and Access. Users now can see at a glance grouped options that change based upon the task being performed rather than clicking around on Menu items. Each general task is indicated on a separate tab. On tab there are sub-tasks that appear in Groups. In a group there are command buttons that can carry out a command or display more options and some of these may appear in a dialogue box. The Home, Inset, Review and View tabs appear on all three applications as shown below, but the groups and their contents are not the same for all four applications.



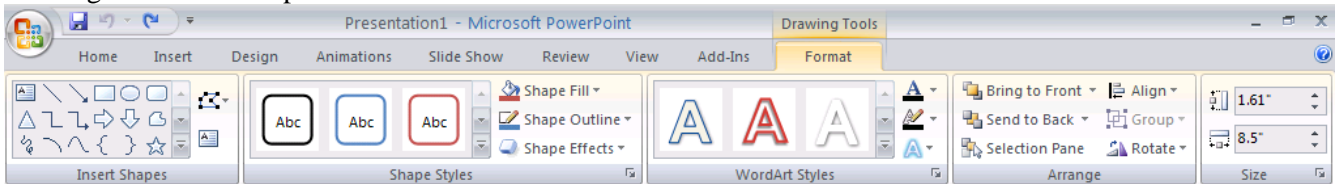
The Home tab is the first tab in all of the newly designed packages and displays the most commonly used tools for that application. For example at the Home tab in Word, the Clipboard, Font, Paragraph, Style and Find are the groups visible.



Double clicking on any tab reduces the Ribbon, clicking again to see the options or double clicking to restore the Ribbon. The Home tab shows when the application is launched and clicking on other tabs will show other options based upon the tab in use.

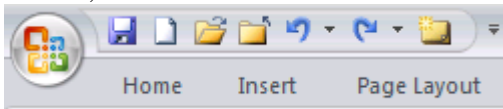
Contextual Tabs

Contextual tabs appear depending on tasks at hand. Here the Drawing Tools tab appears when working on an AutoShape.



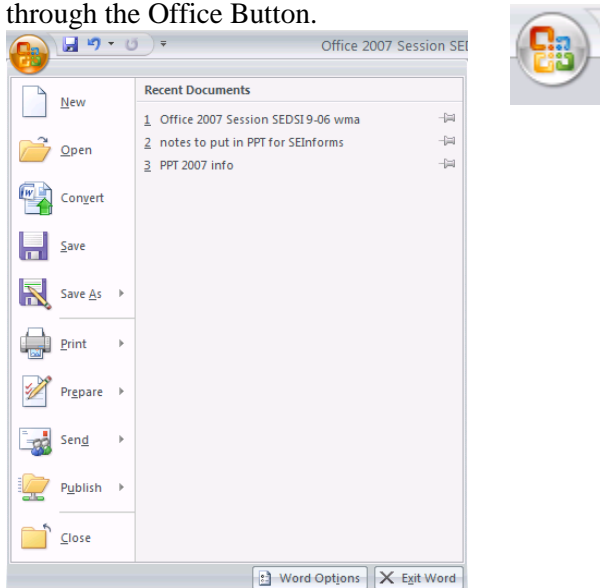
Quick Access Toolbar (QAT)

The QAT can be customized to include frequently used features. Icons are added by right mouse clicking items from the Ribbon or by clicking on the down arrow at the right of the QAT. Default is Save, Undo/Redo. It also can be moved below the Ribbon for quicker access.



Office Button

The Office Button replaces the File Menu. Save, Save As, Print, Send, Close, etc. are accessed through the Office Button.

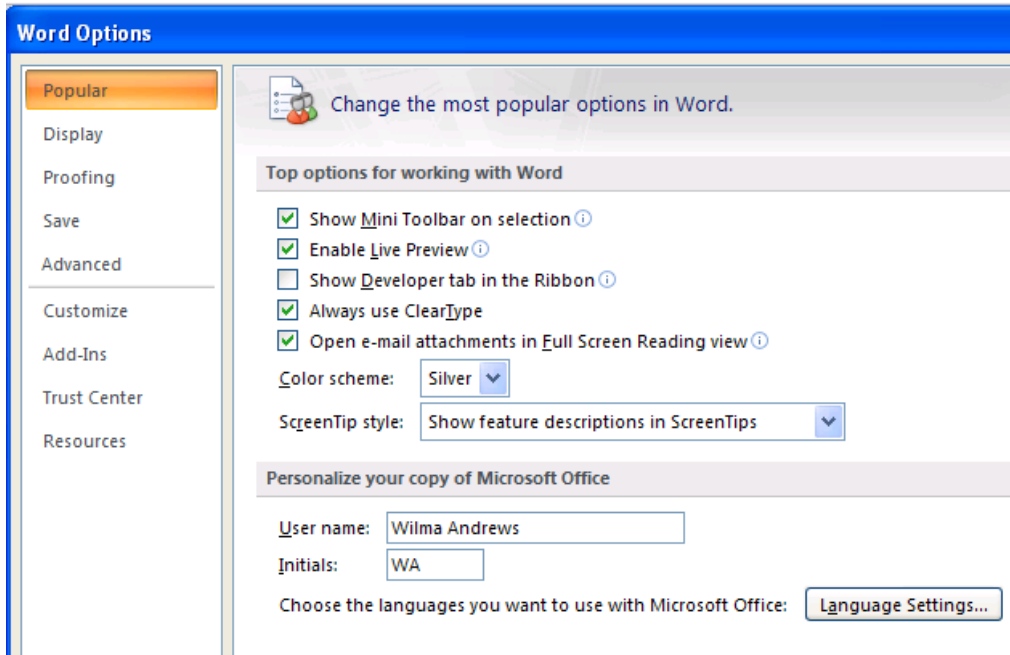


PDF and XPS support requires a free download but is at the Save As option for Word, Excel, Access and PowerPoint.

New File Extensions

New Office XML format for files gives new file extensions – docx, xlsx, pptx. (If there are macros in the document, an m will be at the end instead of the x.) These files in XML file format and are compressed up to 75% smaller. This format also improves damaged file recovery. Options to “save as” in a previous format are also at this screen. Currently Microsoft’s Internet Explorer changes the file extension to “zip” when downloading documents with the new four-character file extensions. Hence after it is downloaded one has to rename the file to change the “zip” extension to the appropriate new extension. Mozilla’s FireFox does not require renaming of files.

The screen obtained by pressing the Office Button is also where you access the Application Options via the button at the bottom of the page. These were located at the Tools/Options menu in earlier versions.



Color Scheme option here gives 3 Default Color Schemes – blue, silver, and black.

Status Bar Customization varies by application allows for the selection of visible functions. Some of these are common to all three and others are unique to the application. For example **Viewing options** that appear at the bottom right of the screen is a new feature that allows easy transition to a different view and can be turned on or off by selecting View Shortcuts. The **Zoom Slider** provides quick and easy zooming.



Full Screen Reading allows many formatting options and makes reading online easier.

MiniToolbar

The new Mini Toolbar appears when text is selected. It allows quick access to formatting options rather than having to access those options on the Ribbon.



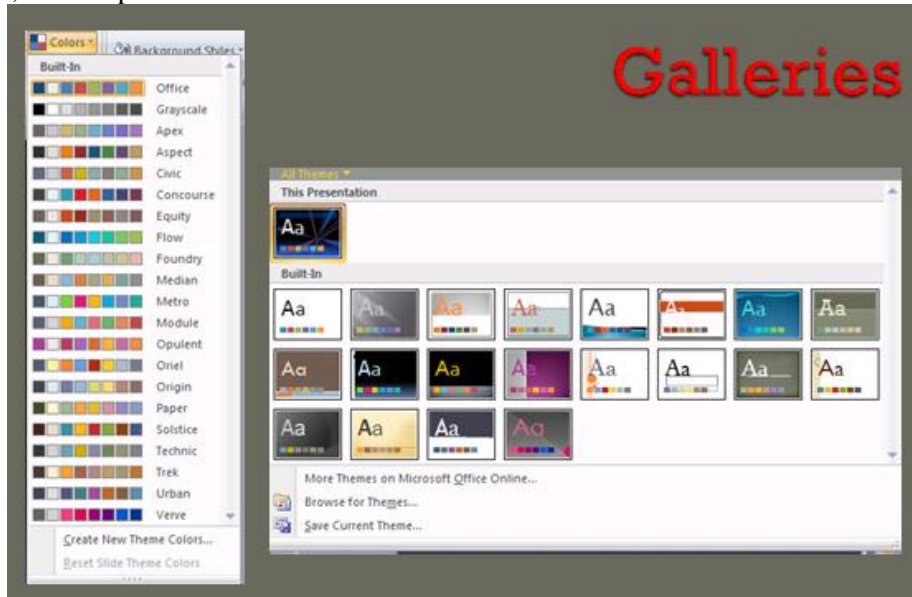
Super Tooltips are descriptions with graphics that are linked directly to Help pages. Help screens are greatly improved and there are more of them.

SmartArt is new a graphic feature on the Insert tab. It includes improved diagrams and custom graphic layouts.

The **“Alt” key** provides readily indicated Key Board Shortcuts. Pressing the “Alt” key displays letters and numbers on the Ribbon that indicate the key board options available. Selecting a letter presents the subsequent set of choices available at the tab.

Galleries

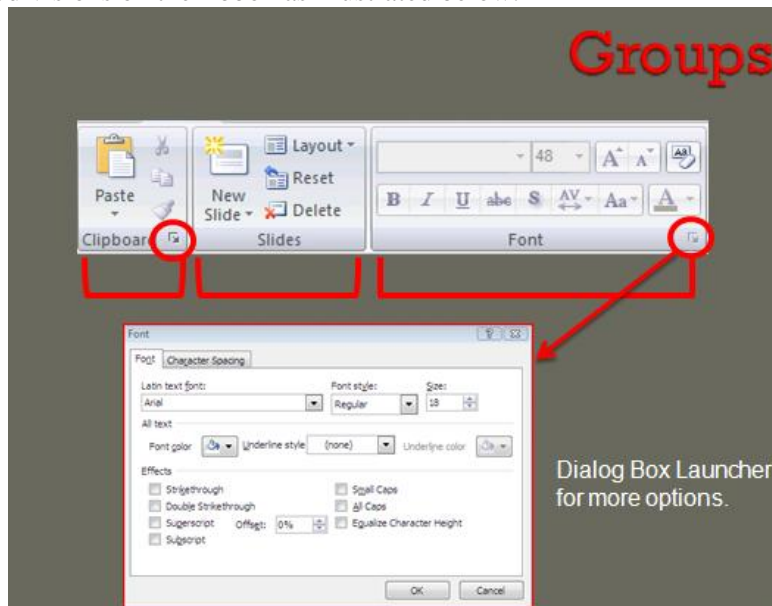
The new Gallery feature will allow the production of more professional looking documents without in-depth knowledge of all the options. Plus the view is shown while selecting so users will see the end results without finalizing a dialog box. In addition, personalized changes to color, font, etc. are possible.



Live Preview

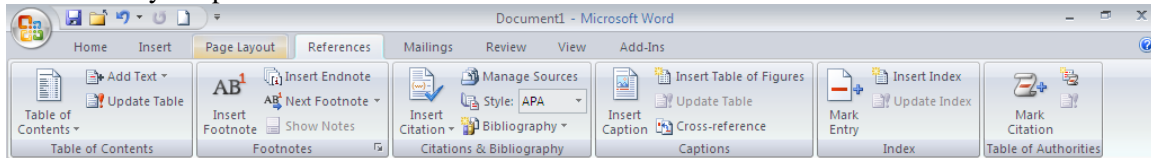
Live Preview, a great new feature, allows users to see what changes will look like before making a selection. As the user hovers over an option, immediate, but temporary, results are shown until one option is selected. Examples include views of font changes, formatting styles, Gallery options, etc.

Groups are subdivisions on the ribbon as illustrated below.



WORD 2007

Creating a professional looking document and including visual formatting can be done quicker and has been made easier. Quick Parts consisting of a specified set of text or equations are building blocks that can be used on demand in creating documents. Word has new Equation Tools accessible from the Insert tab that is very different from the old equation editor. This is not available in Compatibility Mode. However one can create an equation using the Microsoft Equation Editor 3.0 in Excel 2007 as an option under Object and then copy this equation into a Word document. Blog Support with Word allows writers to create a Word document and output to blog-compatible HTML. On the Inset tab in the Tables group one option is an Excel spreadsheet. Excel functionality is provided when the table is created and when the table is highlighted. With an add-in you can save your documents in pdf or xps formats. The References tab unique to Word has several improved features that should save time when preparing academic articles ready for publication.



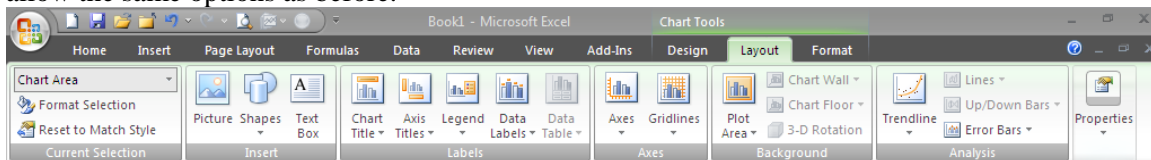
The Mailings tab brings more focus on the mail merge capabilities and facilitates the process for mail merges.

EXCEL 2007

Excel has larger worksheets (1 million rows and 16,000 columns), a formula bar that expands without covering up sections of the worksheet, additional features at the Status Bar, a Quick format gallery showing many new chart layouts, conditional formatting with many new features, new charting options, and pivot table changes. Viewable headers and footers are visible in the Page Layout View.

The main changes have been visual in nature, which includes a change in where things can be found. There are no more wizards for charts and PivotTables. The charting features have been changed. In previous versions of Excel a general rule that worked well was that if the user wanted to change something the mouse should be moved to point to whatever was to be changed then double-clicking on it would provide a menu or other opportunity to make the change. In Excel 2007 the workable rule is to right-mouse click instead of double-clicking.

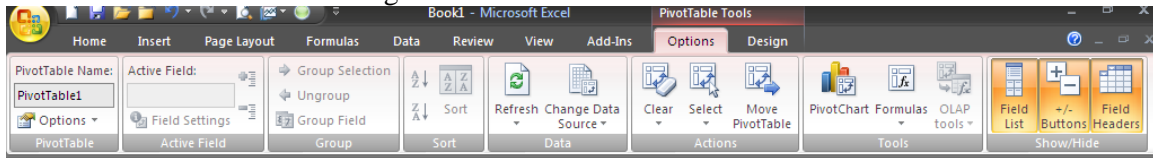
With the disappearance of the Chart Wizard, the different chart types are in a Charts group on the Insert tab and can be selected and inserted onto a worksheet, but there is no possibility to specify titles, labels or other previously available options as the chart is created. Hence one has to make these types of selections after the chart has been created. Once a chart is selected then Excel adds three additional contextual tabs: Design, Layout and Format as shown below. These essentially allow the same options as before.



Three dimensional column charts can no longer be rotated by selecting the image and rotating by clicking on a corner and moving the image with the mouse. Instead there is a 3-D Rotation item on a menu that allows rotation of one axis at a time.

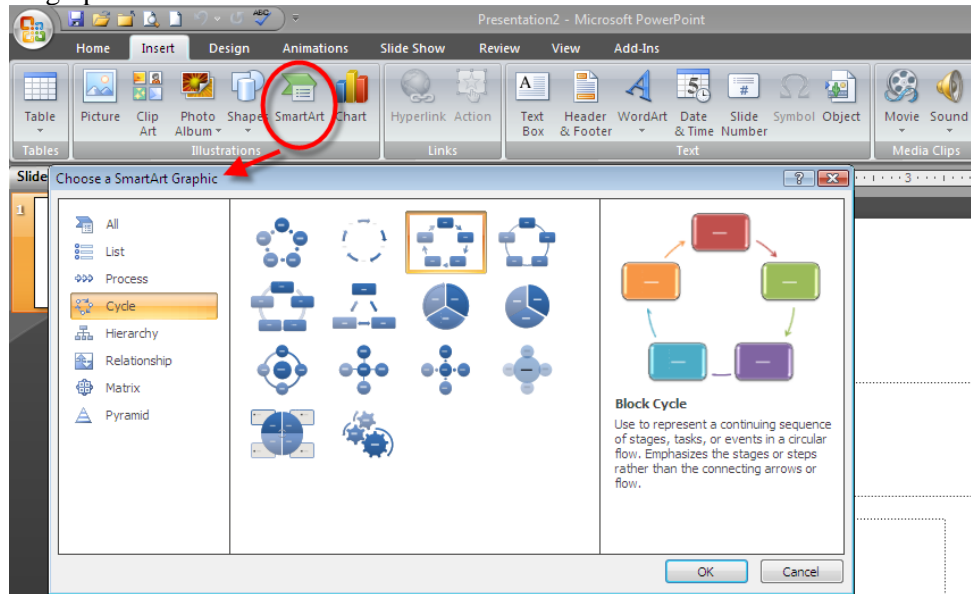
Currently there is a bug in the charting capabilities associated with Regression in Data Analysis. When performing multiple regression Excel2003 would produce multiple charts providing Line Fit Plots and Residual Plots for each independent variable (They were stacked on top of each other only showing a small segment of each chart) and a Normal Probability Plot. Excel 2007 will only produce one of the Line Fit Plots or Residual Plots and the Normal Probability Plot is incorrectly displayed as a histogram. To get the residual plots the user has to use the Excel generated residuals and then create each plot individually.

PivotTables are created from the Insert tab and no longer use the wizard. The mechanism for dragging fields in to the respective positions in the table looks different but functions much the same as in 2003. Once the table is created, clicking on a cell in the table or highlighting the table causes Excel to add two contextual tabs (Options and Design) under the title PivotTable Tools. These can be used to make changes to the table.

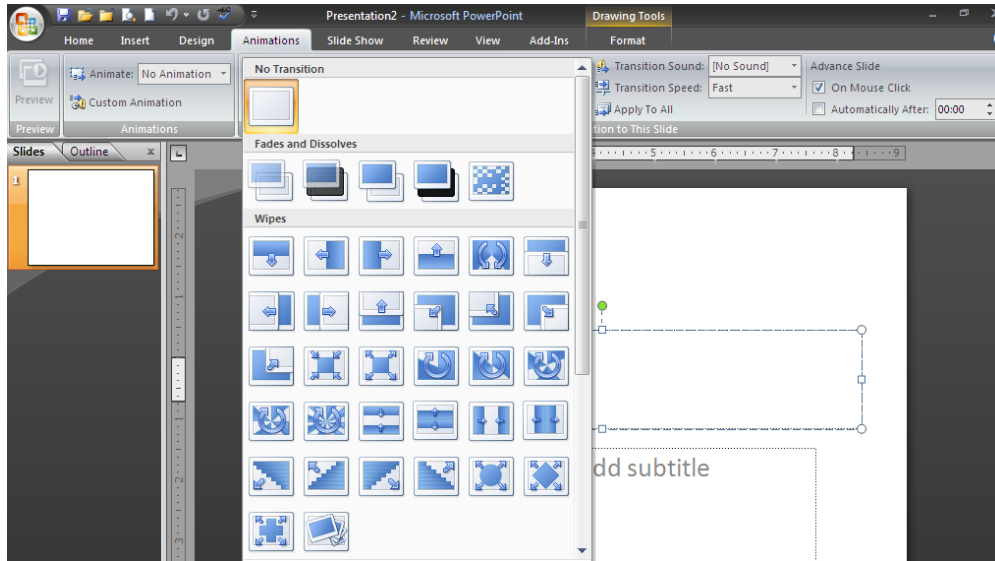


POWERPOINT 2007

SmartArt in PowerPoint provides many more graphics for presentations than in previous versions. Plus these graphics can be animated for some dramatic effects.



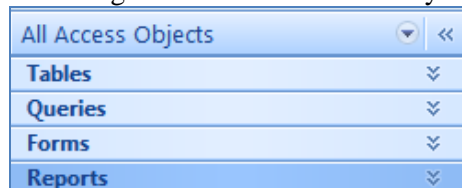
Animation options are more plentiful including new slide transitions.



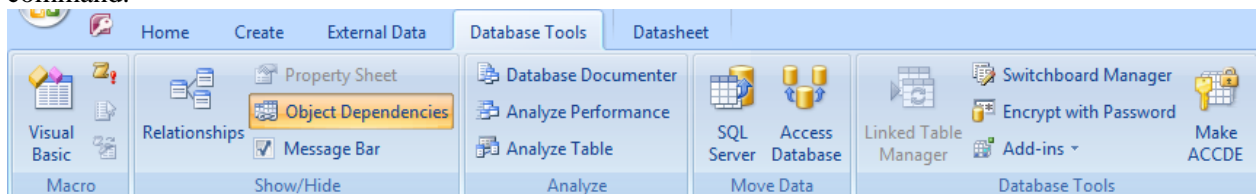
There are table and chart enhancements, proofing tools, and Presenter View using 2 monitors. Themes used in PPT can be repeated in Word and Excel documents for a unified look. The reduced document file size in Office 2007 is especially noticed with PowerPoint presentations.

ACCESS 2007

Microsoft Access is perhaps one of the most impacted components of Office in the change to 2007 both from an aesthetic and a functional point of view. Not much in Access 2007 has remained the same. Just like the other Office applications, Toolbars have been replaced by a Ribbon which usually displays a cluster of toolbars that have logical connections. The actual icons within toolbars have not changed. So, the major change for the 2003 user is to get to the right tab on the Ribbon. Another area that has remained the same in this application is the use of Wizards. This is especially important to those using Report and Label Wizards. You can still follow the same procedures even though there are now easier ways to create these objects.

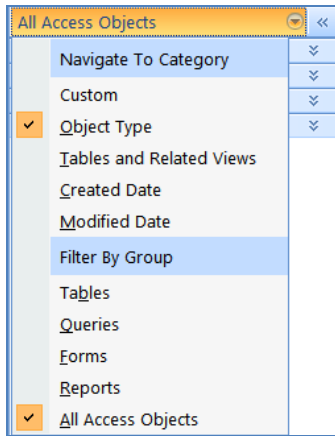


Most of the objects in the Object Navigation area such as Tables, Forms, Queries and Reports have stayed the same and now they all can be displayed simultaneously. Objects such as Pages, Macros and Modules have disappeared from the Object Navigation area. Pages are now clustered with Tables and handled with Access' sister software SharePoint. Macros are clustered with Queries and Modules are now under Database Tools tab and are designed using Visual Basic command.

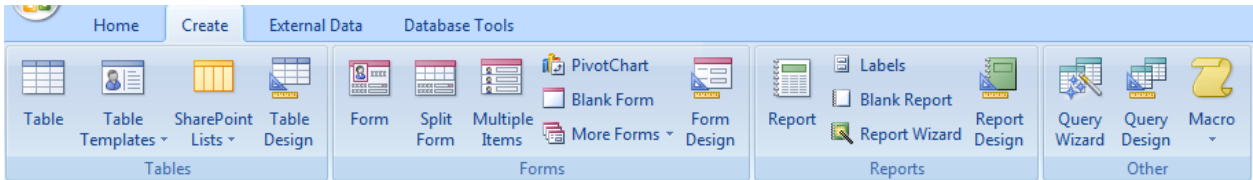


Few other things such as creating Queries in design view, establishing Relationships, creating New Tables, rearranging fields in forms and reports are still done the same as in the previous versions of Access.

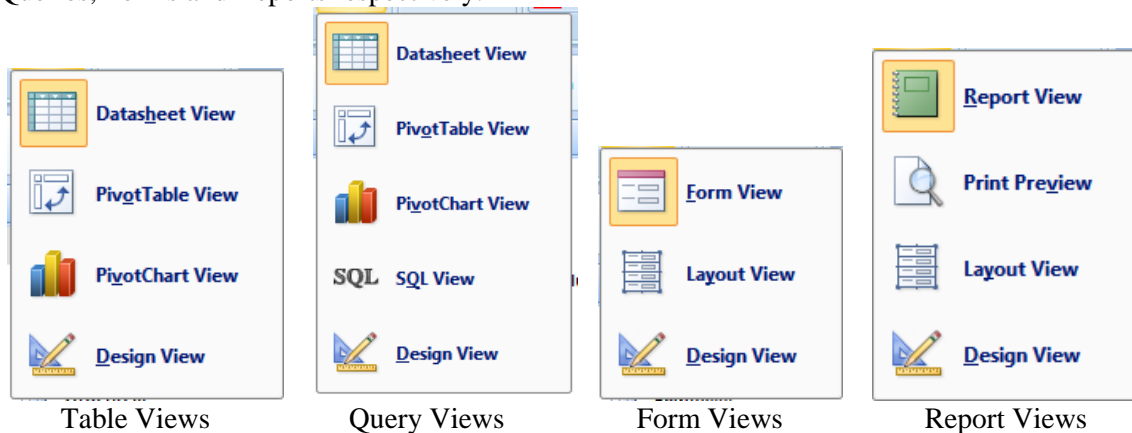
Numerous items have a new look in Access 2007. The old text menu that used to appear on top of the screen is no longer there. Most noticeably is the absence of File which is now under the Office Button like it is for the other applications. Edit, View, Insert, Format, Tools, Records, and Windows commands have been replaced by Home, Create, External Data, Database Tools, and Datasheet tabs on the Ribbon.



All Access Objects area (Objects area in the old version) has a new look and there is an option of displaying all Access objects in a database and arranging them by type, date created or date modified.

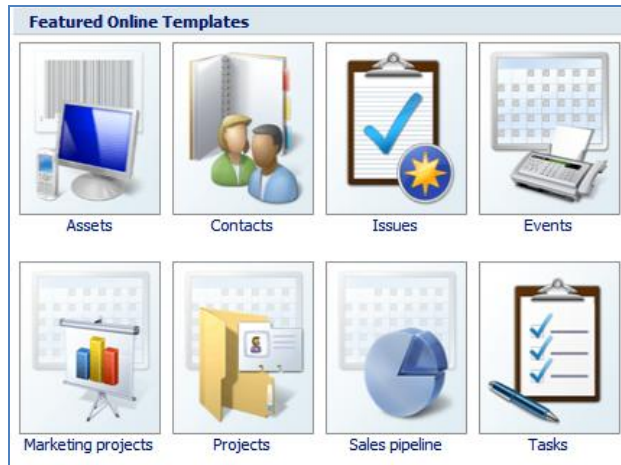


New objects can no longer be created or existing objects edited in this area. Those operations are relegated to the Create tab shown above, and one single key on Home tab allows displaying an object in different views. The images below show the various available views for Tables, Queries, Forms and Reports respectively.



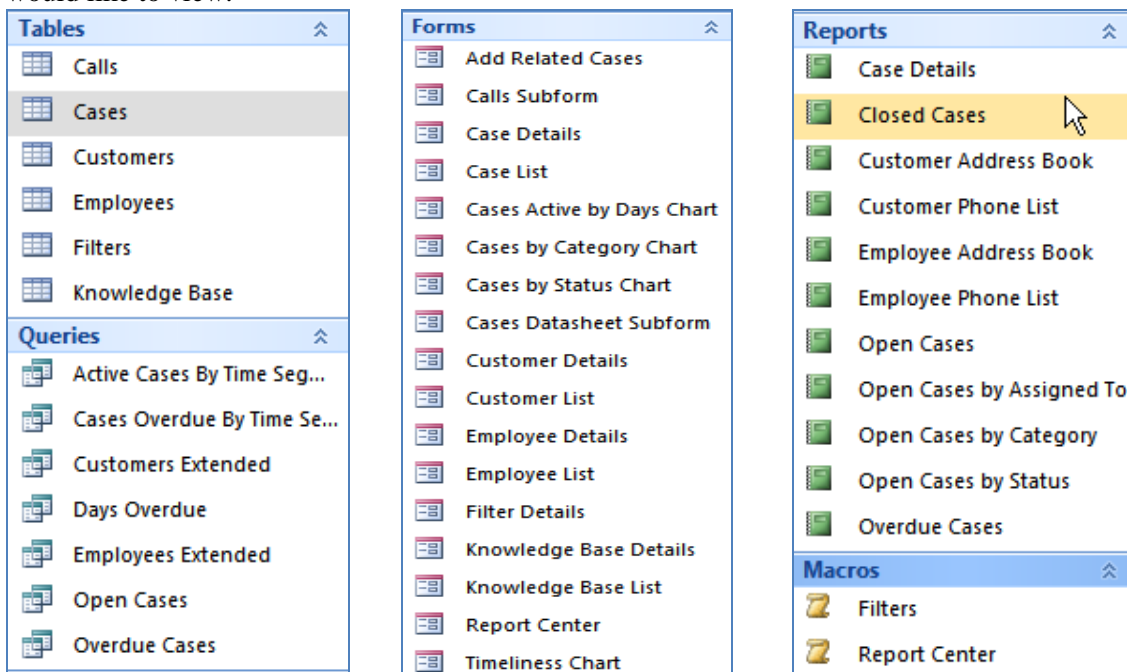
As in the other applications the formatting and cut & paste operations can be performed on the Home tab. Users still have the option of creating objects from scratch or automating the process using auto design or wizards.

There are a few new features in Access 2007 that make life easier for both the expert and novice user. To start, the splash screen is no longer a generic file browser but rather an area where novice users can download predefined templates in several categories.



This is helpful since it eliminates defining data structures that could be a daunting task for beginners. These templates provide a complete blank database that is ready to be populated. It is just like cooking a meal that only requires adding water. For example, under Business category, the Customer Service database can be downloaded within seconds and opened in Access. This database comes complete with 6 Tables, 7 Queries, 17 Forms, 11 Reports, and 2 Macros. The user only needs to add data. This can be done without a course in Data Structures or Database Management Systems!

The Object Navigation bar is on the right side of the screen and what is new in this area is that all objects can be displayed simultaneously and can be arranged by various categories. For example, Tables & Related Views can be used to arrange all objects relating to a table. This means that one can now tell what objects are impacted when the content of a table is changed. Objects can also be arranged by date created and date modified allowing one to filter out only the objects one would like to view.



A form or a report can be created on the fly by pointing to any table or even any object. There is no need for designing new auto forms or auto reports and a report can be created while designing

or previewing a form. How cool is that! Wizards have to be used if the desire is to not dump all fields into a form or a report.

VISTA OPERATING SYSTEM

There are several versions of the new Windows Vista with different features. The basic version on many new computers may not be sufficient for a user’s needs and the purchaser of new computer should be prepared to pay for upgrades.



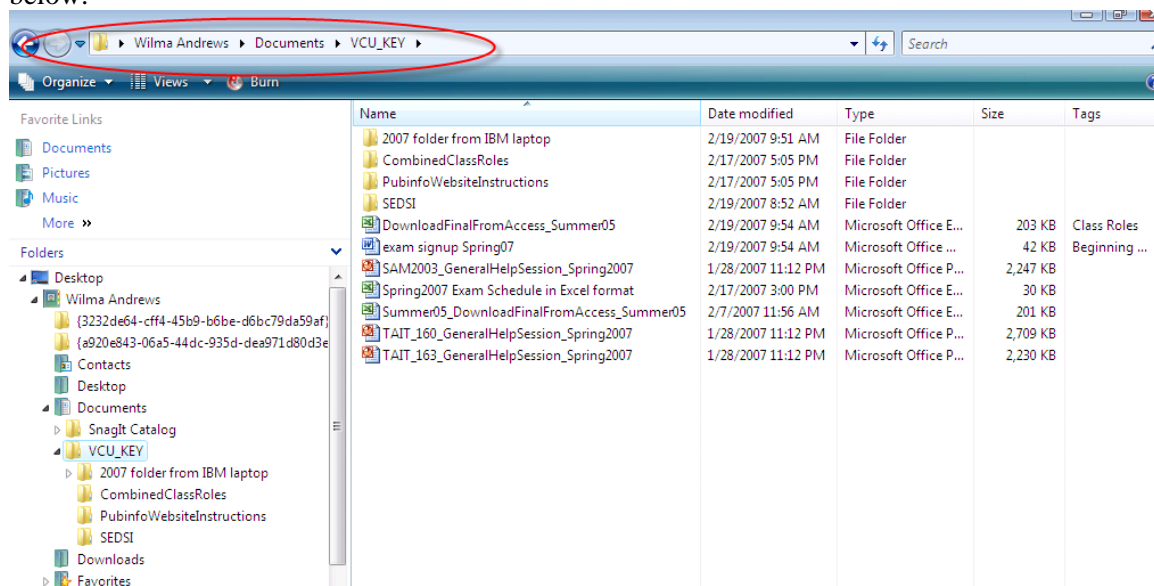
Features	Home Basic	Home Premium	Business	Ultimate
Most secure Windows ever with Windows Defender and Windows Firewall	✓	✓	✓	✓
Quickly find what you need with Instant Search and Windows Internet Explorer 7	✓	✓	✓	✓
Elegant Windows Aero desktop experience with glass-like menu bars, Windows Flip 3D, and Live Thumbnails		✓	✓	✓
Best choice for laptops with Windows Mobility Center and Tablet PC support		✓	✓	✓

Also system requirements are much larger than XP. There is a download at the Microsoft site that will test the computer to see if Vista will work. (At Google type “**Vista Upgrade Advisor**”). It does a free scan of our computer that takes about 10 minutes and will give recommendations and indicate which of your installed programs will be compatible. This compatibility issue may be a big deciding factor as to whether you want to upgrade or not. For example, SAS is not currently Vista compatible.

Beyond the basic version there is a graphic user interface and style called Aero Glass which gives glass-like menu bars, live thumbnails, and a 3-D flip to view open files. Other desktop features in several Vista versions is a Gadget Bar with options for clock, notes, CPU usage, pictures, stock quotes, time, etc. that are on the desktop and additional features can be downloaded from the Internet.



Navigation at Windows Explorer has changed to a bread crumb system as shown in the diagram below.



Greatly improved Search features can be accessed from the Start button and search will even include Outlook if it is used for emails.



Security:

Outside of the new bells and whistles, the main theme of Vista is something that most users do not see, and therefore are less likely to appreciate: **security**.

Background

Rumors of the new Windows version began slipping out in 2004, with hints of actual release dates beginning in mid-2005. The wave of expectation crested long before the product hit the shelves early **in 2007**. So without a big launching event, the question remains, then: **who needs it?** Having sat on the desktop for so long now, Windows XP has earned a solid place of affection for both the casual user and the seasoned champion. Previous major releases of Windows have included demonstrable feature upgrades to tempt the purchase price from users' wallets. For the typical user, an operating system is a necessary evil required to access the true purpose of owning a computer. This is not dissimilar to the requirement to buy insurance before driving your new car off of the dealer's lot. With Vista, the insurance against malware may actually justify the expense.

Another drag on new release adoption, especially from Microsoft, centers on the hardware required. The tradeoffs between making use of cutting edge hardware architecture and mass market appeal challenge any software developer. The behemoth size of Microsoft Vista magnifies this dilemma. For Vista to operate, the minimum configuration requires 512MB of internal memory. As with many products, the minimum configuration results in minimum performance, which introduces a new suite of problems for the adopting public. To run well, Vista requires at least 1GB of memory—this limits the target audience to those who have purchased machines within the prior 12 months of its release. Historically, it seems that new releases of Windows achieve market penetration through new machine purchases, anyway. This begins a new discussion of the impact of companies such as Dell or Gateway making operating system options part of the pricing equation.

Some blog commenter's support the claim that Vista is designed to protect the computer from outside intruders. However they also suggest that the purchaser may want to consider the potential danger from what is inside Vista. It may seem innocuous but it has the potential for Microsoft to monitor and control things that you may not want them to monitor and control. One individual indicated that he would buy a Mac before he would put Vista on his personal computer.

Publishing Tips for Professors

The presenter just completed his second book on the subject of publishing tips for professors. This edition will contain 147 useful tips to aid faculty members in this very important area of their work. The session will provide an introduction to these tips.

HAVE YOUR BUSINESS STUDENTS GOT GAME? SIMULATIONS AND ACTIVE LEARNING IN BUSINESS SCHOOLS

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ABSTRACT

Business leaders and the AACSB International have similar goals for learning in colleges of business. One method to reach these common goals is through more active learning by way of simulations. This symposium will provide an overview of how simulations are being integrated into the curriculum of schools of business. Experienced and expert faculty will present their applications of simulations in courses ranging from introductory level to capstone courses including homegrown, local PC based commercial, and simulations that function in the world-wide-web. The panel will encourage discussion with the audience concerning how simulations can best be integrated into business courses to achieve active learning objectives.

BACKGROUND

What Business Leaders Want

Business leaders say in discussions about their needs and today's business school graduates that they want students to come out of business schools capable in five broad competencies. (See [6] and [4] for a discussion of competency-based curriculum architecture and work-related competencies.) Michigan State's Collegiate Employment Research Institute conducts a national survey of employers that consistently outline these five competencies desired in new business school graduates. These competences include, but are not limited to:

- Analytical Thinking
- Team Building
- Multitasking
- Doing Successful Problem Solving Under Duress
- Meeting hard deadlines

What AACSB Wants

Similarly, the American Association to Advance Collegiate Schools of Business International (AACSB) encourages colleges of business to pursue active learning approaches and have set up requirements to guide that process. These requirements include:

- Requiring closed loop learning for accreditation
- Colleges of business are also required to demonstrate how they are actively teaching and measuring learning outcomes
- Active learning requires the context of real organizational settings, in which a particular problem or challenge is dealt with in real time for a real organizational “client”
- Using case analysis and simulations as an active learning technique

Statement of the Challenge

The challenge for schools of business is to answer the call to engage students in active, action, or experiential course content in a way that ensures they learn how to convert their knowledge from textbooks and classroom instruction into effective business decisions.

An Important Solution - Simulations

Many Professors in schools of business incorporate various levels of course content to get their students actively involved in the learning process. The course activities involve passive activities such as reading textbooks and taking attendant quizzes to measure knowledge and understanding. Typically, cases, projects, simulations, and internships are used to put knowledge and understanding into action. The key element in all of these course elements is whether or not they are integrated (work together) and lead to learning rather than just going through the motions.

Simulations have been utilized in business classrooms for some time [1]. But the results from exams have yielded mixed results [2]. Tompson and Tompson [8] found that computer-based simulations were found by students to provide more learning than traditional group projects. Others [7] have found that simulations either have a neutral effect on or a positive effect on student performance and course evaluations, relative to traditional passive instructional techniques. Both of these studies involve simulations running for the whole course carried out by groups of students.

THE PROMISE OF SIMULATIONS

Consistent with what business leaders and the AACSB want, simulations promise to offer:

- To be useful for learning principles of the discipline involved
- To be useful for applying those principles
- Ease of use for students to navigate the simulation
- Useful help from personnel at the simulation website
- A self-paced demo helpful in using the simulation
- Assignments that help the student learn and understand discipline principles
- Easy to learn interface and way to access and use the simulation
- To add excitement in the class leading to more involvement and participation
- Metrics to indicate how well individual or teams of students perform in the simulation

Azriel, Erthal , and Starr [3] have argued that simulations do three things:

- Motivate active participation in the learning process
- Encourage teamwork
- Provide a way to review business theories and vocabulary

These authors note that these enhancements of the learning experience can be obtained in even large sized and very diverse classes.

The largest advantage of using business simulations is their impact on students [5]. The design of a business simulation is aimed at offering students immediate insight and feedback on their strengths and weaknesses by putting key business issues in sharp focus. In looking at the impact of active and passive course design on student outcomes, Wingfield and Black [9] found students perceive active courses to be more useful to their future than passive courses, but course design had no impact on student grades, satisfaction, or course evaluations.

Ensuring Learning Instead of Gaming

There are many questions related to the use of simulations and their role in active learning. However, one problem with simulations is many students say they are unprepared to interact with the simulation in a constructive fashion. Ensuring they learn in the process how to apply business theories and principles instead of gaming is a key factor in the value of simulations. Wolfe and Luethge [10] have argued that “knowing little” may lead to less involvement in the simulation and poor performance. They concluded that business simulations increase involvement and lead to planned decision-making practices integrating strategy and tactics that ultimately lead to high performance and learning.

SYMPOSIUM PURPOSE

This Symposium explored how faculty with experience using simulations as learning tools foster learning instead of gaming in simulations. In the process the questions below were also explored as well as questions raised by the audience

Types of Simulations Discussed During the Symposium

The following are descriptions of the simulations used by panel members, the objectives these simulations are to address, and the method of assessing impact.

PharmaSim (Interpretive.com)

PharmaSim is used in the Marketing Major Capstone Course at Coastal Carolina University titled Marketing Strategy. The relevant course objectives addressed by PharmaSim are:

- To illustrate the process of devising and implementing Marketing Strategy in a dynamic global marketplace.
- To illustrate the use of strategic planning models to organize marketing decision-making.
- To distinguish segments of a marketplace and devise a targeted marketing effort to reach organizational goals.
- To compare and contrast the decision-making process of individuals and organizations in the marketplace.

- To illustrate marketing mix manipulation in a competitive marketplace (Product, Price, Promotion, and Place/Access).
- To prepare students to conduct themselves as informed consumers and marketing managers in a dynamic global marketplace.

Following a 2 week practice period, students are positioned to treat each week as one year in the life of the simulation (10 years total). The simulation typically runs for at least 12 weeks over the life of semester. Student assessment of PharmaSim is done as follows:

Please evaluate the use of PharmaSim (the online computer simulation) used in the delivery of the Marketing Strategy course using the scale provided.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
PharmaSim was useful for applying Marketing Strategy models.	1	2	3	4	5
PharmaSim was easy to access.	1	2	3	4	5
PharmaSim was easy to learn.	1	2	3	4	5
PharmaSim was easy to use.	1	2	3	4	5
I got useful help from personnel at Interpretive.com (the provider of PharmaSim).	1	2	3	4	5
PharmaSim provided the opportunity to apply the concepts discussed in class and in our textbook.	1	2	3	4	5
The PharmaSim in-class assignments helped me to learn about Marketing Strategy.	1	2	3	4	5
The OTC Consumer Study helped me to learn about Marketing Strategy.	1	2	3	4	5
PharmaSim added excitement to the Marketing Strategy course.	1	2	3	4	5
The use of PharmaSim increased my level of satisfaction with the Marketing Strategy course.	1	2	3	4	5

The Professor continues to work to more fully integrate the simulation with the remainder of the class, believing the data that follows reflects an important need for active learning.

Mike's Bikes Advanced (SmartSims)

Mike's Bikes Advanced is used in Strategic and International Issues in Management MBA course at Coastal Carolina University. It is fit into the course by discussing applications of course materials as those sections arise in the textbook.

Related Course Objectives include the following:

- To identify and explain feasible courses of action based upon a integration of functional skills (e.g., accounting, human resource management, finance, marketing, MIS, etc.).
- To differentiate between strategies at the functional, business, corporate, and international levels and to analyze the appropriateness of these different strategies for particular organization, given the environment in which the organization operates and the resources of the respective organization.
- To apply analytical skills toward the integration of course material and real world business problems in both simulated and real decision situations.
- To demonstrate the connection between formulation and implementation of strategic plans.
- To devise and evaluate comprehensive work plans in teams.
- To design, organize, and prepare formal presentations of strategic analysis and plans of action in both written and oral form.

A description of Simulation Assignment/Assessment of Learning is as follows:

Throughout the course, students compete in teams in a simulation involving strategic, functional, and organizational decision making. While many of the other components of the course focus on formulation of business strategy, this component emphasizes the integration of both formulation and implementation. Three segments will comprise the grade for this component:

- Simulation Preliminary Strategic Plan and Performance
- Final Simulation Strategic Plan
- Presentation of Final Simulation Strategic Plan

Better Business Game (BT Group plc, UK)

This stakeholder game is used in the Management Major Capstone Course on Strategic Management at Coastal Carolina University. It is played twice by each student individually with no competition involved. There are two years of the stakeholder game, one at the start of the course and one at the end of the course. To make good decisions, a player needs to devote at least an hour to study the available information and select good options. A written report with the final results page is required.

The course objective related to the simulation is:

- To adopt a stakeholder analytic perspective when applying analytical skills toward the integration of course material and to real world business problems.

The simulation has some relationship to first chapter in the text with a section titled "Strategy and Ethics: Passing the Test of Moral Scrutiny." Ideas are also revisited in Chapter 10 titled "Strategy, Ethics and Social Responsibility." More importantly, however, stress is placed on the stakeholder impact in all major course assignments. Stakeholder theory is a central theme of the course, and the Better Business

game provides great reinforcement. Students often comment on how they gained a greater appreciation for the CEO's job in having to make stakeholder decisions

BROADEC The Broadcast Economic Computer Simulation Game (Louis Mancuso)

BROADEC is used in both an Advertising Management class and Marketing Strategy class for Juniors and Seniors at Xavier University of LA. It is a stand-alone simulation, but can be used with a variety of textbooks in advertising and marketing strategy. The courses are designed to teach management functions of an advertising campaign including planning, direction, organization, control, and feedback.

The courses consist of 'live' case studies, textbook material, lectures, and the simulation.

The simulation helps the student develop and understand:

- The strategic planning and management of a media buy campaign.
- The integration of various business disciplines (including accounting, economics, management, finance, and marketing) to enhance the students' skills in decision making.
- How to prepare and implement a strategic plan and modify the strategic plan overtime to meet the competition.
- How to learn to work in teams and make both formal and informal presentations using such programs as Power Point.
- The effects of economics on various managerial decisions.
- The effects of natural forces, such as, hurricanes on the decision making process.

The students must pass in their senior year the ETS Comprehensive Examination in Business with sections in Accounting, Marketing, Economics, Finance, and Management. The simulation prepares students for these exams.

Foundation Simulation (CapSim)

The Foundation Simulation is used in the Capstone Course of the MBA program at Charleston Southern University which examines the strategic planning process from an executive level of management. The course is designed to teach the student to understand, integrate, and apply strategic planning and management concepts from the MBA business core in the solution of domestic and global business problems. The course consists of written case studies, computerized management simulation, reading assignments, and group Discussion Board activities. This course is an on-line version taught regularly during the Fall and Spring semesters.

- To develop an understanding of the strategic planning and management concepts in a variety of domestic and global situations.
- To integrate various business disciplines with the strategic management process and enhance students' skills in decision-making.
- To acquaint students with strategic management concepts, including formulation and implementation of these concepts in practice.
- To give students practical experience in preparing and implementing a strategic plan for a business or an organization.
- To provide students with opportunities to work in teams, make formal and informal presentations through presentation software such as PowerPoint.
- To understand the impact of the world economy in which the manager operates.

Students take the Comp-XM evaluation exam at the end of the course which compares their knowledge and expertise with students from all over the world. This procedure first used this year is a test procedure to support a probable recommendation that this evaluation be done with each class.

MarketShare (Interpretive)

MarketShare is modeled from an OTC brand management perspective, but the issues raised apply to marketers in any industry. In the introductory course for Marketing Principles designed as a foundation for the Marketing Major, MarketShare is an active learning tool. MarketShare is an online Simulation that focuses on the process of creating and delivering marketing value: learning about customers and how to create, communicate, and deliver value. Students develop a sound understanding of the Four P's of Marketing: Pricing, Promotion, Product and Place (distribution). This includes an introduction to segmentation, marketing research, consumer behavior, integrated marketing communications, distribution, and channel management. In MarketShare, students take the role of the Brand Management Team in the over-the-counter pharmaceutical industry and manage 'Allstar Brands' the leading multi-symptom cold medicine, for up to 6 simulated years. As a member of this marketing team, students manage the marketing mix for their products, along with reformulating their brand, introducing a line extension, and launching a new product. For the Marketing Team Project, the class is divided into teams of approximately 4 to 5 persons per team. Once teams are formed, they do not change in composition. Each team member is assigned a role, e.g., Product Manager, R&D Director, VP Marketing, etc. (The number and sizes of teams will vary depending on the final class size). Although weekly class times may be given to meet, the team must meet on their own time. Teams must select a team leader who will be responsible for coordinating meetings and the team playing of MarketShare. The team project using the MarketShare simulation will be assigned early and each team will be expected to start early and pace itself. This realistic simulation offers the advantages of an opportunity for hands-on learning at an accelerated pace when compared with "real life". Teams will form through a collaborative process, and each team will be responsible for a number of homework assignments and for running their firm. The assignments will help teams prepare to run a firm effectively, and give direct experience with some of the concepts discussed in class. Each student firm will start at the same starting point and will compete against the other computer-run teams. At the end of the simulation, each team prepares a marketing plan and a presentation to management.

A "Balanced Scorecard" approach to relative performance is used to evaluate team performance and is based on each firm's weighted rank at the end of the simulation, assessed as follows:

- The firm's stock price - 35%
- The firm's cumulative net income - 35%
- The firm's overall market share (at retail in \$) in the last period - 30%

Both the simulation impact and the working in teams environment are assessed at the end of the simulation as follows:

MARKET SHARE SIMULATION EVALUATION		<i>Strongly Agree</i>			<i>Strongly Disagree</i>	
1	The simulation was useful for learning marketing principles	5	4	3	2	1
2	The simulation was useful for applying marketing principles	5	4	3	2	1
3	The MarketShare simulation was easy to use	5	4	3	2	1
4	My team got useful help from personnel at Interpretive.com	5	4	3	2	1
5	The self-paced demo was helpful in using the simulation	5	4	3	2	1
6	The MarketShare assignments helped me learn and understand marketing principles	5	4	3	2	1
7	The simulation was easy to learn how to access and use	5	4	3	2	1
8	The simulation added excitement to this class	5	4	3	2	1
9	The MarketShare simulation experienced could be improved by:					

WORKING IN TEAMS EVALUATION		<i>Strongly Agree</i>			<i>Strongly Disagree</i>	
1	My team was well organized	5	4	3	2	1
2	My team worked together to make decisions	5	4	3	2	1
3	My team members were prepared to work together	5	4	3	2	1
4	If I were looking for a job, I would want to work with my team	5	4	3	2	1
5	The team experience was valuable	5	4	3	2	1
6	My team members attended meetings regularly	5	4	3	2	1
7	The team experience could be improved by:					

Additional questions and issues related to simulations that were addressed in the symposium include:

- How do Professors foster application of business theories and principles instead of gaming?
- What are the perils and pitfalls of using simulations in the classroom?
- Should simulations be group or individual activities?
- What role should simulations have in reaching the goals of business leaders and AACSB?
- How should that role be fulfilled through passive and active learning methods?
- How can we measure the effect of adopting a simulation in the classroom?

- What role do simulations and active learning processes play in developing a business decision perspective?
- What role do textbooks, cases, and other assignments play in fostering a business decision perspective in the classroom?
- What kind of performance metrics should be used to define student outcomes?

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TIME OUT!: TAKING STOCK OF YOUR ACADEMIC CAREER TO DATE AND PLANNING FOR GREATER-THAN-YOU OUTCOMES IN THE FUTURE

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ABSTRACT

Time Out! We'd like to introduce the **Halftime** paradigm to our academic colleagues to encourage them to think of (even dream of) greater-than-you outcomes given our work and skill sets as academicians. Colleagues in their 40's or 50's may reflect on their academic careers and begin to channel some part of their future efforts to activities they believe contribute to a greater good. Further, colleagues looking to retire in the coming years have significant skill sets that can be put to non-academic use (including grant writing, mentoring, volunteerism, etc) in the years following retirement from the academic life. The session itself may be viewed as the beginning of a journey for participants rather than a destination itself.

INTRODUCTION

Bob Buford was a successful entrepreneur actively developing his business, a collection of television stations and cable systems in the southwestern United States. A number of events, both personal and professional, caused Bob to re-evaluate his life and the relative balance between his personal and professional goals. He wondered why he was increasingly successful at work (increasing sales revenue, increasing net income, increasing market share, etc) but experiencing lesser and lesser joy from these 'successful' efforts. He had entered, to use his term, **Halftime** (See Buford 1994; Buford 1997; Buford 2001; Buford 2004). Below is a brief description of **Halftime**:

Halftime (Bob Buford) – the opportunity, after some of our life has passed, to evaluate what has taken place during the first half and to choose which new goals and dreams we may want to pursue during the second half of our lives. **Halftime** is the start of an exciting journey that can take us past success and lead us toward significance.

Buford's work is a subset of a growing literature stream which seeks to help readers transition their orientation from success to significance (see, for example, Maxwell 2004; Reeb 2004, Ziglar 2007). This literature serves as the foundation for the preparation of this special session.

THE PURPOSE OF SPECIAL SESSION

According to the **Halftime** paradigm, most of us begin taking stock of our work (for that matter, our lives) in our early 40s (though some may do so earlier and some may do so later). The analogy of a sporting contest ... time divided into halves with a break in between ... is used to model life's events. This paradigm is presented graphically below:

First Half	Halftime	Second Half
You acquire the skills and develop the talents to be successful.	You decide to take stock of your success and plan for a transition in your life to a greater-than-you outcome.	You find ways to use your skills and talents to achieve a greater good ... from success to significance.

Academics have developed and value-added skill sets. Daily, we engage in teaching, research, and service work. We position our students for success in the classroom and beyond. We experiment with new paradigms in the interest of continuous improvement. We mentor developing colleagues. We add to the collective knowledge base of our disciplines. We consult with stakeholders hoping to help them improve their efforts. We participate in the governance of our institutions. We have predictable measures of success in the profession, such as promotion, tenure, professional recognition, and so on. But, we lack any unified measure of significance for the academic life. As such, many of us may not think about the greater impact of our work (or, the possibility of our work having a greater impact) as we move from semester-to-semester, quarter-to-quarter, or academic year-to-year. This lack of broader thinking may hinder us from such a transition in orientation from success to significance.

The purpose of the session is to introduce the **Halftime** paradigm to our academic colleagues to help them think about their past work and how their existing skill sets may be able to be used for a greater good in the future. Colleagues in their 40's or 50's may reflect on their academic careers and begin to channel some part of their future efforts to activities they believe contribute to a greater good. Further, colleagues looking to retire in the coming years have significant skill sets that can be put to non-academic use (including grant writing, mentoring, volunteerism, etc) in the years following retirement from the academic life. We believe a presentation of the **Halftime** paradigm could be beneficial for all colleagues and add value to the SOUTHEAST INFORMS meeting.

DELIVERING THE SPECIAL SESSION

The session may be viewed as a coach calling, "**Time Out!**" Then, having gained the attention of the team, the group reflects on their prior work and plans for improved performance in the future. The interactive panel discussion will consist of a collection of colleagues familiar with the **Halftime** paradigm. From their collective input, a series of self-evaluation tools has been developed to help audience members begin to think about their personal transition from success to significance.

The session itself may be viewed as the beginning of a journey for participants rather than a destination itself. Through the presentation of the paradigm and the self-discovery exercises, we hope to encourage our academic colleagues to think of (even dream of) greater-than-you outcomes given our work and skill sets as academicians. If we can effectively do so, the developers of the special session will have, in some small way, contributed to a greater good themselves by spurring others toward similar thinking. We look forward to sharing our ideas with our colleagues.

SUGGESTED READINGS

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Predicting a Driver's Finish in a NASCAR Race

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ABSTRACT

This paper examines an interesting problem of building a model using Excel to predict a NASCAR driver's finish in a race based on the data from the previous races for the season. The important modeling decisions are discussed. Several functional capabilities of Excel are illustrated in the model building process. The necessity of having a monotonic function to consistently find a minimum or maximum is also illustrated because the chosen loss function ends up not being monotonic and this means that a truly successful model was not attained with this process. In addition it is obvious that even though the binomial is a discrete distribution giving probability values for $x=0$ through $x=42$, it is not a proper distribution for modeling this phenomenon.

INTRODUCTION AND OVERVIEW

NASCAR standings are determined by points earned during the season's races. The number of points a driver earns in a race is determined by his/her finish in the race and his/her ability to be in the lead during the race. Bonus points are earned based on leading the race. Five points are earned if a driver leads for at least a lap and an additional five points are earned by leading for the most number of laps. Hence a driver's bonus points for a race will either be 0, 5 or 10. The points awarded for the place the driver finishes in the race for the purpose of clarity will be referred to in this paper as place points. Place points are not strictly linear based on the place the driver finishes in the race. The first place is awarded 180 place points plus there is the additional consideration of bonus points and these would be five or ten points given the fact that the winner at least was in the lead at the end of the last lap. There is a ten point decrease for second place and a five point decrease in place points awarded between places for the second through sixth place finishes. For the seventh through the eleventh place there is a decrease of four points. Then from the twelfth through the forty-third place there is a decrease of three points per place as is shown in Table 1.

Table 1
Place Points Awarded Based on Finishing Place

Finishing Place	Place Points	Finishing Place	Place Points	Finishing Place	Place Points	Finishing Place	Place Points	Finishing Place	Place Points
1st	180	10th	134	19th	106	28th	79	37th	52
2nd	170	11th	130	20th	103	29th	76	38th	49
3rd	165	12th	127	21st	100	30th	73	39th	46
4th	160	13th	124	22nd	97	31st	70	40th	43
5th	155	14th	121	23rd	94	32nd	67	41st	40
6th	150	15th	118	24th	91	33rd	64	42nd	37
7th	146	16th	115	25th	88	34th	61	43rd	34
8th	142	17th	112	26th	85	35th	58		
9th	138	18th	109	27th	82	36th	55		

The point accumulation situation for a season becomes even more complicated because at the end of the twenty-sixth race of the season the point totals for all drivers qualifying for the "chase" have their point totals adjusted. The top ten drivers and anyone else within 400 points of the points-leader qualify for the "chase." The driver with the most total points will begin the chase with 5,050 points. The driver in second place in the points standing will start with 5,045 and the awarding of points decreases by five points each time through all drivers qualifying for the chase. To put the 5,050 points in perspective, a

driver would only have a total of 4,940 if he or she earned the maximum number of points in all twenty-six races.

Qualifying for the “chase” places a great deal of interest and focus on the twenty-sixth race. Prior to the 2005 twenty-sixth race in Richmond, VA there were six drivers who were virtually sure of being in the chase with the remaining four positions to be decided in the twenty-sixth race. There were ten drivers who could mathematically qualify for the chase. The motivation for this paper came when I was called by a newspaper reporter who asked me if I could come up with a probability of qualifying for the chase for each of these ten drivers based on their performances in the preceding races. At the time I had no clue about how the NASCAR points were awarded for a race. I did know that it was not something that I could do in the two day time-frame for the reporter to be able to write an article prior to the race. The problem did intrigue me and this paper addresses this problem.

Overall the problem of making predictions about the likelihood of each driver qualifying for the chase is complicated for some of the drivers because their ability to qualify depends on how many points they get relative to the points earned by multiple other drivers. Some drivers can control their own destiny and qualify by earning a specified number of points. For them predicting their ability to qualify can be accomplished by merely developing a model for predicting the points that will be earned in the upcoming race. Another issue is what should be used as inputs into the model. Should I form a model using only the outcomes for the previous races of the season or should I try to include information from previous seasons? Even if I wanted to build a model that includes information from previous seasons it would certainly have to have a major component that uses the current season data. Hence my initial focus was exclusively on building a model that attempts to predict a driver’s finish in the last pre-chase race of the season using the results for the preceding races of the season. Such a model is also essential if one attempts to deal with the more complicated situation involving the results of multiple drivers. Hence my attempts at developing this model will be the beginning point the focus of this article.

MODELING POINTS FOR A SINGLE RACE

As indicated in the introduction, the possible points earned by a driver in a race is a discrete variable with integer values but there is no regular interval between the possible values due to difference in the gaps between place points awarded based on where the driver finished and due to the awarding of bonus points. Due to the lack of linearity for the points the initial decision was to first develop a model for the finishing place in a race. Then the finishing place in the race can be easily translated in to a number of place points based on the NASCAR formula. Bonus points will be considered separately, if it is possible to develop a reasonably successful model for finishing place. Bonus points are separate from finishing place because with the exception of the winner, bonus points will not be directly dependent on where a driver finishes in a race. There is of course some statistical dependence here because the chances of earning bonus points for someone finishing 43rd will not be the same as for someone finishing second in the race, even though it is possible for the 43rd place finisher to lead one or more laps while the 2nd place may finish without ever leading a lap.

The data that will be used to build the model for each driver were obtained for 2005 from a Fox Sports website <http://msn.foxsports.com/nascar/cup/stats>. This site has the race results arranged by driver and was chosen over other sites that just have results arranged by race. Excel was the analysis tool that was readily available and was used in the attempt to build a workable model. The results for a driver were first put into a frequency table to register the number finishes for the driver in places one through forty-three.

Having an accident or mechanical failure that would prematurely eliminate the driver from finishing the race clearly impacts the finishing place for the driver. I initially considered trying to separate this out creating an initial estimate of the probability of the driver having an accident or mechanical failure then

developing a model to predict the finishing place in the case of an accident for mechanical failure and another model to predict the finishing place if the driver was still running in the race at the end. With less than 30 races to provide the data for the modeling these would not be adequate to develop models for what amounts to three separate pieces. In fact for the 2005 season Rusty Wallace was running at the end of each race so there would be no information on which to try to determine what place he might finish if he if he had a mechanical failure or race ending accident. Consequently I abandoned this idea and turned my attention toward attempting to build a single model to predict the finishing place for a driver for the race. The possible values for finishing place range from first to forty-third. The goal is to have a model that provides a probability estimate for each of these values. Having a model that merely gives a point estimate of the finishing place as one would get from a regression type model would be of no real value for the original purpose of estimating the probability of a particular driver placing high enough in the 26th race to make it into the chase.

This situation does not fit into a situation for which there is known probability distribution. The binomial distribution with $n=42$ will provide forty-three probability values that can correspond to the 43 places. The key parameter for the distribution is the probability of success and will be represented by the Greek letter π . Since Excel is the chosen computational tool, it does has a binomial function in its list of statistical functions. For each driver the goal is to use the data from the previous races and try to estimate the value of π . For each value of x , where x is an integer value ranging from 0 to 42, the probability of that x can be calculated using $n=42$ and the value of π . The value of the finishing place will range from 1 to 43, hence the value of x can be determined by subtracting one from the finishing place and (finishing place) = $x + 1$.

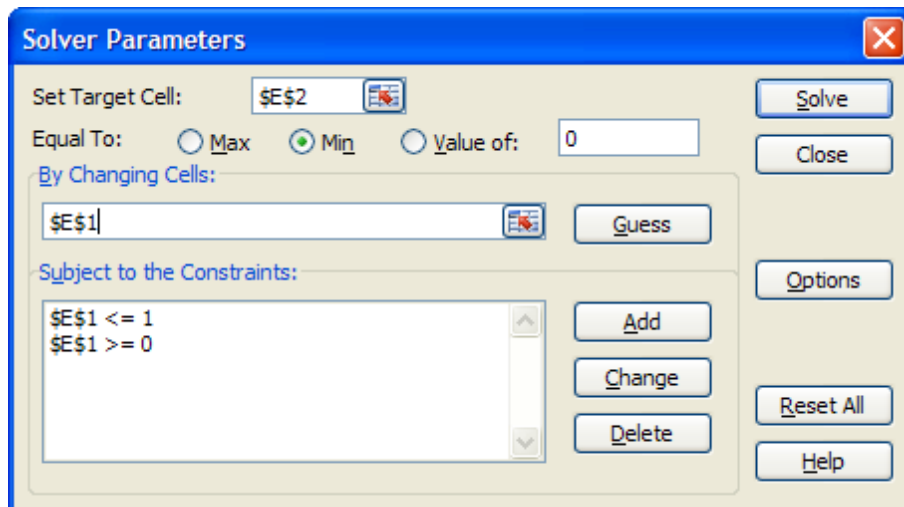
Being able to come up with a specific value of π for a specific driver based on past performance for the season means that a criterion must be established to be able to find a value of π that either maximizes for minimizes the value of the criterion function. Hence a loss function or some method of measuring the amount of disparity between the observed frequencies and the model predicted frequencies was developed. The squared differences between the observed relative frequency and the corresponding modeled probability were used. Hence for each driver there is a frequency table for the driver's finishing places. Since the number of places clearly outnumbers the number of races run, there will be several observed values of zero for Frequency as shown in Table 2. To build a model for a particular driver the goal is select a probability of success that will minimize the sum of squared errors. Table 2 presents a segment of a table for the driver Mark Martin that uses his previous finishes for races in the 2005 season to find an optimal value of π .

Table 2											
Example Table for Calculating a Value for π											
Mark Martin	$p = 0.1208$					$0.1868 = \text{Maximum } B(x) \text{ Value}$					
	$\Sigma [RF(x) - B(x)]^2 = 0.1143$					$6 = \text{Most Likely Finish}$					
Finishing Place	1	2	3	4	5	6	7	8	...	42	43
x for binomial	0	1	2	3	4	5	6	7	...	41	42
Frequency	0	0	4	2	0	1	4	0	...	0	0
RF(x) = Relative Frequency for x	0	0	0.16	0.08	0	0.04	0.16	0	...	0	0
B(x) = binomial probability of x	0.00448	0.02585	0.07283	0.13345	0.17882	0.18678	0.1583	0.11189	...	8.6E-37	2.8E-39
$[RF(x) - B(x)]^2$	2E-05	0.00067	0.0076	0.00286	0.03198	0.02154	2.9E-06	0.01252	...	7.5E-73	8E-78

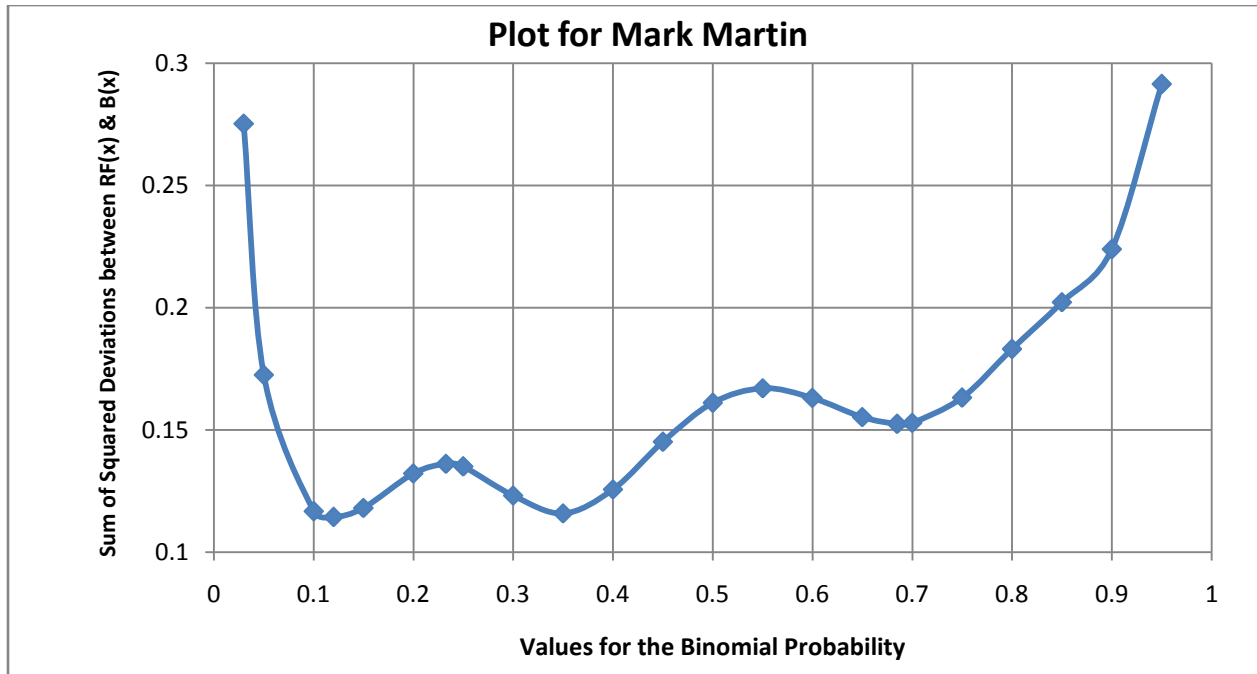
In Table 2 the values for Finishing Place range from 1 to 43 since there are 43 drivers in each NASCAR race. To get the value of x for the binomial the value of one is subtracted from each of the Finishing

Place values. The Frequency row contains values for the count of the number of times the driver finished in this place. The RF(x) row measures the relative frequency or proportion of the 2005 races for which the driver finished in this place. The B(x) row is the binomial probability calculated by the binomial function in Excel using the value for x from the table, number trials equal to 42 and the value for the probability of success equal to the value of π at the top of the worksheet. The $[RF(x) - B(x)]^2$ row contains the values for the squared difference between the relative frequency row value and the binomial probability row value.

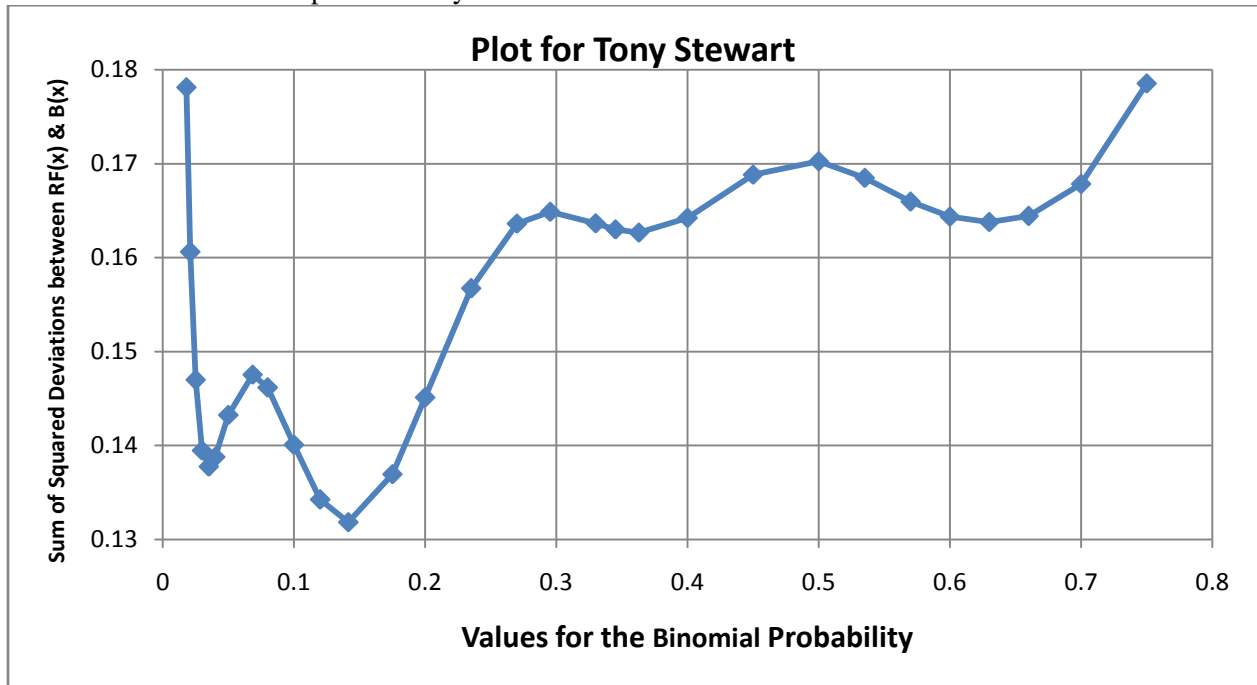
The sum of the squared differences was placed at the top of the sheet appearing below the value for π . The goal was to find a value of π that would minimize this sum of squared differences. Solver was used to accomplish this. To use Solver a formula must be located in cell, E2 in this example. Excel will alter the value in a designated input cell to either maximize, minimize or solve for a specified value of the function. The formula in the target cell must either directly or indirectly depend on the value in the cell Excel has been told to change. The value of π was determined by solver to minimize the sum of the squared differences for the 2005 season results for Mark Martin. The solver parameters below were used for the complete table like the one in Table 2 above. To make sure that the value for π was not outside the valid range for probabilities, between 0 and 1, I sent up constraints with these values as the limits for the cell containing the probability value. I discovered though that I obtained three different minimum values when I used different initial values for π , which tends to indicate that this sum of squared error function is not monotonic with a single local minimum over the range from 0 to 1.



Subsequently I plotted the sum of squared differences for Mark Martin as shown in the graph below. From it one can clearly see that there are in fact three local minima and two local maxima over the plotted range. This explains why I obtained three different values for the minimum (.1208, .3474 & .6866) when I varied the starting value for π .

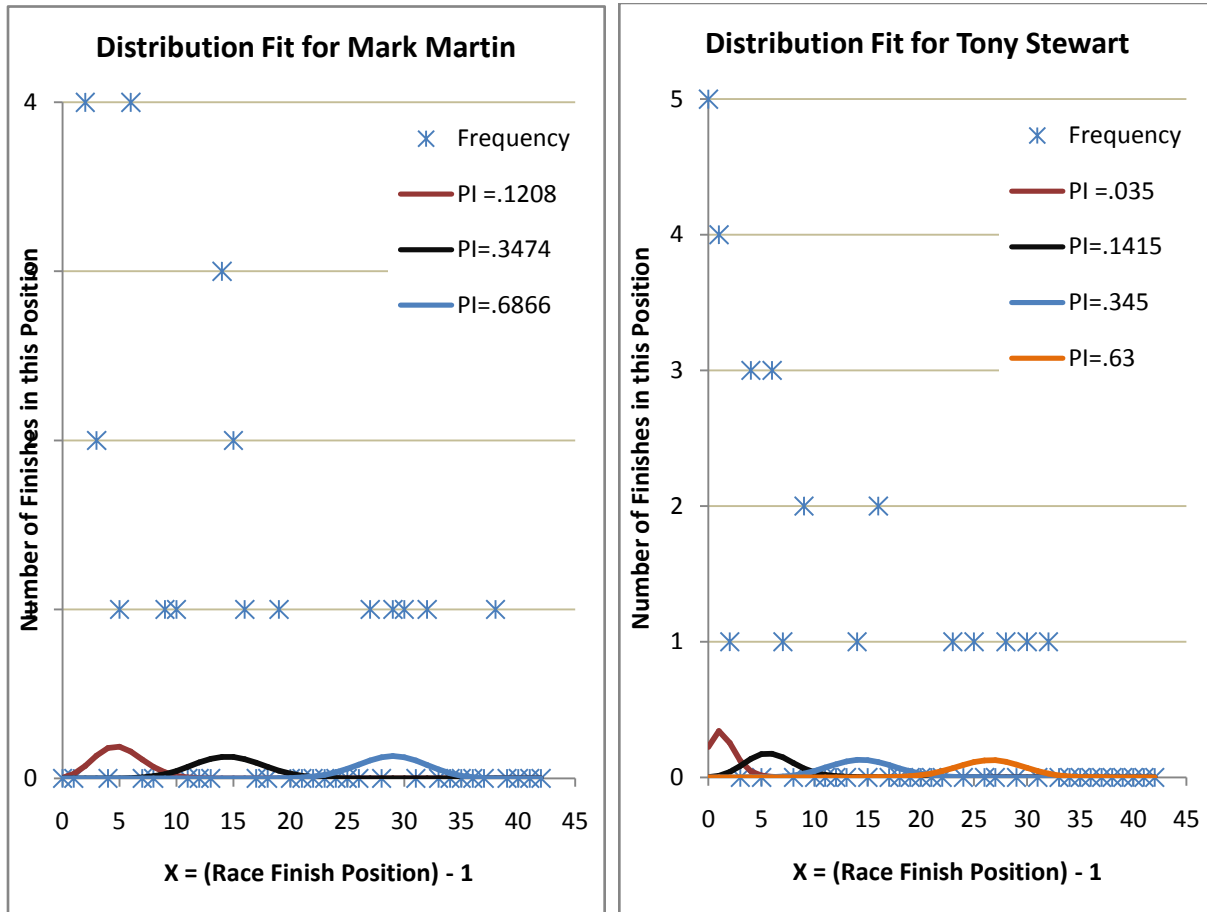


To see if this problem was unique to the data for Mark Martin or if similar problems existed for other drivers I created a similar plot for Tony Stewart



The plot for Tony Stewart shows that there are four local minima (.035, .1415, .345 & .630) and three local maxima for this function. As can be seen from the respective plots, for Mark Martin the global minimum is at $\pi = .1208$, while the global minimum for Tony Stewart is at $\pi = .1415$. Based on the binomial model this means that the expected finish place for Mark Martin would be 6.07 while the expected finish place for Tony Stewart would be 6.94. In the races used to build the model, the average finish for Tony Stewart was 10.07, while the average finish for Mark Martin was 13.7. We are seeing a disparity between the model and what was observed.

To better understand what is happening for these two drivers a separate graph was created for each showing the distribution of their respective finishes and the fitted distributions for the local minima values of π .



From the distribution graph for Mark Martin one can see that the three different fitted binomial distributions attempt to have the hump in a location that is allowing the curve to rise up toward a cluster of finishes above it. The four different fitted binomial distributions do the same thing for Tony Stewart. It is also clear that none of distributions is really doing a respectable job of approximating the distribution of finishes. The spread for the binomial is too narrow compared to the distribution of finishes. The binomial has its maximum variability with $\pi=.5$ and for $\pi=.5$ the standard deviation is about 2.6. Using the data for the previous finishes for both drivers the standard deviation for Mark Martin was 10.4 and the value for Tony Stewart was 10.2. For the 16 drivers who were in the chase or had the mathematical possibility of qualifying for the chase in the last race for the 2005 season, the standard deviations of their finishes ranged from 7.9 for Jeremy Mayfield to 14.1 for Kurt Busch. This further enforces the fact that the spread of the binomial is not adequate for modeling driver finishes. Hence to be successful in creating a method for estimating the probability of the finish of a driver the probability distribution will have to be much wider than the binomial.

SUMMARY

It is clear that I have not accomplished the stated goal of developing a model that would provide a reasonable estimate of a NASCAR driver's finish in a late season race based on the results for the season's previous races. I have clearly established that the binomial distribution, which will give discrete probabilities for each of the possible finish values and can be easily calculated with Excel, is not a proper distribution to use due to its limited variability. Also I will not be able be quoted in the newspaper with my model's probabilities for the likelihood of the different drivers qualifying for the chase when NASCAR comes to Richmond this year. Maybe with more thought and work I will have a model ready for next year.

Sociocultural Influences on Women's Body Image

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Abstract

Studies of health practices should include consideration of factors stemming from social and cultural forces that play a role in determining body image. For example, a woman's attitude about body image is formed within her cultural environment and is the result of sociocultural experiences (Arena, 2003). Different cultures have varying degrees of influence on what are considered valued behaviors. Findings from a study by Weaver (2006) indicated how socially constructed differences toward appearance contribute toward "thinness" standards for women. Many women in American society are identified by their body type. This unrealistic standard of beauty has been further distorted in the mass media. Many believe that the emphasis placed on thinner body shapes as the ideal causes some women to develop eating disorders in an effort to become or remain thin (Elliot., 2006). Women may develop a poor self-image because they can never achieve what is believed to be the ideal body image. This may lead to many women subjecting themselves to yo-yo dieting which eventually may lead to constant weight loss and gain in their effort to achieve thinness. This process of weight gain and loss induces weight gain over time.

Influence of Age and Body Size

Fingeret (2004) studied sociocultural, feminist, and psychological influences on women's body dissatisfaction by examining the manner in which awareness and internalization of appearance standards, feminist ideology, and self-esteem affect body

dissatisfaction. Sociocultural influences were shown to have significant effects on body image. Self-esteem had a direct effect on body dissatisfaction. Clearly, societal pressure for a body shape that is not attainable by most women can have a negative effect on self-esteem as well as physical health. There is some evidence that this is especially true for younger women. In a study of adulthood predictors of health-promoting behavior in older women, Holahan (2004) reported that education, and perceived health in adulthood, recalled importance in adulthood of success in sports before the age of 12. Older women may be more positive about their bodies than younger women because they perceive fewer societal pressures associated with their bodies. Choate (2005) added that body dissatisfaction is prevalent among women and girls.

Saucier (2006) investigated aging women and how body image emphasized society's role in influencing their body perceptions. The findings concluded that women entering middle age become more conscious of the realization that they no longer conform to society's standards of youth and beauty and that this may lead to low self-esteem, depression, and anxiety. According to Bruening (2005), the key to successful promotion of exercise and health benefits among diverse groups of women is to include women of all body shapes. Bruening suggested that a woman does not have to conform to an ever-changing ideal body image portrayed by the media and fashion industry to be considered beautiful. The motivation for changing exercise habits is assumed to be related to the discrepancy between reality and the ideal image of oneself (Rowe, 2005).

Influence of Media Images

In the past there appeared to be an arguable case for a contrast between middle-class caucasian women's obsession with food versus a more accepting attitude toward women's appetites within many African American communities. This previous trend changed in certain

media portrayals in the nineties. For example, features on diet, exercise and body image problems have grown increasingly prominent in magazines aimed at African American women. This trend has led to many African American women having eating disorders such as bulimia (Swann, 2007). This reflects the cultural reality that for most women today- whatever their racial or ethnic identity free and easy relations with food are a relic of the past (Swann, 2007). Additionally, Swann explained that if we surveyed cultural attitudes toward women's appetites and body size there would be a variety of answers shaped by ethnic, national, historical, class and other factors.

In a study on young women who were exposed to ultra thin magazine models Clay (2005) found that self esteem declined substantially during middle adolescence. Clay proposed that the reason may be due to changes in body image which develops in the context of sociocultural factors. According to Clay the main sociocultural factor was the unrealistic media images of female beauty.

Another study on young girls ages 5-8 years reported that girls who looked at magazines aimed at adult women had greater dissatisfaction with their appearance. This particular study concluded that girls aged 5-8 years of age are already living in an appearance culture in which both peers and the media influence body image and dieting awareness (Dohnt, 2006). Girls as young as 6 years old have reported negative body images (Choate 2006).

Rowe (2005) conducted a study on women that measured self-ideal size perception. He found that the majority overestimated their body size on average one fourth larger than they really were. The findings in Rowe's study show that women may not actually see themselves as fat, but they base their evaluations of themselves with their own self-critical standards. Swann (2007) concluded that lack of self-esteem is the cause of women's body image problems. He stated that the better women feel about themselves, the less they tend to overestimate their size.

Bessenoff (2006) explored body image self-discrepancy as moderator and social comparison as mediator in the effects on women from thin-ideal images in the media.

This study reported that women with high levels of body image self-discrepancy were more likely to engage in social comparison from exposure to thin-ideal advertisements. She stated that these comparison processes tend to induce self-directed negative consequences. Unfortunately, study after study has shown that many women do not feel good about their bodies (Swann, 2007). In our American culture many women are “disordered” about issues of self-worth, self-entitlement, self-nourishment and comfort with their bodies.

Distorted Body Image

There are many women considered to be normal weight, with no eating disorders who look in the mirror and see their bodies as fat and ugly. Many of these women’s distorted beliefs about their bodies can be traced to the fashion industry’s portrayal of the ideal woman as very thin. The fashion industry tends to use models who are not indicative of the average woman. As a matter of fact, the average model used in the fashion industry weighs 25 percent less than the average woman (Mahan, 2004). This distortion can lead to women seeing their imperfect bodies as indicators of an imperfect person (Brownell, 2005). Socially and culturally, many women are taught that their looks will determine their success.

Some cultures state that a woman who is thin is the ideal woman accepted by society, while some cultures tend to believe that the ideal body type for a woman is not too thin. This type of pressure for women to try to achieve the impossible may lead to depression, eating disorders, and low self-esteem. Throughout the years, in many cultures, women have been the focus of beauty, not men. Women have had to read, listen and hear about what is considered to be beautiful. Unfortunately, for most women they do not fit into the prevalent category that is accepted as the norm for beautiful. This type of pressure can be overtly or inadvertently reinforced by their friends, family in the work environment and in the many magazines, books and television ads and shows that are shown daily.

Before and after advertisements are shown to be biased. In other words, they send a message to women that if you look like the before that your body type is not acceptable. These type of ads also tend to send an unrealistic message about how losing weight is a process, not an overnight cure. The ads do not focus on the many hours that the individual may have spent adjusting her diet and modifying her lifestyle through exercising. These ads send a message that losing weight is easy and that if you are similar to the before picture that you are lazy and fat.

Focus on Inner Vision

The ideal body image for women has shifted over the years. The waif (thin) look is currently the ideal look for many women in society (Kaminski, 2005). The sculpted look through plastic surgery has also become an acceptable look for women in society. The unattainable ideal image has led women to try diet pills, and may lead to eating disorders that are not easy to overcome (Kaminski, 2005). Women who are caught in the middle with a distorted image of their body may need to learn to get in touch with their body type. In other words, women may need to try to live outside of society's perceived notion of what is considered an acceptable, ideal body type for women. They need to have a positive acceptance of their particular type of body and appreciate the uniqueness of their bodies.

Brownell (2005) stated that it is hard to find a woman who likes her body. Brownell mentioned that women are changing the way they view their bodies. He suggested that instead of being horribly dissatisfied with their own bodies, women have become somewhat less horribly dissatisfied. Brownell (2005) mentioned that many women will find something wrong with their bodies. Brownell stated that if a woman likes her shape, she will usually find something wrong with her body such as her toes, knees elbows or ankles. Women need to focus on their inner vision which entails knowing what they want, and learning to express themselves through their thoughts and emotions. This may lead to their ability to accept their body types and not be engrossed in believing that they have to conform to the stereotyped women's body image portrayed by society, particularly the media.

Summary

Orbach (2005) stated that even as the media such as the movies, television and magazines has begun to promote images of normal-size or large women, the skinny-body ideal continues to exist. Orbach (2005) stated that the ideal of the skinny-body ideal is embedded in the average woman's psyche. The rail thin ideal body image has been passed down through generations. Burgard (2000) concluded that we are in our third generation of women who believe in the rail thin body as the ideal image. Burgard (2000) mentioned that there are patients now whose grandmothers were anorexic.

Many women are exposed to similar sociocultural pressures. As a result, can a cultural analysis account for the fact that some women develop a distorted view of their bodies while others do not? Why are some women more vulnerable than others? The feminist position on this subject involves positing of an identical cultural situation for all women instead of the description of ideological and institutional parameters that govern the construction of gender in our culture (Fingeret, 2004). Of course not all women are exposed to the same cultural environment. Rather, they are all exposed to homogenizing and normalizing images and ideologies concerning female beauty. Unfortunately, these images and ideologies press for conformity to dominant cultural norms. A woman's identity is not formed only through interactions with such images. The configurations (of ethnicity, social class, sexual orientation, religion, genetics, education, age, etc.,) that make up each woman's life will also be factors in how each woman is affected by our culture.

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INVESTIGATING PUBLIC FUNDS DEDICATED TO RECREATION PROGRAMS—A COMPARISON FOCUSED ON ONE LOCALITY

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With S. Gilfillan, M. Flanigan, and A. O'Connor

ABSTRACT

This paper discusses what I have accomplished, researched, and learned during the last 3 years of my Citizen Scholar project. The focus of this project is on the funding of youth athletics in the Farmville, Prince Edward County area. This document explores specifically how localities in the state of Virginia allocate funding to various uses versus recreation. Highlighted is the town of Bedford which has a successful recreation department and how Farmville compares in spending and recreation programs provided.

INTRODUCTION

As a division I athlete I believe in the importance of giving the opportunity of athletics and recreation to everyone, especially underprivileged youth. In fulfillment of my role as a Cormier Citizen Scholar, I have chosen to work on a four-year project that focuses on this belief. The Center for Cormier Citizen Scholars is a scholarship program which provides participating students the opportunity to enrich their undergraduate experience while contributing to the betterment of society. During the last three years I have worked in conjunction with my mentoring faculty member, Mrs. Gilfillan, to plan, organize, and carry out my project. Upon completion of the project I am required to present my project to the Board of Visitors of Longwood University in the final semester of my senior year. This paper is a draft of what I will be presenting in the spring of 2008 to the board.

I chose to study the recreation programs, specifically the youth athletics, offered in the town of Farmville and the surrounding county of Prince Edward. I have experienced first hand the benefits of youth athletics throughout my childhood and feel very strongly that every child should have the opportunity to participate in athletics while growing up. Upon arriving at Longwood University, located in Farmville, VA I began to learn about the youth programs in the surrounding area, or at the time, the lack there of. There is currently no town or county run youth athletics program, but there is a YMCA youth athletics program as well as the Prince Edward Farmville Youth Association (PEFYA) run youth athletics program. Although both of these programs receive some amount of funding from the town of Farmville, they are still private organizations. Within the last year the town of Farmville has hired a recreation director who is implementing various youth programs, such as, dance, double Dutch, arts and crafts, and

many other activities. This recreation department is comprised of a sole individual and a small recreation room, with no traditional youth athletics offered.

FIRST SURVEY

In the first two years of the project I chose to study the current youth athletic organizations which are available in the area, the YMCA and PEFYA. After doing preliminary research to find out what exactly each of the programs had to offer, I chose to shift my focus towards the satisfaction level which the citizens of the town and county have with these programs. In order to measure the satisfaction I decided to survey students and/or parents of local public school system, Prince Edward County—the elementary, middle, and high school. Once the process of creating the survey was completed, I had to obtain approval by various authority figures. This included the superintendent of Prince Edward County Schools and Dr. Laws of Longwood University Human and Animal Subjects Research Review Committee. Additionally, I met with the Superintendent and the General Manager of the town of Farmville to receive input on the questions asked.

This resulted in 2700 surveys being distributed to the schools with a request to hand out to the students and have them completed and returned to my school mail box or the principal of the respective school. This initial set of surveys was passed out close to the end of the school year and thus the response rate was extremely low. Subsequently it was decided to re-administer the surveys at the beginning of the next school year and the response rate dramatically increased. Out of the 2700 surveys administered the second time, 232 were returned giving a response rate of 11.6%, providing data that I analyzed. I worked in conjunction with a faculty member, Dr. Flanigan, who had experience in SPSS—an analytical software program to draw some conclusions from the data.

Once the data had been entered, various comparisons were explored and numerous descriptive statistics were determined. The basic conclusions drawn from this data are that the main reasons for dissatisfaction with the current youth athletic programs relate to lack of money, lack of time, and lack of transportation to be able to participate. In addition many respondents desired additional sports not currently available in the area.

SECOND SURVEY

After this exploration of the satisfaction level of the current youth athletic programs I shifted my focus to study other localities and how they run their respective recreation programs. There were two sets of surveys sent out—25 in each set for a total of 50 and 20 in total were completed and returned. A copy of the cover letter and survey can be found in Appendix A and B. I chose the localities to survey primarily based on population size—any locality that is within a 1,000 population range of Farmville; Farmville having a population of 6,845. I chose localities from several states including, Virginia, North Carolina, South Carolina, Georgia, Tennessee, West Virginia, Maine, Delaware, Florida, Rhode Island, Connecticut, and Kentucky.

These states were chosen because they were located in the Eastern United States. Although there are far more than 50 localities that are within the 1,000 population range to that of Farmville, many of the localities did not have recreation departments to send the surveys to or I could not find an address to send the survey to, so I had to include more states in the study than initially planned. In the survey I inquired about several areas relating to how the localities operated their respective recreation programs. The primary topics included: programs available, the facilities, number of employees, after school programs,

funding—independent or joint with the county, program costs, and financial assistance for participants. The returned surveys provided an understanding of how different localities run their recreation programs and demonstrated the ability of small towns and cities to run successful recreation programs.

Upon gaining this insight into other localities and their recreation departments, I became interested in how much localities, specifically in Virginia, are spending on recreation. In addition, I wanted to see how much is spent on recreation in relationship to several other variables. These variables included: local revenue per capita, percentage of families that live in poverty, percentage of individuals that live in poverty, law enforcement and traffic control per capita, correction and detention, percentage of the population under 18, and percentage of the population between 5-17 years of age. In studying these variables, I created questions which were then answered through determining correlations.

QUESTIONS

1. If the local revenue per capita increases does the town or city or county increase the amount it spends per capita on parks and recreation?
2. If the percentage of families that live in poverty increases does the town or city or county increase the amount it spends per capita on parks and recreation?
3. If the percentage of individuals that live in poverty increases does the town or city or county increase the amount it spends per capita on parks and recreation?
4. Is there a correlation between how much a town or city or county spends on parks and recreation per capita and how much they spend on law enforcement and traffic control per capita?
5. Is there a correlation between how much a county spends on parks and recreation per capita and how much they spend on correction and detention per capita?
6. If the percentage of population that is under the age of 18 increases does the town or city or county increase the amount it spends per capita on parks and recreation?
7. If the percentage of population that is between the ages of 5-17 increases does the town or city or county increase the amount it spends per capita on parks and recreation?
8. Is there a correlation between how much a town or city or county spends on parks and recreation per capita and how much they spend on education per capita?

In addition I also composed lists ranking the localities based on these variables to gain an understanding of how Farmville compared to other locations.

The following scale was used to evaluate these correlations:

Correlation	Negative	Positive
Small	-0.29 to -0.10	0.10 to 0.29
Medium	-0.49 to -0.30	0.30 to 0.49
Large	-1.00 to -0.50	0.50 to 1.00

[2]

ANSWERS AND EXPLANATIONS

Question #1:

If the local revenue per capita increases does the town or city or county increase the amount it spends per capita on parks and recreation?

- When studying the counties there was a positive large correlation of 0.81, correlation coefficient of variation is 0.6546
- When studying the towns there was a small positive correlation of 0.17, correlation coefficient of variation is 0.0282

My hypothesis before analyzing the data was that it was very likely that as revenue per capita increased the amount spent per capita on parks and recreation would as well increase. I formed this notion based on the fact that typically wealthier localities have better recreation programs because better recreation programs in most cases cost more.

The correlation between the variables on the county level is 0.81 which when converted into the coefficient of variation is 0.6546. This shows that 65.46% of the change of dollar amount per capita spent on parks and recreation can be attributed to dollar amount per capita of local revenue. This means that 65% of the time, if the dollar amount of local revenue per capita increases the dollar amount per capita spent on recreation increases.

In contrast, the correlation between the variables on the town level is very weak showing that only 2.82% of the change of dollar amount per capita spent on parks and recreation can be attributed to dollar amount per capita of local revenue. This means that 2.8% of the time, if the dollar amount of local revenue per capita increases the dollar amount per capita spent on recreation increases.

The conclusions that can be made from this data are not definite, because they are solely relationships between variables and not cause and effect. But what we can conclude is that for counties, as local revenue per capita increases so does the amount that is spent per capita on parks and recreation. This does not hold true for towns due to the lack of a relationship.

Question #2

If the percentage of families that live in poverty increases does the town or city or county increase the amount it spends per capita on parks and recreation?

- When studying the counties there was a medium negative correlation of -0.47, correlation coefficient of variation is 0.2253
- When studying the towns there was a medium negative correlation of -0.37, correlation coefficient of variation is 0.1399

My hypothesis before analyzing the data was that it was very likely that as poverty levels increased the amount spent per capita on parks and recreation would decrease. I formed this notion on the basis that higher poverty levels would constitute a lesser local revenue and therefore less funding for recreation. Regardless of what my hypothesis was, it would be more logical for a locality to spend more money on recreation if there were an increased percentage of its families living in poverty. This is because in order to participate in a recreation activity, for example youth athletics, there are fees that have to be paid by the participants. If a family is living below the poverty level they will likely not be able to afford to pay those fees and thus the recreation department will have to do one of two things, either subsidize the fee for the child participating or lower the cost to all participants. Regardless of which method is used the recreation department would have to increase the funding per capita.

The correlation between the variables on the county level is -0.47 which when converted into the coefficient of variation is 0.2253. This shows that 22.53% of the change of dollar amount per capita spent on parks and recreation can be attributed to percentage of families living below the poverty level. This means that 22.53% of the time, if the percentage of families living below the poverty level increases the dollar amount spent per capita on parks and recreation will decrease.

The correlation between the variables on the town level is -0.37 which when converted into the coefficient of variation is 0.1399. This shows that 13.99% of the change of dollar amount per capita spent on parks and recreation can be attributed to percentage of families living below the poverty level. This

means that 13.99% of the time, if the percentage of families living below the poverty level increases the dollar amount spent per capita on parks and recreation will decrease.

The conclusions that can be drawn from this data are not as significant due to weaker relationships between the data sets. This data however does show that it is highly unlikely that as a localities percentage of families living under the poverty level increases the localities dollar amount per capita will increase—on the contrary it will most likely decrease.

Question #3

If the percentage of individuals that live in poverty increases does the town or city or county increase the amount it spends per capita on parks and recreation?

- When studying the counties there was a medium negative correlation of -0.47, correlation coefficient of variation is 0.2236
- When studying the towns there was a small negative correlation of -0.29, correlation coefficient of variation is 0.0836

My hypothesis for these variables is consistent with the hypothesis explained in question number two.

The correlation between the variables on the county level was -0.47 which when converted into the coefficient of variation is 0.2236. This shows that 22.36% of the change in dollar amount per capita spent on parks and recreation can be attributed to percentage of individuals living below the poverty level. This means that 22.36% of the time, if the percentage of individuals living below the poverty level increases the dollar amount spent per capita on parks and recreation will decrease.

The correlation between the variables on the town level is -0.29 which when converted into the coefficient of variation is 0.0836. This shows that 8.36% of the change of dollar amount per capita spent on parks and recreation can be attributed to percentage of individuals living below the poverty level. This means that 8.36% of the time, if the percentage of individuals living below the poverty level increases the dollar amount spent per capita on parks and recreation will decrease.

The conclusion that can be made on the county level, although not definite, there is a strong enough relationship to state that it is very unlikely that if the percentage of individuals living in poverty increases then the amount spent per capita on parks and recreation will increase. On the town level, it is much the same conclusion although the correlation was not as strong it is still significant enough to state that it is very unlikely that as one variable increases the other will increase as well.

Question #4

Is there a correlation between how much a town or city or county spends on parks and recreation per capita and how much they spend on law enforcement and traffic control per capita?

- When studying the counties there was a large positive correlation of 0.658, correlation coefficient of variation is 0.4332
- When studying the towns there was no correlation with a result of 0.09, correlation coefficient of variation is 0.00799

The reasons for exploring this possible correlation was the possibility that if a locality spent more money on parks and recreation that they possibly would have to spend less money on law enforcement and traffic control—thus a negative correlation. This reasoning was based on the fact that youth participating in athletics “can improve behavior and concentration, motivation and attendance and even academic

achievement” [1]. All of these factors would stand to reason to decrease the need for law enforcement, and therefore reduce dollar amount spent per capita, due to less petty crimes and other costly offenses.

The correlation between the variables on the county level is 0.658 which when converted into the coefficient of variation is 0.4332. This shows that 43.32% of the change of dollar amount per capita spent on parks and recreation can be attributed to the dollar amount per capita spent on law enforcement and traffic control. This means that 43.32% of the time, if the dollar amount spent per capita on parks and recreation increases so does the dollar amount spent per capita on law enforcement and traffic control.

The correlation between the variables on the town levels is 0.09 which when converted into the coefficient of variation is 0.00799. This shows that only 0.799% of the change in dollar amount per capita spent on parks and recreation can be attributed to the dollar amount per capita spent on law enforcement and traffic control. This means that 0.799% of the time, if the dollar amount spent per capita on parks and recreation increases so does the dollar amount spent per capita on law enforcement and traffic control.

Once again, the conclusions that can be made from this data are not definite based on the fact that they are solely relationships and not cause and effect. But on the county level, nearly half of the time if the amount spent on parks and recreation increases so does the amount spent on law enforcement and traffic control. This data contradicts what I would have thought to be the outcome based on my logic, because I hypothesized that as dollar amount spent per capita on parks and recreation increased the dollar amount spent per capita on law enforcement and traffic control would decrease (due to the positive impact of increased recreational programs). In contrast, the relationship between these two variables was nonexistent on the town level.

Question #5

Is there a correlation between how much a county spends on parks and recreation per capita and how much they spend on correction and detention per capita?

- When studying the counties there was not a correlation with a result of 0.09, correlation coefficient of variation is 0.0073

The reasoning for exploring this relationship is consistent with the logic stated in question number 4. The hypothesis is the same with an expected negative correlation.

The correlation between the variables on the county level is 0.09 which when converted into the coefficient of variation is 0.0073. This shows that 0.0073 % of the change of dollar amount per capita spent on correction and detention can be attributed to the dollar amount spent on parks and recreation. This constitutes a lack of correlation between the variables and thus no relationship.

The results of this correlation show that there is no significant relationship between the two variables and thus there is no data to say that as parks and recreation per capita increases, correction and detention per capita will decrease.

Question #6

If the percentage of population that is under the age of 18 increases does the town or county increase the amount it spends per capita on parks and recreation?

- When studying the counties there was a small positive correlation of 0.19, correlation coefficient of variation is 0.03689
- When studying the towns there was a no correlation with a result of 0.059, correlation coefficient of variation is 0.0034.

Through my study of recreation departments and the programs which they offer I have observed that the majority of recreation departments' funds are directed to youth based programs. So from this observation I hypothesized that if a locality had a greater percentage of its population under the age of 18 then they would allocated more of its resources to parks and recreation.

The correlation between the variables on the county level is 0.19 which when converted into the coefficient of variation is 0.03689. This shows that 3.689 % of the change of dollar amount per capita spent on parks and recreation can be attributed to the percentage of the population below the age of 18. This constitutes a small correlation between the variables and thus a weak relationship.

The correlation between the variables on the town level is 0.059 which when converted into the coefficient of variation is 0.0034. This shows that 0.34% of the change of dollar amount per capita spent on parks and recreation can be attributed to the percentage of the population below the age of 18. This signifies a lack of correlation between the variables and thus no relationship.

The conclusion that can be made from this data is that there is a small possibility that on the county level there is a relationship between the variables. This is not consistent with my hypothesis, for I would have thought that counties would have greatly considered the percentage of their population which is under 18 when determining how much they would allocate to recreation. On the town level there is no relationship between the two variables at all; completely opposite of what I would have thought.

Question #7

If the percentage of population that is between the ages of 5-17 increases does the town or county increase the amount it spends per capita on parks and recreation?

- When studying the counties there was no correlation of 0.095, correlation coefficient of variation is 0.0091
- When studying the towns there was no correlation with a result of 0.0028, correlation coefficient of variation is 0.000084

My hypothesis for the relationship between these two variables is much the same as my hypothesis in question #6. In addition, I expected that these two variables, parks and recreation and percentage of the population between 5-17, would have a stronger relationship then the previous, under 18 years of age, due to the fact that majority of the children that participate in recreation are in this age range. I formed this notion based on the fact that very few programs are tailored to children who are under five years of age and thus this section of the population would not effect how much a locality spends on youth based programs.

The correlation between the variables on the county level is 0.095 which when converted into the coefficient of variation is 0.0091. This shows that 0.9 % of the change of dollar amount per capita spent on parks and recreation can be attributed to the percentage of the population between the ages of 5-17. This constitutes a lack of correlation between the variables and thus no relationship.

The correlation between the variables on the town level is 0.0028 which when converted into the coefficient of variation is 0.000084. This shows that 0.0084% of the change of dollar amount per capita spent on parks and recreation can be attributed to the percentage of the population between the ages of 5-17. This, as well constitutes a lack of correlation between the variables and thus no relationship.

In conclusion, the results did not support my hypothesis; rather they completely contradicted it on both the county and town level. There is a greater relationship between parks and recreation and the percentage

of the population under 18 than there is between parks and recreation and the percentage of the population between the ages of 5-17.

Question #8

Is there a correlation between how much a county spends on parks and recreation per capita and how much they spend on education per capita?

- When studying the counties there was a large positive correlation of 0.52, correlation coefficient of variation is 0.2736

The reasons for studying these two variables was to see if a county spent more on education per capita would they, then, spend more on parks and recreation per capita. It is possible that if a county spends a high amount on education per capita then they would be likely to spend more on parks and recreation because they already demonstrate that they place a high value on the children in the area. And if this is the case than they would be more likely to support an expenditure, parks and recreation, that provides youth athletics.

The correlation between the variables on the county level is 0.52 which when converted into the coefficient of variation is 0.2736. This shows that 27.36% of the change of dollar amount per capita spent on parks and recreation can be attributed to the dollar amount per capita spent on education. This means that 27.36% of the time, if the dollar amount spent per capita on parks and recreation increases so does the dollar amount spent per capita on education.

The results of this correlation do support my hypothesis in that there is a strong positive relationship between the two variables. But based on the previous two correlations between parks and recreation and percentage of population under the age of 18 and parks and recreation and percentage of population between the ages of 5-17, the reasoning that I based my hypothesis on does not stand true. This is because there would have to be a relationship between parks and recreation and percentage of children between the ages of 5-17, which are school aged children, to support the logic. The results solely show that if a locality increases the amount they spend on education they also increase the amount they spend on parks and recreation.

FARMVILLE

As stated earlier, the focus of my study is the town Farmville where my University is located. During my first year at Longwood I became concerned with the lack of recreational programs. In order to understand where Farmville stands in relationship to other localities that I considered (see above), I included below a chart which shows various variables. In addition I have ranked Farmville in comparison to other towns; the ones which are included in Virginia’s 2006 Comparative Report of Local Government Revenues and Expenditures. These ranking tables can be found in Appendix C.

Local Revenue Per Capita	Population	Parks, Recreation, and Cultural Per Capita	Parks and Recreation Per Capita	Law Enforcement and Traffic Control Per Capita	Percentage of Population under 18 years of age	Percentage of Population between 5-17 years of age	Percentage of Families living below Poverty Level	Percentage of Individuals living below Poverty
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									Level
Farmville	\$955.22	6,845	\$9.22	\$2.73	\$274.83	14.7%	10.3%	19.9%	22%

- Of the 35 towns with data, Farmville is ranked 13th highest in terms of local revenue per capita at \$955.22.
- Of the 35 towns with data, Farmville is ranked 5th lowest in terms of dollar amount spent per capita in the area of parks, recreation and cultural enrichment at \$9.22.
- Of the 34 towns with data, Farmville is ranked 2nd lowest in terms of dollar amount spent per capita in the area of parks and recreation (cultural enrichment is omitted) at \$2.73.
- Of the 35 towns with data, Farmville is 17th highest in terms of dollar amount spent per capita in the area of law enforcement and traffic control.
- Of the 36 towns with data, Farmville is ranked 2nd lowest in percentage of population that is under the age of 18.
- Of the 36 towns with data, Farmville is ranked 4th highest in percentage of families that are living below the poverty level.
- Of the 36 towns with data, Farmville is ranked 5th highest in percentage of individuals that are living below the poverty level.

In addition I have included in the Appendix D a chart which includes Farmville and several other localities for means of comparison. This chart includes Marion, Ashland, Prince Edward County, Christiansburg, Bedford County, Lexington, and Bedford, the county averages, the town averages, and the United States averages. The reasons for choosing these localities are as follows:

- Marion:
 - Significantly lower local revenue per capita but significantly higher parks, recreation, and cultural per capita and parks and recreation per capita.
 - Higher parks and recreation but lower law enforcement and traffic control.
 - High poverty level; similar to that of Farmville.
- Ashland:
 - Similar population and lower local revenue per capita.
- Prince Edward County:
 - The county in which Farmville is located
- Christiansburg:
 - Closest local revenue per capita to Farmville.
- Bedford County:
 - The county in which Bedford is located
- Lexington:
 - Extensive information on its effective recreation program from a returned survey.
 - Similar size to Farmville.
- Bedford:
 - Extensive information on its effective recreation program from a returned survey.
 - Similar size to Farmville.

COMPARISON BETWEEN FARMVILLE AND BEDFORD

The reasons for choosing the city of Bedford as a comparison to Farmville is the proficient recreation program which Bedford offers to its citizens. Bedford has successfully developed a program that provides its citizens with a various programs which include youth programs, adult programs, senior citizen programs, family events, and community events. Bedford has also collaborated with the county to offer these programs to a greater number of citizens as well as utilizing the area school systems' facilities.

The chart below depicts the basic elements of Bedford's recreation program. (As mentioned earlier, the Town of Farmville has a brand new program consisting of a sole employee and no facility.)

BEDFORD'S RECREATION PROGRAM

Bedford, VA	
Programs Available	Trips (ex. Snow Tubing), Baseball/Softball/Tee-ball, Teen Dance, Football, Fishing Clinic, Sports Clinics, Youth Tennis, Hook-a-kid on golf, Basketball, Self-Defense, Girls Volleyball, Youth Cheerleading, Special Events (Easter Egg Hunt, Spooktacular), Mountain Bike Race, Movie Night, Pitch hit run
Facilities	6 parks, Walking trails, Baseball/Softball Fields, Shelters, Football Fields, Playgrounds, Liberty High School, Bedford Middle School, Bedford Elementary School, Outdoor Basketball Courts, 5 Tennis Courts
Number of Full-Time Employees	10
Type of Government	Collaborate with county for special events
Who is Allowed to Participate	Youth Programs-only allowed for those children in the elementary school zone; all other activities open to city and county
After School Programs	Yes
Transportation	No-only for trips
Programs Funding	Small grants (NFL Grant), Team Sponsors, Donations; but mostly through the city recreation budget
Dollar Amount of Total Fiscal Year Budget to Recreation	903,700
Total Budget for Fiscal Yr.	44,996,875
County Funding	Yes, Bedford County provides funding when doing joint programs
Percentage of County Funding	less than 1%
Funding for Transportation	fees charged for the trip
Difference in Fees Based on Region	youth athletics- county residents \$10 non resident fee
Low-income Assistance & Qualifications	Residents fill out an application and decision is based on their household income
Source for Assistance	through fiscal year budget-just absorb the cost
Amount of Total Budget to Fund Low-income Assistance	less than 1%
Promote Low income-Assistance	Yes
Promote, by What Means	through program brochure that is sent through the schools 3 times a year
To Participate in Athletics, Flat Rate or Pay as One Goes	pay as on goes
Pay as you go, how much Difference in fees based on	city residents \$20, county residents \$30 \$10 for county residents

region
 % of participants receiving
 some form of financial
 assistance

less than 1%

COMPARISON TABLE OF BEDFORD AND FARMVILLE

	Local Revenue Per Capita	Population	Parks, Recreation, and Cultural Per Capita	Parks and Recreation Per Capita	Law Enforcement and Traffic Control Per Capita	Percentage of Population under 18 years of age	Percentage of Population between 5-17 years of age	Percentage of Families living below Poverty Level	Percentage of Individual living below Poverty Level
Farmville	\$955.22	6,845	\$9.22	\$2.73	\$274.83	14.7%	10.3%	19.9%	22%
Bedford	\$1,461.96	6,091	\$175.53	\$125.42	\$340.29	21.6%	16%	15.4%	13.3%
<i>Town Average</i>	<i>\$832.77</i>	--	<i>\$94.36</i>	<i>\$88.04</i>	<i>\$173.50</i>	--	--	--	--
<i>United States Average</i>	--	--	--	--	--	25.7%	18.9%	9.8%	12.4%

As seen in the chart above, the town of Farmville is slightly larger, by a margin of 754 people, than that of the city of Bedford; making Bedford an ideal size to study.

- The local revenue per capita in the city of Bedford is significantly higher--\$1,461.96 versus that of Farmville which is \$955.22; giving Bedford a local revenue per capita of 153% of that of Farmville.
- The parks, recreation, and cultural per capita in the city of Bedford is immensely higher--\$175.53 versus that of Farmville which is \$9.22; giving Bedford a local parks, recreation, and cultural that is 19 times that of Farmville
- The parks and recreation per capita in the city of Bedford is also immensely higher--\$125.42 versus that of Farmville which is \$2.73; giving Bedford a local parks and recreation that is nearly 50 times higher than that of Farmville.

DISCUSSION

Although some of the difference in the amount spent on parks, recreation, and cultural and parks and recreation can be attributed to the fact that Bedford has a significantly higher local revenue per capita it does not justify the extent of the difference between the two localities. For comparison, lets adjust the amount of the two variables—parks, recreation, and cultural and parks and recreation—into percentages of local revenue per capita.

- 0.97% of Farmville’s local revenue per capita is allocated to parks, recreation and cultural. 12.01% of Bedford’s local revenue per capita is allocated to parks, recreation and cultural. Resulting in Bedford still spending over 12 times that of Farmville.
- 0.29% of Farmville’s local revenue per capita is allocated to parks and recreation. 8.58% of Bedford’s local revenue per capita is allocated to parks and recreation. Resulting in Bedford still spending nearly 30 times that of Farmville

Farmville has a larger percentage of its families living under the poverty level than Bedford does; by a margin of 4.5%. Farmville also has a higher percentage of its individuals living under the poverty level than Bedford does; with 8.7% higher. The reasoning behind comparing these to variables is to show the need for the locality to spend more on recreation due to its participants not having the finances to participate in activities. It is my thinking that if a locality has a higher percentage of its citizens and families living under the poverty line then they would have to spend more on recreation to provide programs at no or a lower cost.

An additional variable to compare is how much each locality is allocating to law enforcement and traffic control. Farmville is spending \$274.83 per capita on law enforcement and traffic control and Bedford is spending \$340.29 per capita. When we adjust these to percentages of local revenue, Farmville is allocating 28.77% of its local revenue per capita to law enforcement and traffic control while Bedford is allocating slightly less with 23.28%. Although this difference does not appear to be that significant if Farmville were to adjust its percentage of local revenue allocated to law enforcement and traffic control of that of Bedford, 23.28%, it would be \$222.38 per capita. The difference between the current amount that Farmville allocated to law enforcement and traffic control, \$274.83 per capita, and the adjusted amount of \$222.38 per capita is a difference of \$52.45 per capita. This amount would make a huge difference in the ability for Farmville to run a successful recreation program. To understand the difference currently Farmville is allocating a total of \$18,686.85 to parks and recreation, if they were to reduce the amount they spend on law enforcement and traffic control and allocated the difference to parks and recreation the adjusted total of parks and recreation would be \$377,707.10.

POTENTIAL AREAS OF FUTURE RESEARCH

In trying to analyze and compare recreational spending by Farmville and similar localities, further areas of study that would appear to be interesting are:

- Crime rates vs. Recreation
- Crime rates vs. Law Enforcement and Traffic Control
- Crime rates vs. Correction and Detention

CONCLUSION

I undertook this study because I wanted to gain a better understanding of how localities determine how much to allocate to recreation. I also wanted to see how Farmville compares and ranks to other towns and cities. I've learned that there is no simple equation of how a locality determines how much they will spend on recreation and that the variables which I thought would have effected spending on recreation in fact do not. By studying the ranking tables, I have realized how little Farmville does spend on recreation in comparison to other towns, and in addition, how much more they allocate to other expenditures. It would be very interesting to understand how Farmville decides how much to assign to each expenditure, and the logic behind each one.

APPENDIX A

October 1st, 2006

Dear Recreation Director,

As a division I athlete I believe in the importance of giving the opportunity of athletics and recreation to everyone, especially underprivileged youth. In fulfillment of my role as a Cormier Citizen Scholar, I have chosen to work on a four-year project that focuses on this belief.

Currently, I am working on a project that investigates how a community organizes and provides recreational programs, with an emphasis on the funding and methods enabling low-income individuals to fully participate.

To this end, I am researching and comparing how localities of similar size to that in which my university is located run their recreational programs. In order to do this, I have developed a short survey regarding recreational facilities and programs, which I am asking various localities to complete. Your government is one of the twenty-five that I am investigating.

For your convenience, I have enclosed the 23 question survey, along with a self-addressed stamped envelope. It should take you only about fifteen minutes to complete.

Your locality's information is very critical for the success of my research. For this reason, I hope you are willing to participate and would appreciate your returning your completed survey to me by October 31st. While each locality's information will be strictly confidential, I would be happy to share the overall results of my research with you.

If you have any questions, please contact me via email at lem152@longwood.edu or by phone at (336)392-4992. Thank you again for your time.

Sincerely,

Leigh Mascherin
Cormier Citizen Scholar
enc.

APPENDIX B

Longwood Citizen Scholars

Topic: Recreation Programs Offered

1. Please describe the programs available
2. Please describe the recreation facilities
3. Is transportation provided by the government for participants?
4. Are there full-time recreation employees? If yes, how many?
5. Is the recreation program run as a joint program with another government?
6. Who is allowed to participate in the recreational activities – only the governments' own citizens? Or are the programs available to any citizen outside that specific government area?
7. Does the recreation department include after schools programs?

Topic: Financial Support of Recreation

8. How are the recreational programs funded?
9. What is the total government budget for the fiscal year?
10. In the coming year, what dollar amount of the fiscal year's total budget is allocated to recreation?
11. Regarding funding for the recreation programs - does more than one government provide funds. If so, please explain.
12. If the answer to #11 is yes, what percentage of the recreation program budget (funds, not programs) is provided by the sponsoring government?
13. If transportation is provided for users, how is this service funded?

Topic: Cost to Participant and Low-Income Support

14. If programs are for a region, is there a difference in the fees for the government's own citizens versus citizens of the region? If so, please explain.
15. If there is low-income assistance? If so, how does one qualify?
16. What percentage of participants are receiving some form of financial assistance towards fees?
17. Where does the program get the money to support this assistance?
18. What amount of the recreation budget is used to assist low-income residents to participate in recreational programs?
19. Do you promote the fact that financial assistance is available or do participants have to inquire?
20. If you do promote this fact, by what means do you do so? (television, newspapers, bulletin boards at places of business, etc.)
21. In order to participate in athletics is there a flat rate or does the participant pay for each activity individually?

22. If a yearly rate, how much is it?

23. If there is a fee per activity, what is the rate per sport?

Name of government: _____

APPENDIX C

Ranking Tables:

Table 1: Local Revenue Per Capita

Table 2: Parks, Recreation, and Cultural Per Capita

Table 3: Law Enforcement and Traffic Control Per Capita

Table 4: Percentage of Population under 18

Table 5: Percentage of Population between 5-17

Table 6: Percentage of Individuals Living Below Poverty Level

Table 7: Percentage of Families Living Below Poverty Level

APPENDIX D

Comparison Table of Several Localities

	Local Revenue Per Capita	Population	Parks, Recreation, and Cultural Per Capita	Parks and Recreation Per Capita	Law Enforcement and Traffic Control Per Capita	Percentage of Population under 18 years of age	Percentage of Population between 5-17 years of age	Percentage of Families living below Poverty Level	Percentage of Individuals living below Poverty Level
Marion	\$446.50	6,349	\$87.23	\$81.77	\$188.26	19.4%	14.4%	13.2%	18.0%
Ashland	\$749.89	6,619	\$27.35	\$27.35	\$263.79	19.9%	15%	6.9%	10.0%
Prince Edward County	\$801.20	20,846	\$14.25	\$3.81	\$42.17	20.2%	15.2%	14.6%	18.0%
Farmville	\$955.22	6,845	\$9.22	\$2.73	\$274.83	14.7%	10.3%	19.9%	22.0%
Christiansburg	\$982.42	16,947	\$81.33	\$80.65	\$238.64	23.8%	16.4%	6.4%	8.5%
Bedford County	\$1,040.11	65,033	\$40.58	\$17.01	\$76.57	24%	18.2%	5.2%	7.1%
Lexington	\$1,451.54	7,230	\$73.57	\$23.83	\$255.94	11%	8%	2.4%	21.0%
Bedford	\$1,461.96	6,091	\$175.53	\$125.42	\$340.29	21.6%	16%	15.4%	13.0%
<i>County Average</i>	<i>\$1,818.48</i>	--	<i>\$79.15</i>	<i>\$47.05</i>	<i>\$137.77</i>	--	--	--	--
<i>Town Average</i>	<i>\$832.77</i>	--	<i>\$94.36</i>	<i>\$88.04</i>	<i>\$173.50</i>	--	--	--	--
<i>United States Average</i>	--	--	--	--	--	<i>25.7%</i>	<i>18.9%</i>	<i>9.8%</i>	<i>12.0%</i>

APPENDIX E

Graph 1

Town—local revenue per capita vs. dollar amount per capita on parks and recreation

Graph 2

County—local revenue per capita vs. dollar amount per capita on parks and recreation

Graph 3

Town—percentage of families living in poverty vs. dollar amount per capita on parks and recreation

Graph 4

County—percentage of families living in poverty vs. dollar amount per capita on parks and recreation

Graph 5

Town—percentage of individuals living in poverty vs. dollar amount per capita on parks and recreation

Graph 6

County—percentage of individuals living in poverty vs. dollar amount per capita on parks and recreation

Graph 7

Town—dollar amount per capita on law enforcement and traffic control vs. dollar amount per capita on parks and recreation

Graph 8

County—dollar amount per capita on law enforcement and traffic control vs. dollar amount per capita on parks and recreation

Graph 9

County—dollar amount per capita on correction and detention vs. dollar amount per capita on parks and recreation

Graph 10

Town—percentage of the population under the age of 18 vs. dollar amount per capita on parks and recreation

Graph 11

County—percentage of the population under the age of 18 vs. dollar amount per capita on parks and recreation

Graph 12

Town—percentage of the population between the age of 5-17 vs. dollar amount per capita on parks and recreation

Graph 13

County—percentage of the population between the age of 5-17 vs. dollar amount per capita on parks and recreation

Graph 14

County-dollar amount per capita on education vs. dollar amount per capita on parks and recreation

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ASSOCIATION OF LEISURE-TIME PHYSICAL ACTIVITY WITH PERCENT BODY FAT IN AFRICAN AMERICAN COLLEGE STUDENTS

Kevin Ritsche, Terese Stratta, Aysel Kavas, Jesse Pittsley, and Cynthia Williams Brown

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Physical activity, including leisure-time exercise, has many physiological and mental/emotional health benefits. At any age, active individuals have greater work capacities than their inactive peers (Nies, Vollman, & Cook, 1999). Inactivity has been associated with increased risk of obesity, cardiovascular diseases, various cancers, Type II diabetes, and other health problems (Haase, Steptoe, Sallis, & Wardle, 2004).

Young adulthood (ages 18-29), a common age for college attendance, is characterized by life changes such as school, work and other life events, and may result in reduced physical activity and increased weight gain (Racette, S.B., S.S. Deusinger, M.J. Strube, G.R. Highstein and R.H. Deusinger, 2005). Although one of the goals of Healthy People 2010 and recommendations of The Centers of Disease Control and Prevention and the American College of Sports Medicine is to increase the number of people who engage regularly in light to moderate activity for at least 30 minutes per day, most young adults do not meet this minimum goal (Huang, et al., 2003; Gordon-Larsen, Nelson, & Popkin, 2004). Haase, et al. (2004) indicated that between one fifth and one half of college students do not engage in leisure-time physical activity. Also, a decline in physical activity participation was observed in college students as well as a 10% decrease in moderate leisure-time physical activity even though the school environment presents an excellent opportunity to be physically active. Leisure-time physical activity in university students from 23 countries showed that physical activity was higher in males than in females and in those students with stronger health-benefit beliefs (Haase, 2004). Furthermore, physical activity declines started at an earlier age in females than in males. The reasons for this decline in physical activity in college age students can be explained by changes in priorities, increased demand on their time or environmental barriers (Leslie, Sparling, & Owen, 2001). In addition, there are other factors contributing to sedentary lifestyles, such as technology use and motorized transportation. Both male and female students also cited lower social support from family and friends and lower enjoyment of the activity as barriers. Males were motivated by weight gain, while females were motivated by weight loss and looking better.

African Americans are at increased risk for developing chronic and prevalent diseases which may result from lower levels of health promotion behaviors such as physical activity, healthy nutrition and maintaining a healthy body weight. Obesity is one of the major threats to health and welfare all over the world. Within the US population, African Americans are more vulnerable to obesity and weight-related diseases. Although unwanted weight gain can occur at any age, it commonly occurs between 18 and 34 years of age. Weight gain, lack of exercise and unhealthy eating patterns are the most common health behavior problems among college students, including African American students. National surveys suggest that African Americans are less likely to engage in regular physical activity compared with their Caucasian counterparts (Nies, et al., 1999; Young, Gittelsohn, Charleston, Felix-Aaron, & Appel, 2001). Although weight loss and stress reduction are mentioned as key facilitators of physical activity in African American women, common barriers mentioned included lack of time, health concerns, lack of motivation and social support, and concerns about access to facilities and personal safety.

In a study conducted with college students, researchers found that students with higher levels of physical activity had lower Body Mass Index (BMI) or body fat than overweight and obese students (Clement, J.M., C.A. Schmidt, L.W. Bernaix, N.K. Covington, & T.R. Carr, 2004). Decreases in activity with increasing BMI were more marked in women than in men. The amount of physical activity plays a role on body composition which is the relative proportion of fat and fat-free tissue in the body. Therefore, we aimed to assess leisure-time activities and body fat, and correlate the frequency and intensity of leisure-time activities to percent body fat in African-American college students in order to be able to promote healthy lifestyle behaviors early in college years.

Methods

The study was conducted among 128 students at a Southeastern Historically Black University (HBCU). Quota sampling was used to select students who were first enrolled in courses during the 2006-2007 academic year in order to randomize activity and body composition levels.

Researchers received approval from the University Institutional Review Board to contact classroom instructors who teach fitness activity courses, Concepts of Fitness & Health courses, and Freshmen Seminar courses. Members of the research team met one-on-one with each instructor of the aforementioned classes to explain the scope of the study, to provide a Research Study Synopsis, and to receive permission to discuss the study in one class during the first two weeks of the 2006 Fall

semester. After obtaining support from the instructor, the researchers visited the instructor's class for approximately 15 minutes to explain the scope of the project, to provide a Research Study Synopsis, and to answer questions. Researchers reinforced the fact that students' participation in the study was strictly voluntary and not connected to their grade in the class, and that any collected data will remain confidential and will be used for research purposes only. Subjects were then recruited by researchers through telephone calls.

Prior to participation, each subject signed an informed consent form that was approved by the University Institutional Review Board. To reduce the likelihood of skewed results, each subject also completed a Preliminary Screening Questionnaire in order to collect data from a homogenous group whose assessment results would not be influenced by unusual circumstances or factors outside the purview of the study. Subject eligibility requirements were limited to being African Americans and entering freshman who were attending college for the first time. They were excluded from participating in the study if one or more of the following situations existed: physical activity levels are influenced by factors outside the control of students (e.g., sports, disease, health conditions); or physical fitness indices are influenced by unusual health-related factors (e.g., pregnancy, disease, health conditions); or the student participates in more than one of the above-mentioned classes. Subjects were asked to report to the Exercise Science Laboratory on campus for data collection. Only one visit was necessary to collect all the required data and the entire process took approximately thirty minutes.

Leisure time activity levels were assessed using a modified version of the Godin Leisure-Time Exercise Questionnaire (Godin, Jobin, & Bouillon, 1986) to decipher how many times on average the subject engages in three different intensities of exercise during a typical 7-day week. Strenuous exercise included inducing a rapid heart beat typically stemming from high-aerobic activities such as running, jogging, hockey, football, soccer, basketball, cross-country skiing, judo, roller skating, vigorous swimming and vigorous long distance bicycling. These were estimated to have metabolic equivalent (MET) values of 10 (<http://www.fpnotebook.com/SPO32.htm>). Moderate exercise was quantified as being "not exhausting" stemming from activities such as fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing and dancing (MET= 7). Finally, mild exercise included only "minimal effort" induced by such low level activity levels like yoga, archery, fishing, bowling, horseshoes, golf, snowmobiling and easy walking (MET 3.5). The total METs per week were summed for each subject.

Body fat percentage and body mass index were computed using the Bodystat 1500 bioelectrical impedance (BIA) analyzer. Waist circumference was measured using a flexible tape located one inch superior to the navel rounded to the nearest centimeter. Weight (lbs.) and height (in.) measurements were taken using a Physician's Detecto Scale.

The data were compared using independent samples t-tests and an ANOVA to evaluate statistical differences between and within groups. The statistical software package used was SPSS 15.0.

Results

As noted in Table 1, 33 males (\bar{x} =19.3 years of age) and 95 females (\bar{x} =19.1 years if age) completed the physical activity questionnaires and underwent the body composition assessment. The average weight of males was 162.5 lbs. and of females was 162.0 lbs. with no significant difference. The average height of males and females was 66.4 in. and 65.3 in., respectively. Body mass index and waist circumference were not statistically different between men and women (see Table 2); however, the average percent body fat was significantly lower ($p<0.001$) in males than in females (16.7% and 29.2% respectively).

Table 1: Age, height, and weight of both males and females (Mean \pm SD)

	Males (n = 33)	Females (n = 95)
Age (years)	19.1 \pm 0.35	19.3 \pm 1.1
Height (inches)	66.4 \pm 3.4	65.3 \pm 3.3
Weight (pounds)	162.5 \pm 41.0	162.0 \pm 50.6

Table 2: Body composition comparison between genders (Mean \pm SD).

	Males (n = 33)	Females (n = 95)	p
BMI (kg/m²)	27.9 \pm 9.4	25.9 \pm 5.6	0.133
BF (%)	16.7 \pm 9.7	29.2 \pm 7.9	<0.001*
Waist (cm)	74.7 \pm 9.1	76.5 \pm 14.4	0.500

* $p = .05$

Self-reported leisure-time activities levels were similar between genders (Table 3 and Figure 1). One notable difference was the significantly higher frequency of mild physical activity bouts per week amongst males ($p=0.022$). Despite this difference, the total METS calculated per week did not differ

Table 3: Self-reported activity levels; frequency and calculated METS per week. (Mean \pm SD).

	Total n = 128)	Male (n = 33)	Female (n = 95)	p
Strenuous (5-7 days)	1.96 \pm 1.94	1.7 \pm 1.6	2.0 \pm 2.0	0.417
Moderate (3-5 days)	2.38 \pm 2.09	2.5 \pm 2.0	2.3 \pm 2.1	0.718
Mild (< 3 days)	2.73 \pm 2.64	3.7 \pm 2.9	2.4 \pm 2.5	0.022*
METweek	47.9 \pm 29.3	52.5 \pm 30.0	46.4 \pm 29.1	0.321

* $p = .05$

between men and women. Combining data for both men

and women on a scatter plot, researchers found no relationship between percent body fat and the total METs per week (Figure 2). These findings were repeated when females were plotted alone (Figure 3). Furthermore, despite the finding that males had significantly less body fat and significantly more mild activity sessions, we found no relationship between METs and percent body fat (Figure 4). The investigators also found no significant relationship between the total self-reported physical activity and percent body fat.

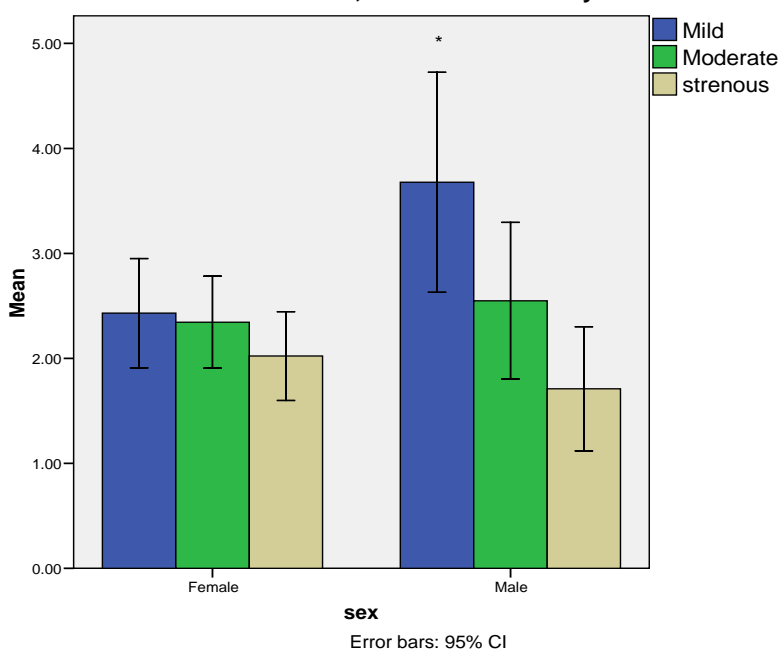
Discussion

Notably was the poor relationship between self-reported physical activity and percent body fat. One possible reason for this lack of relationship is the nature of self-reported physical activity. Individuals may perceive to undergo higher levels of physical exertion when actual caloric expenditure may be low. For example, a male with a percent body fat greater than 50% reported one of the higher levels

of physical activity amongst all subjects (Figure 4). This was also seen with several female subjects (Figure 3). It is possible that those with greater percentages of body fat may perceive their activities to be more strenuous than their more average peers.

The lack of relationship between self-reported physical activity and body composition may be due to the lack of strenuous activity as defined by Godin. More specifically, the Godin Leisure-Time activity survey defines “strenuous” as 15 minutes of “heart beating rapidly.” Those in the physically active community would argue that this definition is considered “traditional”, not “strenuous” exercise. Nevertheless, the subjects of this study reported this level of activity only twice per week. The American College of Sports Medicine recommends three to five, 30-minute sessions per week for physical health. This recommendation is two to three times greater than the average “strenuous”

Figure 1: Mean and 95% confidence intervals of the self-reported mild, moderate, and strenuous activity.



frequency amongst the subjects in this study. In conclusion, this group failed to meet the baseline requirements recommended for physical health and thus was not active enough to show a relationship between activity and body composition.

Given the fact that researchers collected data at only one university, findings from this study cannot be generalized to African American students at other universities. Future data analyses will include comparisons of pre- and post-test measurements. Moreover, post-test data were collected from students at the end of their freshmen year. Data analyses will also be conducted by group membership – i.e., physical activity class, health class, and freshmen seminar class.

Figure 2: Relationship between self-reported activity level and % fat both genders.

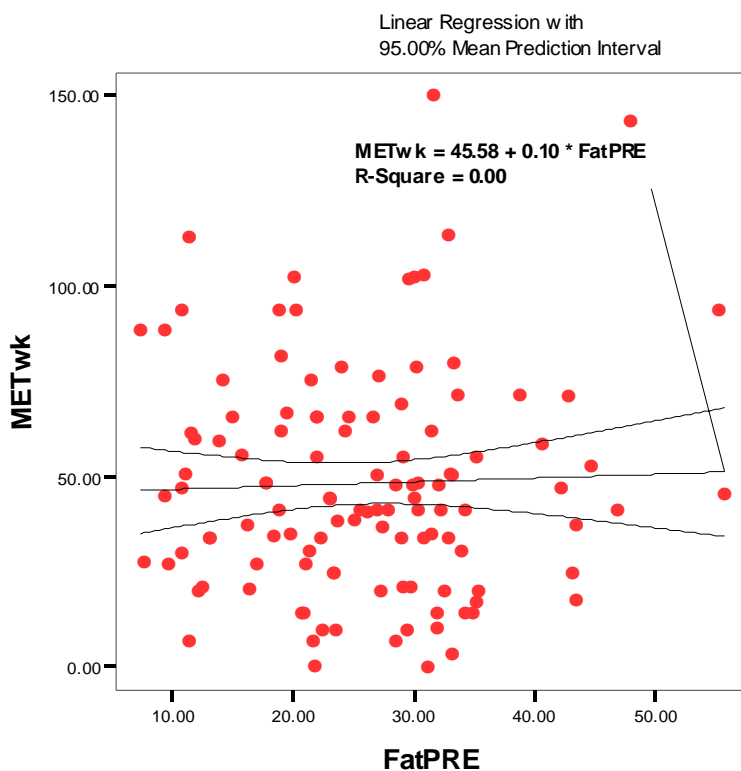


Figure 3: Relationship between self-reported activity level and % fat (Females).

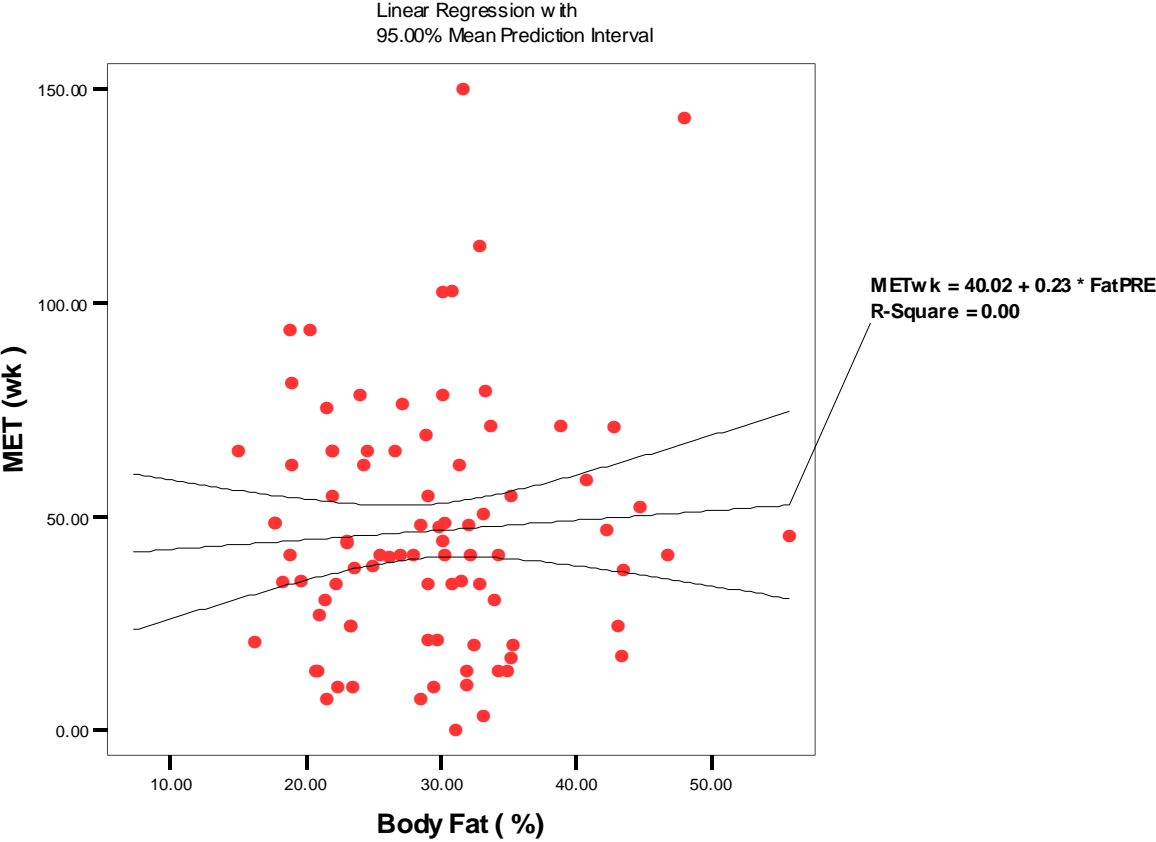
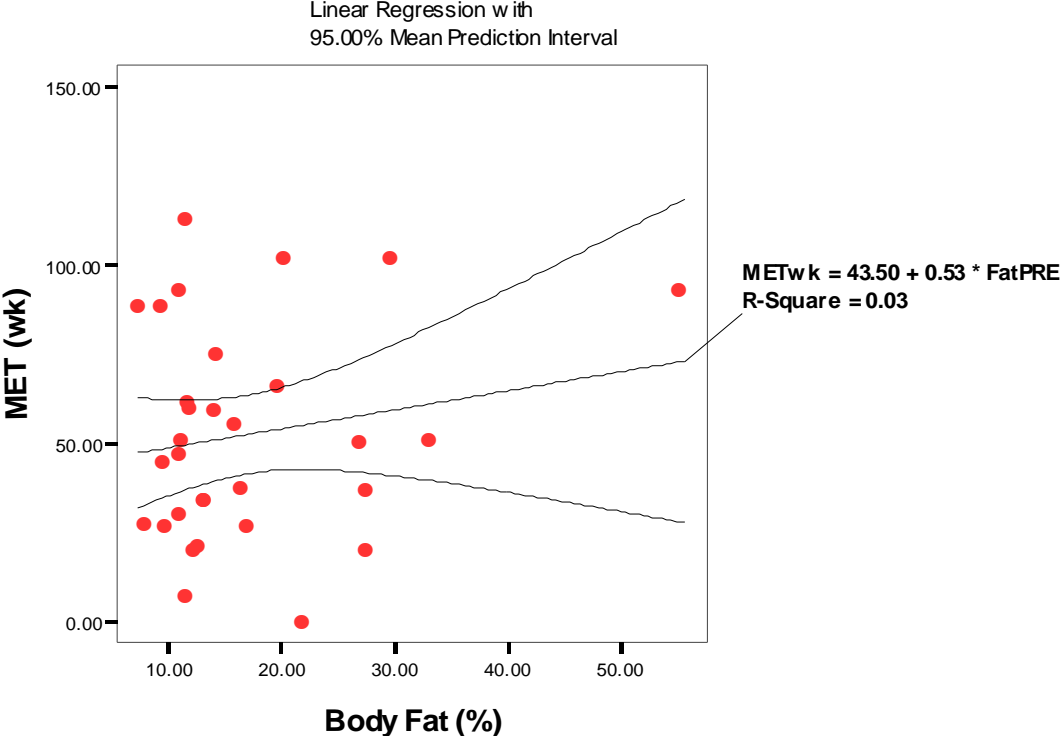


Figure 4: Relationship between self-reported activity level and % fat (males).



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Consumer Empowerment in E-Healthcare: An Investigation Using the Grounded Theory Approach

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Abstract

Technological innovations such as electronic health records (EHRs), regional health information organizations (RHIOs), and the nationwide health information network (NHIN) have enabled increased sharing of medical records in the healthcare community. Recent studies have shown that patients do not trust healthcare providers to keep medical records safe from unauthorized release and want more control over their medical records. Patients seem to have focused attention on negative media stories of information disclosures. Therefore, the notion of patient/consumer empowerment has emerged within the healthcare community's discussions regarding sharing of medical information. In this research, facets of patient empowerment in e-Healthcare will be investigated through a Grounded theory approach to analyze both United States federal and state patient empowerment groups. It is the first phase of a longitudinal study which will generate theory and enable practitioners to better understand the concept of consumer empowerment in e-Healthcare to develop appropriate e-Healthcare policy and technology.

Background

“Twenty-first century health care means untethering care from the doctor’s office to weave health care and disease management into people’s lives. It’s empowering consumers to be active participants in their care rather than passive recipients.”

----U.S. Representative Patrick Kennedy (HIMSS, 2007)

The United States healthcare industry is currently experiencing a transformation. Due to recent technological advances in the field such as electronic health records and the nationwide health information network, patient information can be shared among many healthcare providers towards the goal of reduced medical errors and increased quality of care. It has been estimated that as many as 400 people may have access to your personal medical information throughout the typical care process (Mercuri, 2004). This increased availability for healthcare partners to access sensitive medical information, while pursuing positive goals, also has negative effects. There have been instances where employees have sought medical care and their personal health information (PHI) has been disclosed, without patient consent, to their employers, ex-spouses, and insurance companies (resulting in higher premiums) (Ferris, 2006; Rindfleisch, 1997). As stated by Congressman Dennis Moore, “putting patients at the center of this transformation is not only the right thing to do; it’s the smart thing to do” (HIMSS, 2007).

Patients are more aware now of these negative consequences of sharing medical information. However, patients lack empowerment to control the disclosure of their sensitive health information through new technological innovations. U.S. states such as North Carolina have found that their citizens top consumer protection worries include not receiving copies of their medical records when requested from the physician’s office (North Carolina Attorney General’s Office, 2006). A survey by the California HealthCare Foundation (Broder, 2006) found that most U.S. consumers want to have control over who accesses their medical information and that only three percent used an online medical record service (personal health record). However, in a study conducted by Price Waterhouse Cooper (2006) asked “Do you believe that having an electronic health record would improve the quality of care you would receive?” 42% of respondents said that they were unsure, because they would need more information.

Of the 800 people surveyed by the California HealthCare Foundation, 264 suggested that they were not comfortable with their insurance company sharing medical information with hospitals and almost half shared a fear of information being accessible through the Internet without their control (Broder, 2006). Some also responded that they did not trust healthcare entities to protect the privacy of their information. Also, it has been suggested that specialized populations such as minority groups or patients with specific ‘stigmatizing’ conditions such as HIV or mental illness may have different levels of trust to share information than other populations (Hall, et al, 2001). Many state privacy laws have been

enacted for the purpose of addressing mental health and HIV/AIDS confidentiality issues to “*encourage people to seek appropriate care, without fearing harmful reprisals. . . .In order to encourage people to seek testing, counseling, treatment, and other health services, many states have established heightened protection for people with mental illness HIV/AIDS, drug and alcohol dependence, and other circumstances where people face stigma, discrimination, and embarrassment.*” (Congress, May 1999). If patients do not trust that their sensitive medical information will be kept private, they may not share information with the physician or, worse, may not seek treatment (Rindfleisch, 1997).

Ultimately, a patient’s trust in the security and privacy of their medical data will affect how they share their information. Currently what is not clear is patients’ awareness of the “trade-offs between legitimate concerns about their privacy and the benefits of making more complete information available to the providers” so that they can provide optimal care based on more comprehensive information (Tang and Lansky, 2005). The patient is the person with the most at stake and is in the best position to provide information to providers (Markle, 2006). This suggests that a patient currently places trust in providing information to physicians since physicians control access to medical records to provide treatment, resulting in a power disparity in the doctor/patient relationship. Providers, therefore, are perceived to hold control over access to medical records and how such sensitive information is shared with other entities. “The lack of coherent policies and practices for the secondary use of health data presents a significant impediment to the goal of strengthening the US healthcare system” (American Medical Informatics Association (AMIA), 2006). Consumer empowerment, in this context, would enable self-determination of how and what medical information the patient feels the need to share.

The Need for Health Information Exchange

Many reasons have been given for the necessity to share medical information across entities. One is that health information exchange (HIE) improves the quality of healthcare, thus the quality of human health. “*One out of every 7 primary care visits is affected by missing medical information. More than 40 percent of Americans have been affected by a medical error, either personally or through a friend or relative . . . [Health information technology] places control over health care in the individual’s own hands, through personalized electronic health records. . .*” (U.S. Senator Kennedy, HIMSS, 2007). Stakeholders in the healthcare pursuit to share information include the physicians, hospitals, pharmacies, insurance companies, legislators, government organizations, and patients/consumers. Here, the term consumer is used to include both patients and their caregivers, if the patients themselves may not be capable of taking on a decision-making role in their healthcare.

In the Lake Research 2006 study, it was found that Americans felt that personal health records would allow them more control over their health so they could track symptoms and the status of their healthcare through the Internet. This was the feeling of parents, of which 82% wanted access to track their children’s health records for information such as immunization dates. The majority (80%) also felt

that an advantage of accessing their records would aid in managing the financial aspects of their healthcare. Approximately 84% of those surveyed by Lake Research were interested in checking the accuracy of their electronic records, of which African Americans and Latinos expressed the greatest concern. Respondents also felt that having this access would improve the communication with their physicians.

Although a concern is the unauthorized sharing of their information, many Americans also felt it necessary to share information under certain circumstances. These included: 73% of the respondents would be comfortable sharing information for public health purposes (detecting outbreaks) and 58% for information collection on bio-terrorist attacks, while 72% were willing to share information for improvement of care through clinical research, and 71% felt that sharing information for detection of medical fraud was appropriate. These responses were based on the assumption that appropriate safeguards and identity protection would be enforced. One advantage of e-Healthcare is that the capability to provide audit trails of access to data by individuals or organizations is available (Joch, 2007).

In his article on Health-e Connections, Slone (2007) discusses the primary advantages of sharing medical information electronically. Slone states that electronic records can serve as a permanent, timely, comprehensive health record which can be accessed from anywhere, and in case of disaster, such as Hurricane Katrina. Electronic health records also allow the personalization and standardization of care, typed records which are legible and easily interpreted, and less duplicated paperwork. The risk of drug interactions, complications, missed tests or duplicate tests can be decreased with health information exchange (HIE) between healthcare providers (HIMSS, 2007). Fortunately, e-Healthcare technology enables medication errors to be decreased (Slone, 2007). Also, the capability to monitor public health is now available to detect trends or disease through shared and aggregated health information (Ferris, 2006). All of these advantages add up to two primary benefits: less cost for providing healthcare and improved human health. E-Healthcare Information Technology (IT) can provide these benefits through several types of technological innovations, which will be discussed next.

Technological Innovations for e-Healthcare

There are generally three different types of e-Health technology which are used to store patient health information—the EMR, EHR, and PHR. The Electronic Medical Record (EMR) is the electronic equivalent of the existing paper medical record, typically used in one organization (Larsen, 2006). The Electronic Health Record (EHR) is a 'secure, real-time, point-of-care, patient-centric information resource for clinicians' (Handler et al., 2003), which allows the sharing of patient information between organizations for improved quality of care. President Bush has mandated that healthcare providers adopt an EHR by 2014 (Slone, 2007). The Personal Health Record (PHR) is 'an electronic application

through which individuals can maintain and manage their health information. . .in a private, secure, and confidential environment' (ONR, 2004, pg). "Since this [PHR] approach empowers individuals to control all access to their own health information, it gives each consumer the freedom to establish their own personalized privacy policy" (Enrado, 2006) and decide how it will be shared across organizations such as the Regional Health Information Organization (RHIO) and U.S. Nationwide Health Information Network (NHIN).

Due to privacy and security concerns, there is a rising concern to address how patients can become more involved in what, when, and where their medical information may be shared through e-Healthcare technology. Janlori Goldman, privacy advocate and member of the Health Privacy Project (1999) calls for a "reversal of the technological status quo by demanding that technology be designed to empower individuals" by shifting the balance of power between "the individual and those seeking personal information" for example, through giving control of medical information to the patients. With the advent of EHRs, some patients have become savvier and want not only access, but the ability to change information in the EHR and the capability to carry a smart card or flash drive containing the EHR data (Chan et al, 2001). Access via smart cards or the Internet by either the patient, healthcare partners, or patients results in vulnerable PHI unless a secure technical infrastructure is in place.

Issues In Disclosing Personal Health Information

Most unauthorized disclosures of medical information are from within the organization (Gue, 2004), whether intentional or not. This has major implications for the healthcare provider. It has been suggested that culture of the organization affects how policy can be implemented and enforced (Gordon, 1991). If the culture values communication and training of policy and enforces policy, the organization will become more deeply compliant to these policies (Trevino, 1986). People "are the heart and soul of secure systems . . .and require awareness, literacy, training, and education in sound security practices for system to be secured (Maconachy, 2001, pg. *). There may be policies in place to regulate security of medical information through employee behavior, but if employees do not comply with such policies, healthcare information is at risk for improper disclosure.

Another hurdle is the potential conflict in state and federal privacy law. There are variations in state and federal privacy regulations (Slone, 2007, NC HISPC (Healthcare Information Security and Privacy Council), 2007), which create barriers to health information exchange. For example, North Carolina has two statutes, NCGS 8-53 (North Carolina General Statute) and NCGS 122C-55(i) which conflict with federal Health Information Portability and Accountability Act of 1996 (HIPAA) regulation in regards to how information may be shared (NC HISPC, 2007).

NCGS 8-53 "establishes the physician-patient privilege, which protects information patients share with their physicians from release to third parties without the patient's consent or a court order" (NC HISPC, 2007, pg. 37). This means that confidential medical information should be "furnished only

on the authorization of the patient” or caregiver (pg. 37). This conflicts with HIPAA which states “A covered healthcare provider may, without consent, use or disclose protected health information to carry out treatment, payment, or healthcare operations” (45 CFR 164.506 (2) (Code of Federal Regulations). The second North Carolina statute NCGS 122C-55(i), which conflicts with HIPAA’s disclosure for treatment feature, “allows for release of mental health and substance abuse information without patient authorization to the physician or psychologist who referred a patient to the facility, but it fails to provide for the release of this information without authorization to any other physician who currently is treating the patient” (NC HISPC, 2007, 38).

Other reasons stated as challenges of sharing medical information include:

1. *Unauthorized disclosure of sensitive information* (Clemens and Hitt, 2004; Botkin, 2001; Ferris, 2006; AMIA, 2006)
2. *Lack of security and policy standardization across entities* (NC HISPC, 2007)
3. *Accurately matching patient search to the correct patient* (Ferris, 2007)
4. *Quality of the data and liability for ‘dirty data’* (Ferris, 2007)
5. *Confusion as to ownership of and access privileges to the information* (American Medical Association website)
6. *Lack of definition for consumer empowerment in e-Healthcare and how to include it in system design* (NC HISPC, 2007)
7. *Lack of consumer understanding and awareness of e-Healthcare technology; therefore less consumer input* (Broder, 2005; Broder, 2006; NC HISPC, 2007)

Significance of the Study

Due to emerging technologies in the health care field, the possibilities for sharing medical information have increased drastically. Information can be shared electronically between health care stakeholders such as patients/consumers, doctors, pharmacies, insurance companies, hospitals, research organizations, and government agencies. The purpose of sharing such information is to improve the quality of human health through better health care. The recent concerns among healthcare stakeholders in sharing sensitive medical records have been the access and control the disclosure of information across entities. The protection of medical record information is critical, and in his testimony before the U.S. House Committee on Commerce, Chris Koyanagi of the Consumer Coalition for Health Privacy, stated that “without trust that the personal sensitive information that they share with their doctors will be handled with some degree of confidentiality, patients will not fully participate in their own healthcare” (Congress, May 1999).

Research is needed to examine the variety of perspectives involved in these disparate communities for healthcare stakeholders such as providers, legislators, providers, and other organizations regarding consumer empowerment in healthcare in the U.S. The goal of this study is to investigate the concept of consumer empowerment in e-Healthcare so that an understanding of consumer empowerment dimensions in e-Healthcare will aid in implementing appropriate policy and technology to ultimately improve human health.

Research Questions

Examining consumer empowerment in e-Healthcare is necessary since the technological innovations allow for the sharing of a person's medical information between people in organizations. Because the technology creates new relationships between people and entities, the sociological aspects and technology intermingle to create a phenomenon of consumer empowerment in e-Healthcare. In order to investigate the phenomenon of consumer empowerment dimensions in e-Healthcare, the research questions will be broad since this area is emerging. Lee (2001) states that "research in the information systems field examines more than just the technological system, or just the social system, or even the two side by side; in addition, it investigates the phenomena that emerge when the two interact. The research of this phenomenon will begin with what Gregor (2006) calls "socio-political research" questions. These are questions which study the context of a phenomenon through examining the stakeholders, history, sociology, application (the technology, in this case), practicality, ethical, and political issues. She suggests that socio-political research questions seek to bring about "improvements in the human condition."

Based on the preliminary analysis of consumer empowerment literature and the recent interest in the issues of consumer empowerment in societal venues, the following research questions are posed for this study.

1. What are the dimensions of consumer empowerment in e-Healthcare?
2. How can consumer empowerment be achieved in e-Healthcare?

This study will investigate the dimensions that emerge when information technology in e-Healthcare interacts with consumer empowerment foundational issues. The first question examines the dimensions and facets of consumer empowerment in e-Healthcare contexts, which will be discovered through the grounded theory methodology, and the second question synthesizes what has emerged from the grounded theory methodology to generate recommendations for ways that consumer empowerment may be achieved in e-Healthcare.

Literature Review

"Empowerment is a construct that links individual strengths and competencies, natural helping systems, and proactive behaviors to social policy and change" (Perkins and Zimmerman, 1995). There are numerous definitions of empowerment, and most research implies that empowerment is more than just self-esteem, self-efficacy, competency, or locus of control (Perkins and Zimmerman, 1995). Given that empowerment is the central focus, a review of the literature from empowerment in healthcare, management, information systems (IS), marketing and sociology research streams will provide a context for this research study.

Empowerment in Marketing

Inherent in the function of the empowerment and its benefit to those involved is the aspect of power. The aspect of empowerment in the marketing literature focuses primarily on the concept that consumers can enforce their power through marketplace economics (Shaw, Newholm, and Dickson, 2006; Wathieu et al, 2002). This suggests that the more choices consumers have in their purchases, the more they are able to exercise power through consumption choices (Shaw et al, 2006). The purchases consumers make in the marketplace reflect their preferred choices in an attempt to influence the suppliers to meet their consumption needs.

According to Shaw, et al (2006), this type of influential purchasing is very similar to citizens casting votes in elections. This political comparison is also interesting to note that consumers also may consciously make a choice to purchase or not purchase based on the ethical choices of the company. For example, if the company pursues strategies using child labor or sweatshop practices, a consumer may boycott those practices through the non-purchase of that company's products. However, this premise presumes two things: that everyone has the same capacity to make the same types of choices, and that consumers are aware of the "re-configuration of power relationships that are emerging between consumers and producers" (Shaw, et al, 2006, pg. 1062). Shankar and colleagues (2006) state that the lay view of consumer empowerment assumes that the power is shifted from producers to consumers and, since consumers know what they want, empowerment is beneficial to consumers. According to Shankar et al (2006), this also assumes that consumers are rational utility maximizers in making choices. Such a marketplace and consumption situation discussed by Shaw et al (2006) therefore creates a further gap in the disparity between those who can afford to purposely choose another vendor, even if their product is more expensive, than someone who cannot afford to make that choice.

The weaknesses in the marketing research are that it assumes rational utility decision makers (Shankar, et al, 2006) and that there are institutional factors which can create unequal resources and unequal power (Shankar, et al, 2006). There also has been no determination of a model for government or organizations to provide funding and resources for consumer empowerment in e-Healthcare, either through the availability of technology or money for PHRs (Personal Health Records). Although insurance companies and employers have been the target stakeholder to provide PHRs to patients, this increases the disparity of those patients who are unemployed or uninsured. A study of consumer empowerment in e-Healthcare is needed to examine whether these weaknesses are experienced in the quest for consumer empowerment in e-Healthcare and how they may be handled.

Empowerment in Management and Information Systems (IS)

Wilkinson (1997) suggests that although empowerment has been studied in management literature, it has not been studied in a historical context. From a managerial and IS perspective, the emphasis on modern empowerment began in the late 1980s through the management of organizational culture, creation of teamwork and employee involvement in innovation efforts to ensure that the company was profitable. For example, in IS research, participatory design in information systems and knowledge management were to empower employees while also creating a more efficient and profitable firm (Sjoberg et al, 1998).

The primary question which stems from the management and IS research is who benefits from the employee being empowered? Seemingly, there should be benefits for both, through improved corporate profits or increased worker satisfaction. In the e-Healthcare context, the lessons for participatory design and knowledge sharing for innovation can be utilized to provide feasible and user-friendly PHRs by conducting an examination of what features and capabilities the patients want from PHR technology. However, patients and physicians do not hold the same amount of power, and this power disparity creates different motives for allowing patient to be empowered. The primary motive for physicians to share medical information has been through government mandates to adopt electronic health records and to share information to decrease the cost of healthcare, while also improving human health. Examining the dimensions of consumer empowerment in e-Healthcare will be important to investigate power issues and how they affect the adoption and implementation of e-Healthcare technology and policy.

Empowerment in Sociology

Empowerment in sociology has been examined by Rose (1999), Foucault (White, 2002), Parsons (White, 2002), and Marx (Kamenka, 1983) as being perspectives of disparity in power, class, and control through surveillance. One way that the government and organizations can enact social control is through the control of information. Foucault perceives institutional medicine as a form of social control rather than healing. He states that surveillance of citizens is the “*organization of information that can be stored by agencies and used to monitor the activities of an administered population. . . [and that] modern medicine is a manifestation of an administered society in which the centralization of information about citizens is essential for social planning*” (White, 2002, pg. 118-119) such as biosurveillance. Ultimately, empowerment is socially constructed (Berger and Luckman, 1966) and is “an outcome of changes in fundamental structures and relations of power” (Anderson, 1996), whether instigated by those in control or those being controlled.

The primary weakness discussed in the sociological literature is the inherent difference in power due to institutional structures and power relations. Most organizations flourish within the socially

constructed realms of power differences, and transferring power from those in charge to those who are not is very difficult. Historically, the healthcare provider has controlled access to patient information, and this shift of control and access to the patient through PHRs also signifies a drastic shift in power from the provider to the patient. Not every stakeholder in the healthcare industry holds the same amount of power, and this disparity results in patients often being deferent to the other stakeholders such as providers and insurance companies. This is also emphasized by U.S. Representative Edolphus Towns, who feels that “*progress towards eliminating . . . health disparities has been slow. . .now we must tackle the implementation of health information technology (HIT). My fear is that we will create further divisions in service delivery for medically underserved communities if we don’t include these communities in both the national dialogue and in the implementation of HIT*” (HIMSS, 2007). Because of this inherent difference in power in institutional structures; patients have not been able to seek empowerment through e-Healthcare technology.

Empowerment in e-Healthcare

Literature expresses empowerment as self-determination over one’s own life (Geller et al, 1998) as a result of having access to information and resources to enable an informed choice (Wowra et al, 1999). However, most healthcare-related literature discusses consumer empowerment in four different contexts:

1. of e-Healthcare web sites and the availability of patients to access treatment on the web regarding their treatments, diagnoses, and support group options (Luo and Najdawi, 2004))
2. of specific areas such as mental health and enabling patients to recover with a sense of self-determination (Wowra et al, 1999)
3. of sharing information to organizations outside of the healthcare providers for secondary purposes such as genetic research (Botkin, 2001)
4. of health disparities and giving consumers more choices, power, and resources to reduce disparities (Anderson, 1996).

The difference is that empowerment in healthcare literature currently focuses primarily on reading information from a website to educate themselves on a variety of treatments, medications, procedures, and quality of healthcare providers (such as that provided through LeapFrog) (HON, 2002, http://www.hon.ch/HONcode/HON_CCE_en.htm). E-Healthcare empowerment focuses on the sharing of sensitive, personal medical information, and is likely to contain different dimensions than healthcare empowerment based on the type of information being utilized. For e-Healthcare, this involves analyzing patient access and control of ***their own medical records*** for self-determination of who the information will be shared with and for what purpose, based on the technology utilized.

Implications from Literature

The implication of the consumer empowerment literature in healthcare, marketing, management, information systems, and sociology for this study is important. Most definitions in literature view empowerment as “an intentional ongoing process centered in the local community, involving mutual respect, critical reflection, caring, and group participation, through which people lacking an equal share of valued resources gain greater access to and control over those resources” (Cornell Empowerment Group, 1989). As Shaw (2006) and Shankar et al (2006) suggest, power is often seen as being transferred from the producer to the consumer. To examine power and how it is held and transferred is important in e-Healthcare because traditionally the healthcare provider has held power, especially in the doctor/patient relationship. For a transfer of power to take place, the perspectives of the doctor, patient, and other stakeholders such as insurance companies, legislators, and pharmacies need to be examined. One assumption from these empowerment research streams predominately states that empowerment is positive for the consumer and the economy. However, it is important to ask who benefits from empowerment? Those who hold the power typically determine how empowerment will be allowed, usually for the benefit of the institution in power. Because of these power issues, one challenge of empowerment is that of possible widening disparity between those who can exercise choice and those who don't have the resources (such as technology and literacy level) to do so. In e-Healthcare, it has not been determined how the technology and access to electronic medical records would be provided and who would be responsible for the costs, maintenance, and education to implement such technology.

Because there is no existing theory for consumer empowerment in e-Healthcare, data that are rich and detailed in description are needed to be the source and foundation for such a theory. “We need consumers as part of the equation” as well as providers, legislators, advocacy organizations, and other healthcare stakeholders to create a more comprehensive view of consumer empowerment (Hayes, 2007). Since grounded theory research methodology allows one to develop new theories where none exist, from data that is rich and detailed in description, this methodology will be utilized. Using grounded theory, this research examines consumer empowerment in the context of e-Healthcare primarily by analyzing meeting transcripts of a U.S. government-led Consumer Empowerment Group and a grassroots state-level effort.

Methodology

Grounded Theory Approach

The grounded theory approach is a well-established and systematic way to develop theory founded in qualitative data. Grounded theory is appropriate to use when there is no theory or if a

phenomenon is not clearly understood, and such an approach seeks to better understand human behavior and experience (Bogdan and Biklen, 2003). Glaser and Strauss (1967) suggest that the grounded theory approach is the purposeful “discovery of theory from data systematically obtained” (pg. 2). The grounded theory methodology is systematic through theoretical sampling, the constant comparative method, developing and examining documentation and immersing oneself in a setting, will enable one to generate a theory. The constant comparative method which is unique to Grounded Theory methodology allows for theory to be generated through jointly and systematically coding the data and analyzing the data for content. If analyzing documents or transcription for similar content, each instance of similar content is considered an incident. For example, each incident of the terms empowerment or power that appears in the data would be aggregated to form a concept of empowerment. The comparisons take three forms: 1) Open coding--incidents are compared to other incidents to develop concepts; 2) Axial coding--concepts are compared to incidents to determine if the particular incident should be aggregated with the concept; and 3) Selective coding--concepts are compared to concepts to determine parsimony of the concepts (Glaser, 2004). The comparisons should be performed until the concepts are saturated and begin to repeat in the data. In essence, the researcher performs joint coding and analysis at the same time by using systematic coding and analysis procedures (Glaser and Strauss, 1967, pg. 102).

Application of Grounded Theory Methodology

The grounded theory approach will be utilized to propose a theory for consumer empowerment in e-Healthcare since no such theory currently exists. It is an appropriate approach to use because it provides rigor and relevance (Fernandez and Lehmann, 2005) through its systematic methods using data from the field. The grounded theory approach will allow the research questions to be answered within the rich context of the setting. The purpose of this research is to investigate the dimensions of consumer empowerment in e-Healthcare by studying organizations which focus on consumer empowerment as a goal in implementing e-Healthcare technology and policy. For grounded theory studies, the purpose is to discover theory from concepts in data analysis.

Data Sources

There will be two primary sources of data for this study: American Health Information Community Consumer Empowerment Group (AHIC CEG), and the North Carolina Healthcare Information and Communications Alliance Consumer Advisory Council on Health Information (NCHICA CACHI). The focus for both groups is on consumer empowerment in e-Healthcare; however, the investigation for this study is to determine how each group, from a federal and a state perspective, view consumer empowerment. The initial source of data for this phase of research will be from the AHIC, a group formed by the United States Department of Health and Human Services.

“The American Health Information Community (AHIC) is a federal advisory body, chartered . . . to make recommendations to the Secretary of the U.S. Department of Health and Human Services on how to accelerate the development and adoption of health information technology” (<http://www.hhs.gov/healthit/>). AHIC is an important group to examine for this study because it is a federal effort and provides a higher-level view of consumer empowerment dimensions. There are few large efforts, such as AHIC, which study consumer empowerment in the context of e-Healthcare. It is based on a federally-funded effort and includes a variety of stakeholders expressing their perceptions and views on the phenomenon of interest, consumer empowerment. Because it is a federal workgroup, the meetings proceed systematically, and proper documentation is generated. AHIC workgroups are formed to study specific phenomenon in healthcare information technology. The current workgroups are: Chronic Care; Confidentiality, Security, and Privacy; Consumer Empowerment; Electronic Health Records; Personalized Healthcare; Population Health; and Quality. Because its focus is on empowerment issues, the Consumer Empowerment Group (CEG) was chosen as an initial data source for this study.

AHIC formed the Consumer Empowerment Group to make recommendations for the wide spread adoption of a personal health record that is “easy to use, portable, longitudinal, affordable, and consumer-centered” (Transcript, Feb. 21, 2006). These Workgroup meetings are held on a monthly basis and are open to the public; therefore, members of the public have access to detailed documentation such as minutes and transcription contents. Document analysis can be performed on these materials, which include agendas, testimony hearings, work plans, meeting summaries, transcripts, and streaming archives. Currently, there are over 500 pages of documentation from their meetings, which began in January of 2006 and have been held monthly since that time. Participants in the Consumer Empowerment Group include individuals representing patient advocacy organizations, the Department of Health and Human Services, insurance companies, vendors, and the Centers for Medicare and Medicaid Services. For this preliminary analysis phase, only the meeting transcriptions will be analyzed. Other documents such as presentation slides and articles supplied by AHIC members for supporting evidence will be included in the next phase of this study. It is anticipated that the content of these meetings will provide a conceptual foundation for the factors driving consumer empowerment in e-Healthcare.

Preliminary Analysis

“I think it is very important we make certain the consumer voice is heard.”

-Healthcare Consumer Empowerment Group member (Transcript Feb. 21, 2006)

Using the grounded theory approach, the AHIC CEG (American Healthcare Information Community Consumer Empowerment Group) data has been analyzed by examining the source documents carefully, and using the constant comparative method to begin generating concepts for

theory. For the current study, an initial analysis was performed on one year of AHIC meeting transcripts (Jan. 2006 to Jan. 2007), which included 495 pages of meeting notes. The documents were reviewed for content and context so that codes generated are grounded in the data. The transcripts were entered into the qualitative software package, QSR NVIVO 7.0 to make the management of the data and analysis and coding more effective. Included in NVIVO's functionality is the ability to code across documents to investigate the data for open codes. As the transcripts were analyzed manually for content, NVIVO was utilized to hold open codes generated during the analysis. A constant comparative analysis was performed between the transcript data and the open codes to determine the context of the open codes being generated. As the analysis progressed, the open codes were grouped into similar concepts. For example, consumers and patients were grouped together as the concept Consumer. From this analysis, six initial concepts were generated.

Initial Research Findings

Based upon the context of the documents and the concepts that emerged frequently during the meetings and were emphasized by AHIC CEG members as being important, the following open coding map (Figure 3) was generated. It includes the initial open coding concepts in shaded blocks—Consumers (here it is used interchangeably with patients), Record, Policy, Stakeholders, Technology-Related, and Action-Related. Underneath each concept block are the associated terms which were aggregated underneath each concept. For example, the concept for Record also was associated with the concepts of information and data included in a patient's medical record. Underneath each concept and its associated items are the preliminary attributes associated with each concept. For example, for the information included in the patient's medical record, the transcripts often referred to it as being sensitive, or shared for primary or secondary purposes, as well as being portable for the patient to transfer to each healthcare provider's office.

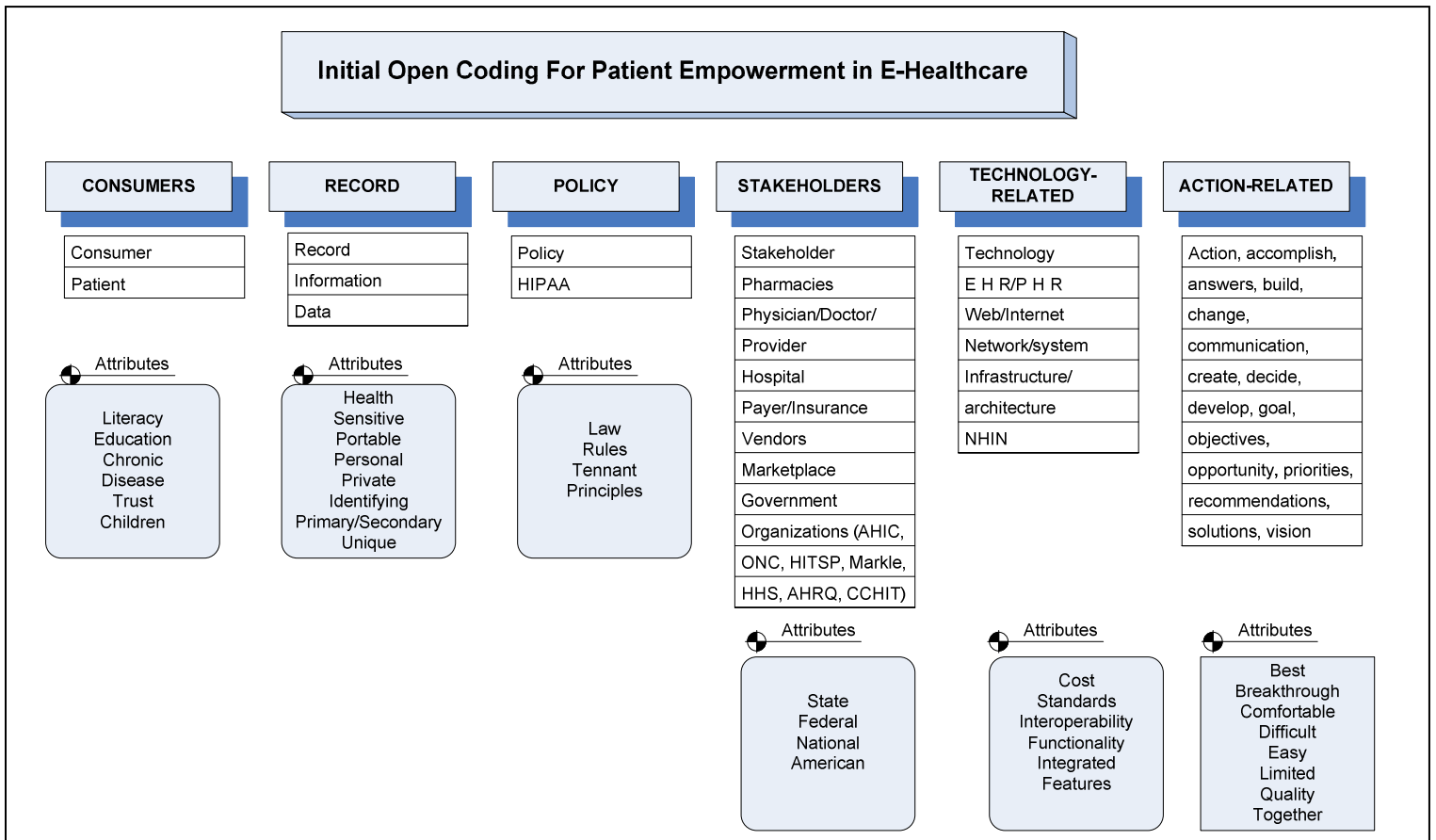


Figure 1--Open Coding from Data with Associated Terms and Attributes

These concepts reveal that empowerment for patients in sharing their healthcare information between stakeholders may be related to the type of medical information in the record, trust between the patient and other stakeholders, privacy and security policies such as HIPAA, and to the features of technology such as the personal health record (PHR) and the Nationwide Health Information Network (NHIN). From the frequently discussed proposed actions, the Consumer Empowerment Workgroup seems to be dedicated to the cause of encouraging empowerment issues and making recommendations to the AHIC Community Group. Since qualitative approaches such as grounded theory should be rich in description, quotes from the AHIC minutes are given in Table 1 to support the reasoning for these conceptual categories.

Concept	Supporting Quotes
Consumers	I truly believe that if we are indeed going to fulfill our responsibility to consumers, we do have to have a widely articulated generally understood policy on privacy, that's what our patients deserve and that's what the American public deserves if indeed we are going to empower them. (Transcript, Feb. 21, 2006)
Record	And I think that since our broad charge is really sort of all encompassing when it comes to personal health records and our recommendation should be addressing interoperability, affordability, patient-centric focus in terms of making sure PHRs meet the needs of consumers, and making sure that these records are longitudinal from birth to death. (Transcript, Nov. 28, 2006)
Policy	A role that we could play as well, or some entity, presumably us, would be as you find that idealized language about what the lawyers need to see to say yep, this is a policy that does have consumer protections built into it, is for the major components of that, create a language . . . that would be understandable concepts in the public environment, what do you say, privacy should have commonly understood meaning among all vendors and some phrase that says when it says your data will be made available and in <u>anonymized</u> fashion for secondary uses, that there's a phrase for that that can be in 4th-grade readable kind of terms. (Transcript, Jan. 10, 2007)
Stakeholders	If we look at related Federal efforts and resources, although CMS and VA and DOD and OPM have access to different types of health care information. Each operates under different legislative authorities and regulatory schemas. The DOD uses clinical data and <u>counterdata</u> claims data from external providers and information on eligibility, whereas OPM has only eligibility and benefit information available. CMS has both eligibility, benefit data, and claims but no access to patient-specific clinical information (Transcript, Jan. 30, 2006)
Technology-Related	. . . ideally personal health data can be exchanged among PHRs and EHRs under the control of the patient while preserving the meaning of the data. And what I tried to do there is to address this movement of data between and among PHRs and EHRs, which I think everyone just said they agreed with, while preserving the controls for the patient, and the interoperability, which is preserving the meaning of the data. (Transcript, Jan. 10, 2007)
Action-Related	Nancy, I want to congratulate you for really identifying - and ONC staff as well here - really identifying how quickly we come upon and confront all of these policy issues. They really are an important crux of what has to be addressed in order to have a real breakthrough here. (Transcript, Jan. 30, 2006)

Table 1—Foundational Quotes from the Data for Each Open Coded Concept

Proposed Initial Theoretical Model of Consumer Empowerment

One aspect that seems to unfold from this initial analysis is that empowerment is a multi-dimensional and complex concept. Also, some of the concepts at this point may be inter-related, such as trust of the consumer and the stakeholders. For example, one member suggested that *“one of the other points we learned is that people want their information -- this information to be conveyed by a trusted source. They viewed their providers as trusted sources. They view the voluntary health agencies, the patient advocacy organizations as well as some that represent clinicians, as the trusted sources to deliver this information. So we know what messages can identify the problems, the solution, who needs to deliver the information as a credible caring source”* (Transcript, Sept. 18, 2006). There are most likely other concepts that may emerge through additional coding, such as barriers, which may overlap with other concepts because policy and technology, for example, could each create barriers to the sharing of medical information. The next steps of clarifying the initial coding and then conducting axial coding for the relationships help generate theory for the relationships between the concepts.

In the model, it is proposed that federal and state policy enacted through active participation of patient/consumer advocacy groups have a direct bearing on consumer empowerment. For example,

HIPAA itself is not sufficient to empower patients in e-Healthcare and either modification or additional regulations are needed to truly empower patients and make them active participants in the healthcare system (Stein, 2006). Patient/consumer awareness and self-determination construct is also critical for consumer empowerment. Without patients being aware and fully educated in terms of the level of control that they have on their own healthcare information, it is difficult to conceive of effective consumer empowerment. The initial analysis suggests that effective education, awareness, and programs be initiated so that patients begin to become aware and feel more self-determined in their healthcare information as participants in the healthcare system. Additionally, the concept of record, which incorporates sensitive healthcare information of patients, integrates with information technology as a delivery for healthcare information exchange to enable consumer empowerment. It is difficult to imagine an efficient e-Healthcare system that does not employ information, data and web-based information technologies. The four interdependent concepts of patient/consumer awareness, record, information technology, and policy combine to represent tools in the hands of the stakeholders to achieve consumer empowerment in e-Healthcare through specific actions, goals, communication to reach for a solution that truly empowers the patients. As a member of the AHIC CEG stated, “. . . *you know, generally thinking we need to be building to a sustainable value based system, that will encourage the integration of care, and consistent communication and coordination, then we need to be thinking that sort of how to build on -- you know, over time, to enable the most important functional areas, or what a PHR could do, that really does deliver value to the patient. So that they get the evidence-based health information that they need that's specific to their conditions, and that they can, you know, talk -- or communicate with their clinicians or their health care team about the decisions that would best meet their needs based on their preferences*” (Transcript, Sept. 18, 2006).

From the AHIC CEG meeting notes, the PHR (Personal Health Record) technology was discussed quite often, in terms of getting people educated and informed about PHRs and the technological capability so that they are willing to use the technology self-sufficiently. A member of AHIC stated that for their future plans, there are “*a number of critical success factors. One is getting the patient-consumers involved and educated, and advocating for this. Two is getting the docs on to EHRs [Electronic Health Records].. Three is having the whole system integrated, because that work flow issue, and the shared information, is what we're after. . . And it's really about the connectivity with the physicians, the patients, the health care team, and the caregivers who is going to be really an important force in the not too distant future. It's really about the relationship, not a product, not software, not a technology*” (Transcript, Sept. 18, 2006). This supports the proposed states of consumer empowerment in e-Healthcare.

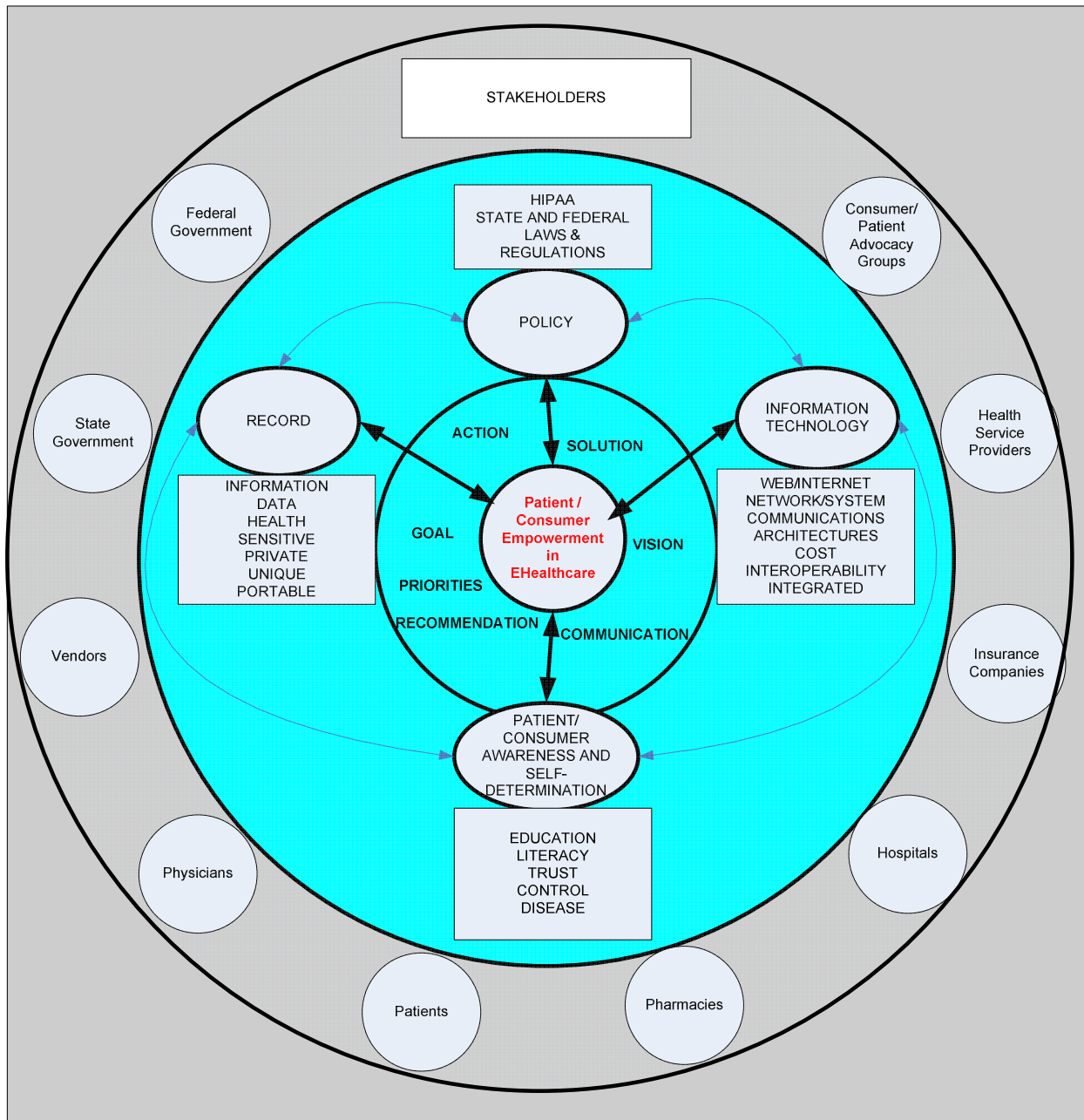


Figure 2--Theoretical Model for Consumer empowerment in e-Healthcare

In analyzing the transcripts from AHIC’s Consumer Empowerment Group, there were moments where the AHIC group members realized that focusing on empowerment entailed many issues and the need to emphasize consumer empowerment was their main charge. One member stated that *“I mean, it seems to me the word “empowerment” should be the watch word of what we’re doing here. And rather than saying our goal is to display in front of people a set of data they may or may not have any interest in, we should say what is it people feel empowered by. And if there are a couple million people with access to a medication list, I’d like to know what they are using it for and what they feel empowered by”* (Transcript, March 20, 2006). At a meeting on a different date, the conversation returned to the notion of understanding consumer empowerment and ensuring that their deliverables

were provided with the patient's interest in mind. One member stated that he did *"want the thought to be when we get done with this and when we're all ready to endorse it and say, "This is what we're handing over to the Community," we can say with all sincerity, "This has 'consumer empowerment' written all over it"* (Transcript, April 25, 2006) to which another member replied that *"the comment about taking a step back and looking at the consumer empowerment notion and reviewing the perspective from that look may lead us to want to take a stronger role at defining the consumer's requirements. If you look at it from a -- call it a system engineering perspective, we really don't have a good sense of the consumers' requirements for the system"* (Transcript, April 25, 2006). This reveals the need to further understand what patients want and need to feel empowered.

Discussion

It is anticipated that consumer empowerment will likely remain a multi-dimensional construct, as revealed through this initial study. Further review of the literature in security, privacy policy, conflict theory, sociology, management, management information systems, information politics and healthcare information systems will be carried out to better develop theoretical underpinnings of consumer empowerment in e-Healthcare apart from the concepts and constructs identified through the analyses of the data. The purpose here is to develop a rich theory of consumer empowerment in e-Healthcare so that with better understanding and insight we are able to develop better interventions that are practical and better research designs that are more informative. In the context of consumer empowerment in e-Healthcare and the struggle to determine power issues over patient information, literature on intellectual property/copyright and e-commerce opt in and out could be beneficial to examine in the context of e-Healthcare.

As the AHIC documents are analyzed further, along with focus groups providing additional rich descriptions of a variety of perspectives, integration with previous literature will enable the generation of parsimonious constructs for understanding consumer empowerment in e-Healthcare. One AHIC member states this very succinctly, what is needed is to: *". . . [take] all the stakeholders and, from the patient's point of view, make some recommendations about what should be done or what should be researched that will really enhance and bring value to all the work that I don't think anyone else is doing"* (Transcript, March 20, 2006). Further examination of these issues will be important to the efforts for building consumer empowerment in e-Healthcare through in-depth investigation of the specific stages of consumer empowerment and detailed interrelationships between the stakeholders.

The initial theoretical model presented in this research is the first step towards developing a conceptual model of consumer empowerment in e-Healthcare. In this study, the initial findings about consumer empowerment are presented. It was found that the role of different stakeholders and their perspectives are critical to move ahead with a practical roadmap for consumer empowerment. The implication of this is that the technological innovations and corresponding e-Healthcare policies will be

generated and implemented properly while also appropriately including consumer empowerment concerns and safeguards.

Future Research

From this preliminary analysis, there is a foundation to further study the dimensions of consumer empowerment in e-Healthcare. The next phases of this study will be to utilize the grounded theory approach to further generate concepts and categories through coding of the documentation from at least the following data sources: AHIC Consumer Empowerment Group (CEG) meetings, NCHICA Consumer Advisory Council on Healthcare Information (CACHI) meetings, individual interviews with NCHICA Consumer Advisory Council on Healthcare Information Members, and Consumer Focus Groups and Provider Roundtables. The manner in which these data sources will be used to generate grounded theory for consumer empowerment in e-Healthcare is discussed next. These data sources will help in the development of a comprehensive theory of consumer empowerment in e-Healthcare.

Conclusions and Implications

It is my hope that my contribution to the field of consumer empowerment in e-Healthcare will enable a better understanding of why patients and providers feel the way they do about these issues. It should provide the basis for education of all parties involved, if appropriate, and should support the foundation for a trusting relationship to form between these parties. The implications are to provide knowledge for future academic research in the area of e-Healthcare consumer empowerment. This study could serve as a foundation to stimulate more research in this important area to make the U.S. healthcare system more efficient and effective.

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ASSESSING THE KNOWLEDGE OF HIV/AIDS AMONG AFRICAN AMERICAN COLLEGE STUDENTS

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ABSTRACT

Many college students have general knowledge about HIV/AIDS, but engage in behaviors that put them at risk for HIV infection. The purpose of this study was to investigate the relationship between knowledge of HIV/AIDS and behavior among undergraduate students. Participants were drawn from a convenience sample of 375 students enrolled in health classes who attend a Southeastern HBCU. A questionnaire was used to assess the knowledge, beliefs, and behaviors regarding HIV/AIDS. The results confirmed that while students were generally knowledgeable about HIV/AIDS, they continue to engage in risky sexual behaviors.

College students may have general knowledge about human immunodeficiency virus/acquired immunodeficiency syndrome (Lance, 2001), yet the number of individuals who attend a higher institution of learning who are at risk for HIV has substantially increased. College students often participate in behaviors that put them at risk for HIV infection (Hou, 2004; Prince & Bernard, 1998). Risky behaviors include unprotected sexual activities and sexual contact with multiple partners. These risks are exacerbated by the low incidence of voluntary HIV testing among college students (Hou, 2004; Prince & Bernard, 1998). Several researchers have attempted to examine college students' knowledge and awareness of HIV/AIDS (Lance, 2001). While college students showed general knowledge of HIV/AIDS, there is still a need for education about important concepts related to HIV/AIDS testing (Hou, 2004). Of greatest concern is the lack of correlation between students' knowledge and reduction of risk behaviors (Hou, 2004). This disconnect may contribute to an environment where college students underestimate their need for testing, which is the reason why regular HIV testing is of profound importance for students who are sexually active.

This study has an impact on rehabilitation counseling professionals, health educators and health care providers. These professionals are all charged with linking general knowledge of HIV/AIDS, risk factors, and testing for HIV. Early identification of HIV status is even more important today because persons with HIV/AIDS have a greater likelihood for a medically manageable prognosis and for continuing or returning to work (Hergenrather, Rhodes, & McDaniel, 2005). In the event that an individual tests positive for HIV/AIDS, these professionals can play a key role in assisting individuals living with HIV or AIDS in both obtaining and maintaining employment (Glenn, Garcia, Li, & Moore, 1998).

Collectively, these professionals can assist in developing age-appropriate and culturally competent curricula for college-aged students and design programs to inform young adults regarding prevention and testing. Studies have verified that the virus can lay dormant for a number of years before symptoms manifest; therefore, some adults who have AIDS were likely infected while attending college (Mattson, 2002). Providing culturally and contextually appropriate messages is essential in educating persons at risk on how to avoid contracting or transmitting HIV. The purpose of this research is to investigate the knowledge and behavior of HIV/AIDS among college students at an HBCU.

Review of Literature

The Morbidity and Mortality Weekly Report (MMWR) published by the Center for Disease Control (CDC, 2005) reported that more than one million persons in the United States are living with HIV/AIDS and an estimated 40,000 new HIV infections are expected to occur this year (Fenton & Valdiserri, 2006). African Americans in the United States account for more persons infected with HIV/AIDS than any other ethnic group (Kates, & Carbaugh, 2006). In 2006, the North Carolina HIV/STD Quarterly Surveillance report concluded that, from January 2004 through March 2006, there were 1,420 new cases of individuals living with HIV (Barrie, 2006).

Although AIDS infection rates are declining among the general population, the CDC reported that young people in the United States at an alarming rate (Brown, Jara, & Braxton, 2005). In North Carolina, males and females between the ages of 13-29 make up 25.1% of individuals living with HIV (Barrie, 2006). In 2005, Forsyth County, located in Winston-Salem, North Carolina reported 338 HIV cases among African Americans, which includes newly reported HIV infected individuals (Ademoyero, 2005). Findings included 27 new HIV and seven AIDS cases which were found among persons in the age ranges of 13-29. In the United States is at persistent risk for HIV infection. This risk is especially notable for youth of underrepresented ethnic groups (Barrie, 2006).

The necessity of studying HIV risk behaviors among college students is clear (Powell & Sergin, 2004). Young Americans between the ages of 13-24 are contracting HIV at a rate of two per hour (Fennell, 2004). Half of all new HIV infections are thought to occur in young people under 25 (Fennell, 2004). The delay between HIV infection and the onset of AIDS suggests that most of these young people were infected as teenagers. While the total number of youth in the United States who have been infected with HIV is unknown, it is estimated that 20,000 young people between the ages of 13-24 are infected with HIV every year (Fennell, 2004).

Approximately 16 million people are enrolled in institutions of higher learning, and it is estimated that 41,602 students attend the 11 HBCU's located in North Carolina (Hightow, MacDonald, Pilcher, Kaplan, Foust, & Nguyen, 2005). Assessing the knowledge of HIV/AIDS among African-Americans college students attending an HBCU is significant because HIV infections among individuals under the age of 25 are escalating at alarming rates (Jones, & Abes, 2003).

In 2002, the North Carolina Epidemiologic Profile for HIV/AIDS used the Screening Tracing Active Transmission (STAT) HIV testing program, which identified two male students who were HIV positive and attended an Historically Black College and University (HBCU). This finding prompted researchers to investigate the number of HIV cases that were reported in the North Carolina Research Triangle Park. There were 25 new cases of HIV infections in males in the Research Triangle Park between January 1, 2001 and March 1, 2003 (Barrie, 2005).

Sample

Participants were drawn from of a convenience sample of 375 students selected from health classes at an Historically Black University (HBCU) in the southeastern section of the United States. Students' involvement was voluntary.

Instrument

The HIV/AIDS Awareness modified questionnaire developed to assess the knowledge, beliefs, and behaviors regarding HIV/AIDS among HBCU college students. The questionnaire consist of 23 multiple choice items with 2-9 answer choices each. Questions focused on these areas: knowledge, behavior, and beliefs. Only 9 questions focused on knowledge will be and 3 behavior questions will be assessed. Questions were taken from the Youth Risk Behavior Surveillance System (YRBSS) (CDC, 2005); and the Population Council surveys (AIDSQuest, 2005) with a database of questions regarding youth health issues and HIV/AIDS. The construct validity of this survey will be reviewed by a panel of experts in field.

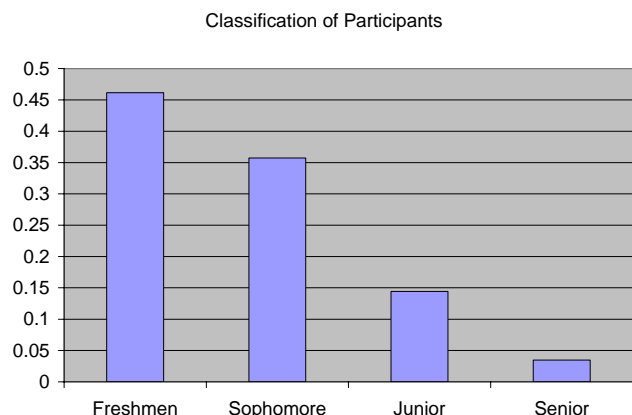
Procedure

The researcher obtained permission to meet with health classes regarding the study. The initial meeting was to recruit and provide relevant information about the study. The second meeting that occurred in the classroom was for students who were interested in the study. Students were asked to remain after class to complete the survey. The survey took 15-20 minutes to administer to students. Data collection consisted of distributing consent forms and surveys were administered anonymously.

Results

Demographic data revealed that 55% (n=209) of participants were female and 44% (n=165) were male. The majority of students were African-American and traditional college students. The majority of the students were freshmen students (47%). Students ranged in age between of 18 to 21. Figure one provides a breakdown of students' classifications.

Figure 1: Classification of Participants



The data revealed that 89% of students have engaged in sexual intercourse. Sixteen percent of the students reported using drugs or alcohol before having sexual intercourse. Over half (56%) of students reported using a condom, while 1/3 or 29.6% reported not using a condom.

Students appeared to be generally knowledgeable about HIV/AIDS. When asked “could a person protect themselves from getting HIV/AIDS”, 89% responded yes. Seventy of respondents knew that HIV/AIDS is incurable. The statistics disclosed that 79% of the students reported if a person was HIV positive they would know it. Over two-thirds of the students (72%) answered that they could not tell if someone was HIV positive by looking at the person. Most students (92%) were aware that they can acquire HIV/AIDS the first time they have sex.

A slightly lower percent of students (68%) reported that HIV infection cannot be passed through sharing eating utensils with someone who has AIDS. Students' knowledge decreased when asked about HIV/AIDS transmission through contact with insects. For example, less than half or 49% answered no to the question “you can get AIDS through mosquito, flea, or bedbug bites”, and 25% indicated that they did not know the answer. A majority (88%) of the students responded that you could not catch HIV/AIDS from talking to, shaking hands with, or playing sports with people who have HIV/AIDS.

Discussion

This study confirms earlier findings about college students' knowledge and behavior in regards to HIV/AIDS. Various studies regarding sexual practices among college students have indicated that students are generally knowledgeable about HIV/AIDS; however they have misconceptions about the risk of transmission (Lance, 2001; Opt & Leffrodo, 2004). Likewise, students in this study were knowledgeable about certain HIV/AIDS facts and were inconsistent in their knowledge about the transmission of HIV/AIDS. In addition, research indicates that this group often participates in behaviors that put them at risk for HIV infection. In this particular study, 30 percent of students reported having unprotected sex. Sixteen percent reported using drugs and/or alcohol during their last sexual encounter. This inconsistency serves to further confirm the gap between knowledge and behavior. Lance (2001)

explained that while most heterosexual college students know that they are at risk for HIV infection, most do not sense a personal risk.

While this study provides valuable insight, its limitations should be noted. HIV/AIDS and sexual behaviors are very sensitive topics. Thus, students may have been reluctant in their responses even though confidentiality was guaranteed. In addition, participants had not completed the unit on HIV/AIDS before participating in the study. Therefore, the true effects HIV/AIDS education cannot be evaluated. Finally, survey questions were compiled from a reliable database; however, the survey was not pre-tested for use with this project. In lieu of its limitations, findings from this study confirm that the knowledge-behavior gap continues to demand further investigation. This study has serious implications for health educators and others that work closely with college age individuals. Health educators suggest that education is the best way to avoid the continued spread of HIV (Lance, 2001). Future research should focus on the impact of HIV/AIDS education programs. Education programs may need to focus more on helping students to understand the implications of risky sexual behavior, as opposed to the current focus on obtaining knowledge. Because over half of all new HIV infections occur in young people, the need for effective programming for this age group is imperative to insure early prevention and awareness.

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Do Inventory Forward Buys Make Sense?

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Abstract

Procuring commodities is difficult due to the fluctuating purchase prices intrinsic in commodities. These price fluctuations can allow a firm to benefit from buying for future demand in addition to current demand when prices are low. Golabi (1985) proposes a method to determine how many, if any, periods to forward buy. However, the commodity price variability must meet a minimum criterion for forward buys to make sense. This criterion along with publicly available historical price indices can give management and indication regarding if it is worth investigating forward buys for inventory replenishment.

Key words: Procurement; Commodities; Forward Buys; Golabi; Inventory

1.0 Introduction

Purchasing commodities is complex because the purchase cost in the future is uncertain. Prices may increase or decrease in a short amount of time. Golabi (1985) proposes a method to determine cost thresholds, where if the current realized cost to buy crosses a threshold, forward buying should occur to minimize expect cost. His method assumes deterministic demand and a known distribution of commodity costs. We outline Golabi's method using a simple example in section 2.1.

Practically speaking, the future distribution of commodity costs can be estimated from historical price variability using commonly available database listed in section 2.3. The variance and mean of price distributions can be calculated from historical spot prices with the same interval length as a company's buying frequency. From this, managers can asses how often historical prices would have been low enough to warrant forward buying in the past.

A simple method will be shown that determines a lower price threshold. A manager can use this price threshold to determine if forward buys would have been optimal in the past. Given the frequency of realized prices below this price threshold, the probability of future similarly low prices can be calculated. If the price data support that forward buys are likely, then the method outlined by Golabi (1985) can be applied each purchasing period to determine how many periods to forward buy at each buying opportunity.

2.0 Literature Review

2.1 Golabi's Method of Forward Buys

Golabi (1985) proposes a method whereby material for future periods is bought as long as the marginal cost is less than the marginal savings. His recursive heuristic yields a series of decreasing thresholds corresponding to the number of periods to buy forward. Ordering prices in each period are random with a known distribution. Magirou (1987) comments on the similarity between his 1982 paper and Golabi's 1985 work. Golabi's equation accounts for the probability that the next period price will be less than the current price plus the benefit of locking in the prior price minus the holding costs for one period. Equation 1 below is the corrected equation (9) from Golabi's paper that specifies the next price point such that forward buying $n+1$ periods is optimal. A_n is the threshold price per unit such that buying n periods ahead is optimal. If the current purchase price is less than or equal to A_n , then it is optimal to buy for the current period and n periods ahead. Let x be the purchase price and $F(x)$ is the known cumulative price distribution for each period (in equation 1 below $dF(x)$ is equivalent to $f(x)dx$ the probability density function). h is the cost to hold one unit of stock for one period. A_0 is the highest possible purchase price since Golabi assumes all demand must be met for the current period (period 0). Each additional threshold price is computed according to (1) below

$$A_{n+1} = \int_0^{A_n} x dF(x) + \int_{A_n}^{\infty} A_n dF(x) - h \quad (1)$$

Given the probability that the price falls in the future, the first integral in (1) is the opportunity cost of buying in the current period versus buying at a possibly lower cost

next period. The second integral is the benefit of locking the A_n purchase cost. The final term is the holding cost for buying inventory in period n for use in period $n+1$. We will now illustrate this heuristic with stationary, uniform price distributions. Assume that the price at any buying opportunity can be \$25, \$50, \$75 or \$100 – each with equal probability. Assume the holding cost for one period is \$5.

Since we must buy to cover demand in the current period (0), A_0 equals the highest possible price. Thus $A_0 = 100$, the highest possible purchase price of our uniform price distribution.

A_1 is the expected price lower than or equal to A_0 plus the benefit of locking in at the price A_0 minus the one period holding cost h . The first term in equation 1 is the expected price lower than or equal to A_0 is $\$25 * 25\% + \$50 * 25\% + \$75 * 25\% + \$100 * 25\% = \$62.50$. The second term in equation 1 is the expected benefit of locking in the price of A_0 . This second term is \$0 since the price cannot go higher than \$100. We also need to subtract the one period holding cost (\$5 in this example) if we buy now for the next period. $A_1 = \$62.50 + \$0 - \$5 = \57.50 . If the current purchase price is \$57.50 or lower, we should buy for the current period demand plus the demand for the next period.

Likewise, $A_2 = \$18.75 + \$28.75 - \$5 = \42.50 , $A_3 = \$6.25 + \$31.88 - \$5 = \33.13 , $A_4 = \$6.25 + \$24.84 - \$5 = \26.09 , and $A_5 = \$19.57$ which is below the possible price range for the distribution so we can be certain that we will never buy for more than four periods in advance.

This method seeks to answer how many periods in advance should we buy to satisfy all predicted demand and to minimize total expect costs. Given our price

distribution, Table 1 shows the current purchasing prices that make sense for forward buying.

Table 1: Price Thresholds to Forward Buy

Calculated						
	Value	\$ 25.00	\$ 50.00	\$75.00	\$ 100.00	No Discount
A0	\$ 100.00	Yes	Yes	Yes	Yes	
A1	\$ 57.50	Yes	Yes			
A2	\$ 42.50	Yes				
A3	\$ 33.13	Yes				
A4	\$ 26.09	Yes				

2.2 Historical Commodity Prices

The historical prices for can be found from a variety of sources including American Metal Market, LLC (www.amm.com) for metals, Random Lengths (www.randomlengths.com) for forest products, and The American Economagic (www.economagic.com) for many different commodities. The American Economagic is a website providing economic time series data for classroom use. Commodity prices on this site are under Producer Price Index by Product. The database contains Seasonally Adjusted (SA) prices and Non-Seasonally Adjusted (NSA) prices in U.S. Dollars for these categories of products:

- * 01 Farm products: SA, NSA
- * 02 Processed foods and feeds: SA, NSA
- * 03 Textile products and apparel: SA, NSA
- * 04 Hides, skins, leather, and related products: SA, NSA
- * 05 Fuels and related products and power: SA, NSA
- * 06 Chemicals and allied products: SA, NSA
- * 07 Rubber and plastic products: SA, NSA
- * 08 Lumber and wood products: SA, NSA
- * 09 Pulp, paper, and allied products: SA, NSA
- * 10 Metals and metal products: SA, NSA
- * 11 Machinery and equipment: SA, NSA
- * 12 Furniture and household durables: SA, NSA
- * 13 Nonmetallic mineral products: SA, NSA
- * 14 Transportation equipment: SA, NSA
- * 15 Miscellaneous products: SA, NSA

Under each category are detailed products. For example, under 08 Lumber and wood products, the following products are found:

- * **08 Lumber and wood products: SA, NSA**
- * 081 Lumber: SA(more), NSA(more)
- * 082 Millwork: SA(more), NSA(more)
- * 083 Plywood: SA(more), NSA(more)
- * 084 Other wood products: SA(more), NSA(more)
- * 085 Logs, bolts, timber and pulpwood: SA(more), NSA(more)
- * 086 Prefabricated wood buildings and components: SA(more), NSA(more)
- * 087 Treated wood and contract wood preserving: SA(more), NSA(more)

For more information on these databases, see Manikas (2007). From the free online database Economagic, Table 2 shows the monthly spot price data for plywood from 1996 to 2004.

Table 2: Monthly Spot Prices for Plywood: 1996 - 2004

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1996	\$ 154.00	\$ 154.20	\$ 152.10	\$ 151.60	\$ 158.30	\$ 155.80	\$ 154.00	\$ 157.40	\$ 166.70	\$ 160.10	\$ 157.90	\$ 155.30
1997	\$ 154.50	\$ 158.80	\$ 163.60	\$ 159.10	\$ 158.20	\$ 162.70	\$ 162.60	\$ 162.60	\$ 162.60	\$ 156.00	\$ 157.90	\$ 153.60
1998	\$ 152.90	\$ 153.30	\$ 151.30	\$ 152.40	\$ 151.40	\$ 151.10	\$ 159.10	\$ 167.60	\$ 170.00	\$ 156.70	\$ 160.90	\$ 161.10
1999	\$ 161.60	\$ 169.30	\$ 173.00	\$ 170.20	\$ 179.10	\$ 196.90	\$ 208.30	\$ 202.10	\$ 177.80	\$ 158.70	\$ 159.50	\$ 160.80
2000	\$ 162.00	\$ 162.20	\$ 166.00	\$ 167.20	\$ 156.60	\$ 155.30	\$ 154.00	\$ 152.60	\$ 156.40	\$ 155.10	\$ 152.60	\$ 150.90
2001	\$ 147.00	\$ 145.60	\$ 148.00	\$ 147.10	\$ 165.10	\$ 166.50	\$ 156.80	\$ 163.80	\$ 161.20	\$ 151.60	\$ 150.30	\$ 148.00
2002	\$ 148.30	\$ 151.50	\$ 160.30	\$ 159.30	\$ 152.30	\$ 153.30	\$ 150.60	\$ 152.40	\$ 149.70	\$ 149.30	\$ 147.30	\$ 146.30
2003	\$ 145.90	\$ 147.20	\$ 146.00	\$ 145.60	\$ 145.40	\$ 148.90	\$ 162.30	\$ 166.30	\$ 193.90	\$ 203.90	\$ 206.30	\$ 192.10
2004	\$ 174.40	\$ 202.50	\$ 218.50	\$ 222.60	\$ 224.40	\$ 200.80	\$ 178.60	\$ 203.10	\$ 208.30	\$ 189.00	\$ 173.90	\$ 185.50
2005	\$ 187.00	\$ 191.50	\$ 187.80	\$ 183.80	\$ 174.00	\$ 186.30	\$ 181.90	\$ 176.80	\$ 200.10	\$ 211.60	\$ 180.70	\$ 180.20

Figure 1 shows a graphical representation of the data.

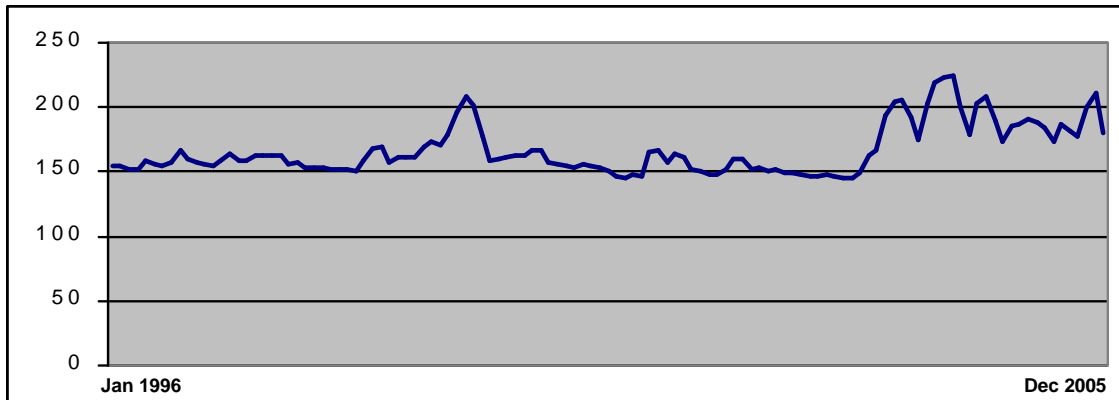


Figure 1: Historical Plywood Prices 1996-2005

The plywood prices in Table 2 had a maximum one-month price swing of 16.6%. A holding costs of 20% per year is equivalent to a monthly holding cost of 1.66%. In this case, 50.4% of the price movements in Table 2 deviate more than 1.66% from month to month. These fluctuations can be seen graphically in Figure 1. For an annual holding cost of 12%, the price swings of the plywood data in Table 2 are beyond the holding costs 65% of the time. These significant fluctuations indicate that forward buying may make sense, and therefore the threshold calculation outlined in section 5 should be used. Certainly, the assumption of non-speculative buying would not make sense for this plywood data.

2.4 Random Walk Costs

Some commodity prices may reasonably be modeled as a random walk [Working (1934); Kendall (1953); Roberts (1959)]. These authors note that a random walk may accurately portray the increasing uncertainty in future prices each period forward. Moinzadeh (1997) investigates price discounts (deals) at random points in time with

negligible lead times and exponentially distributed times between deals. Our random walk approach differs because 1) the price may increase or decrease, and 2) the discount amount is not known, just the distribution. Grubbström and Kingman (2004) use a net present value model to replace Economic Order Quantity (EOQ) decisions for known future price increases that are announced in advance.

The price distribution F_i would then be as shown in Figure 2 where i is the period number from the current period forward. c is the cost per unit to buy now (period 0). Assume that each period forward there is a $1/3$ chance each of 1) the cost staying the same, 2) the cost going up by $c/3$ or 3) the cost going down by $c/3$.

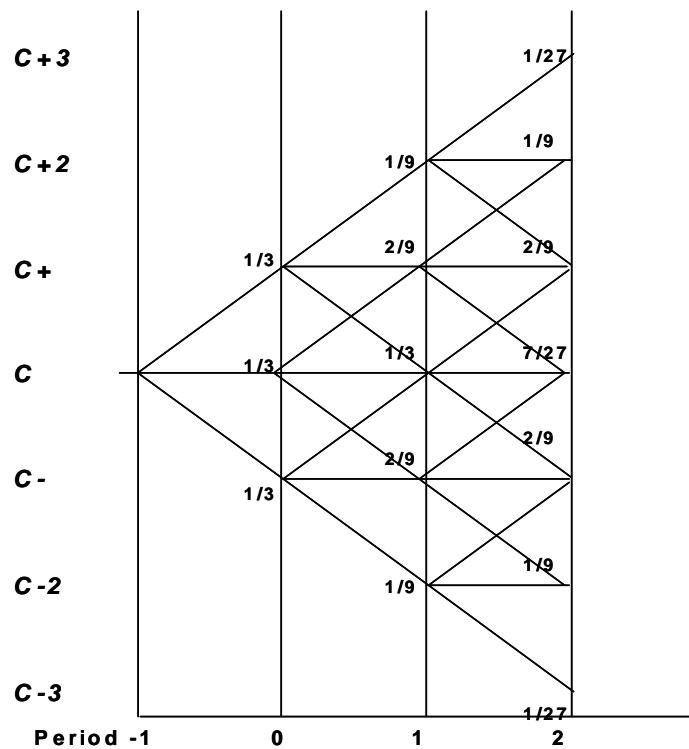


Figure 2: Random Walk Probabilities

We assume that we have observed the last cost c , so the distribution for period 0 is from c^- to c^+ . A_0 is therefore c^+ by definition. Rewriting (1) for a random walk price distribution, the cost threshold to forward buy one period becomes (2) below.

$$A_1 = \frac{1}{3}c + \frac{2}{9}(c - \lambda) + \frac{1}{9}(c - 2\lambda) + \frac{1}{3}A_0 - h \quad (2)$$

Plugging in the known value for A_0 yields (3).

$$A_1 = c - \frac{1}{9}\lambda - h \quad (3)$$

Even if h was 0, A_1 would still be a value less than c since $\lambda > 0$ by definition. This knowledge will allow us to determine the correct probabilities for the next threshold A_2 . The current cost distribution is c^- or higher, therefore we can set (3) to be greater than or equal to this lowest possible purchase cost to find a threshold for the holding cost h . Substituting in the known value of A_0 , and solving for h , we get the following for constraint for h :

$$h \leq \frac{8}{9}\lambda \quad (4)$$

Regardless of the last observed cost c , holding costs for one period must be no more than $8/9^{\text{th}}$ of the random walk step, otherwise no forward buying should ever occur.

Similarly, we can derive the equation A_2 in (5), then solve it in (6).

$$A_2 = \frac{1}{27}(c - 3\lambda) + \frac{1}{9}(c - 2\lambda) + \frac{2}{9}(c - \lambda) + \frac{12}{27}A_1 - h \quad (5)$$

$$A_2 = c - \frac{152}{243}\lambda - \frac{44}{27}h \quad (6)$$

Setting this to be less than or equal to c allows us to solve for the constraint on h in (7) below.

$$h \leq \frac{91}{396}\lambda \quad (7)$$

We can derive an equation for A_3 as shown in (8), then solve it and its holding cost threshold as shown in (9) and (10).

$$A_3 = \frac{1}{81}(c - 4\lambda) + \frac{4}{81}(c - 3\lambda) + \frac{10}{81}(c - 2\lambda) + \frac{16}{81}(c - \lambda) + \frac{50}{81}A_2 - h \quad (8)$$

$$A_3 = c - \frac{20236}{19683}\lambda - \frac{4387}{2187}h \quad (9)$$

$$h \leq -\frac{553}{19683}\lambda \quad (10)$$

Notice that the holding cost would have to be negative in (10) since λ is positive by definition. Therefore, it is never recommended to buy more than two periods forward under a random walk. If the distribution in the current period is assumed to be the point cost c , then no forward buying is ever recommended as was shown in Manikas (2007).

3.0 Non-Random Walk Distributed Prices

Given the availability of historical commodity spot prices shown in section 2.3, it is certainly possible that the prices do not exhibit random walk behavior. If prices are normally or uniformly distributed, then the average historical price can be calculated easily. The necessary lower price threshold can be established to indicate if forward buying would have been optimal in the past. Assuming these past prices reflect the future price realizations, a manager can have a degree of confidence that if the lower price threshold was met in the past that it may occur in the future. Therefore, forward buys may be optimal for this particular item in the future and the Golabi thresholds should be calculated for this particular commodity product.

To find the lower threshold, the average historical price should be calculated. The *low* threshold is shown in (11) below, where h is the holding cost percentage per period. For example, if the annual holding cost is 20%, and procurement is done once every month, then h is $20\% / 12$ or 1.66%. If the average purchase price is \$100, then *low* is calculated to be $\$100 / (1 + .0166) = .9836$. Therefore, if the historical price was ever \$98.36 or lower than forward buying would have been optimal in the past for the period where the historical price was at or below this *low* threshold. The historical spot prices can be searched to see if the price was ever equal to or lower than the *low* price.

$$low = \frac{average}{1 + h} \quad (11)$$

3.1 Uniformly Distributed Prices

If historical prices are uniformly distributed, then the likelihood that forward buying will make sense is:

a = lower bound of uniform distribution

b = upper bound of uniform distribution

p = probability that forward buying would be optimal is calculated below in (12).

$$p = \frac{1}{(b-a)} \left(\frac{(b+a)}{2} - a \right) \quad (12)$$

A manager can use this probability to determine how likely forward buys would have been in the past. The lower (higher) p is, the less (more) likely forward buys would have been optimal to minimize expected costs. Clearly, the historical data can be searched to arrive at an exact number of periods that the actual price was at or below the *low* value to given an exact probability.

3.2 Normally Distributed Prices

If prices appear to be normally distributed, then the mean and standard deviation can be calculated and used in (13) below to compute p , the probability that forward buying would be optimal. We show the Microsoft Excel function for this calculation since that spreadsheet application is so widely available in business and the math for computing probabilities for a normal distribution is built into that office productivity software application.

$$p = \text{normdist} (\text{low} , \text{mean} , \text{standard deviation} , \text{TRUE}) \quad (13)$$

This probability can be used by management to assess the probability that the historical price would have been below the *low* threshold indicating that forward buys would have been optimal in the past. Again, the exact number of times the historical price was at or below *low* can be counted instead of using the calculated probability in (13). Assuming the future will have similar price variability to the past, this probability gives managers a good indication if forward buying might be beneficial for their situation.

4.0 Conclusions and Discussion

If a random walk fits the commodity data in question, then the manager can conclude that forward buying of more than two periods is never optimal. Even with zero holding cost, the expected savings equal the expected costs, therefore the added uncertainty of buying further in the future is a disincentive to forward buy. Since each commodity is different, depending on the time period and buckets analyzed, whether or not a random walk fits the price data can only be ascertained on a case by case basis given the particular commodity, date range, and frequency.

For uniform or normally distributed price distribution based on past data, the probabilities that the price was ever low enough to make forward buys expected to optimize costs were outlined in equations 3.1 and 3.2 respectively. A manager needs to use this information regarding the optimality of forward buys in the past to decide if forward buys are worth investigating for future procurement. If the probability is sufficiently high, and the future price distributions are assumed similar to historical price

distributions, then the method outlined in Golabi (1985) may be applied to determine the optimal number of periods to forward buy given the current purchasing cost and assumed future price distribution.

Krishna (1994) uses a Weibull distribution to model time between deals (low prices) to build on Golabi's method. Similarly, for any well behaved purchase cost function, the applicability of forward buys can be ascertained beyond those functions we evaluated in section 3.

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MOTORCYCLE INDUSTRY: CAN CHOPPERS COMPETE AGAINST THE BIG DOGS?

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**MOTORCYCLE INDUSTRY: CAN CHOPPERS COMPETE
AGAINST THE BIG DOGS?**

ABSTRACT

Growing consumer demands has created a new niche market in the motorcycle industry that is quickly transforming the industry itself. Successful custom builders like Orange County Choppers and Metropolitan Choppers are providing their customers with an avenue to express their individuality and uniqueness, while accommodating every need and want. As a result, custom-built choppers have cornered a continually-growing market. This fact has forced stock producers, who have historically dominated the industry, to re-evaluate their strategy to compete with these smaller companies.

By reviewing the strategies of three stock and custom motorcycle companies, evidence suggests that choppers can viably compete with the “big dogs.”

MOTORCYCLE INDUSTRY: CAN CHOPPERS COMPETE AGAINST THE BIG DOGS?

Introduction

Motorcycle riding in the United States today is more popular than it has been in the past. Since the early 1990s, there has been an explosion in the number of motorcyclists. This trend has spawned the rise of custom built machines that defy the imagination and teeter on the edge of a new art form. Shows like *American Chopper* and pop culture icons like Jesse James of West Coast Choppers have immortalized custom motorcycle builders. Recent box office hits such as *Wild Hogs* and *Ghost Rider* have prominently featured custom motorcycles. Out of this resurgence of motorcycle popularity, custom shoppers have begun to take market share from industry leaders.

The motorcycle industry is very volatile and a highly competitive market. Since the emergence of custom motorcycle shops, they have had to face fierce competition locally and nationally. Major brands such as Harley-Davidson, Honda, and BMW have dominated motorcycle sales in the United States for years. Thousands of custom-build motorcycle shops have sprung up all over the nation within the last decade, providing more stiff competition within the market. Furthermore, common misconceptions portray custom-built cycles as too expensive and too high-maintenance.

The growing trend in the motorcycle industry creates opportunities for small businesses and entrepreneurs to enter the market. Analysts expect the global motorcycle industry to possibly grow as much as 40% by 2007 [11]. Aside from the major manufacturers like Harley-Davidson and Honda, a growing industry like that of motorcycles can support:

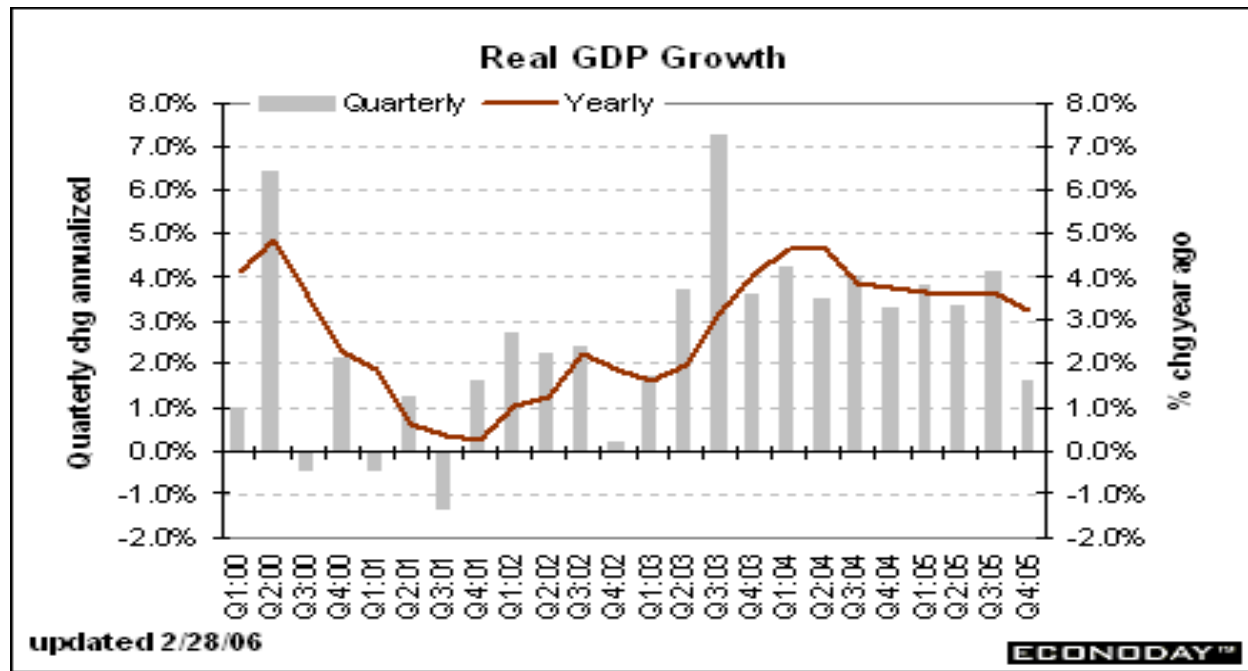
A myriad of small and mid-size players, including motorcycle dealers, manufacturers/retailers of aftermarket add-ons, custom builders who create small numbers of highly individualized bikes, and apparel manufacturers/retailers [11].

The motorcycle industry is the strongest it has been since the inception of the machines in the early Twentieth Century. The industry is expanding rapidly with new competitors and new customers entering the market.

Economic Environment

The United States economy has a strong correlation to the performance of the motorcycle industry. There are several factors within the economy that shape how the economy will perform in the future. First, the gross domestic product (GDP) is the most comprehensive measure of U.S. economic activity. GDP has been growing close to 3% after a shortfall in 2001 [41]. This shortfall was the direct result of substantially high unemployment and business failures. GDP is expected to be slightly less than 3% in 2007. This suggests that the motorcycle industry's production will drop slightly in 2007 [48]. Second, the Federal Reserve Board has been steadily increasing interest rates over the past few years [42]. This raise in interest rates decreases the discretionary income of consumers by increasing mortgage and credit card payments. Third, energy prices have been steadily increasing after hurricane Katrina and Rita in the fourth quarter of 2005 [46]. A rise in energy prices will result in less discretionary income for consumers and a decrease in the sales of high end motorcycles. Fourth, the national savings rate was at its lowest since the Great Depression in 2005 [45]. Consumers are overextended with debt from their purchases

over the last few years and do not have the ability to purchase new items, such as motorcycles. The current U.S. economy overall does not appear to be conducive for the outlook of the motorcycle industry.



Source: [48]

The income in the United States is skewed because of the demographics in our society. “The baby boomers make up 26% of the U.S. population and are currently at the height of their earning potential” [69]. Baby boomers are individuals born from 1946 to 1964. The baby boomers have a higher household income and greater purchasing power than any other age group in the United States [44].

Socio-cultural Environment

In the first half of the last century, motorcycle trends and culture were not distinct from other modes of transportation. People who owned and rode motorcycles were seen as people with the mechanical ability to keep their vehicles running. Motorcycles were not as dependable as current day vehicles and there was no special aura attached to using a motorcycle for transportation. Trends in the motorcycle business tended to follow the same ups and downs as other areas of life following political and financial events. However, with the 1954 motion picture, *The Wild One*, a new mystique was born and attached to motorcycle riders. They were now seen as wild, dangerous and carefree. People used this movie to form a stereotype of motorcycle riders as dangerous gang members and outlaws outside the normal bounds of society. This was modified to some extent by the Honda slogan, “You meet the nicest people on a Honda” in the 1960’s. Honda’s were seen as non-threatening, small motorcycles and the people who rode them did not fit the menacing gang member stereotype.

In 1983 Harley-Davidson launched the Harley Owners Group (HOG) to try to appeal to a wider group of people. They aimed to attract rich urban bikers, called rubies [68]. Gradually over the years Harley owners have tended to be older, more affluent and better educated than in the past. In recent years, more women have been attracted to motorcycle riding. These female riders have the same demographics as their male counterparts. Motorcycle fashions have also become an important trend in the United States and are an important source of revenue for Harley-Davidson.

Motorcycle Industry History

The history of the motorcycle began with an idea taken from a bicycle maker by the name of John Kemp Starley in 1885. His bicycle, known as the Rover Safety was a popular bicycle for its time. It was an idea from a man by the name of Gottlieb Daimler. Daimler produced the first gas-engine motorcycle in 1885 which had a chassis made of wood. The motorcycle engine itself was invented by Nicolaus August Otto in 1876. Otto is also responsible for inventing car engines. These engines are known as the 4 stroke internal combustion engine, the same one we use today. What Daimler did was he assembled the Otto engine to a motorcycle and hence this was the first motorcycle [70].

William S. Harley and Arthur Davidson decided to mount an engine on a bicycle in 1903. They wanted to improve the speed of the bicycle. This was the beginning of the Harley-Davidson Motor Company and a cultural phenomenon that can sometimes be almost cult like. Harley-Davidson's efforts were preceded by the Triumph Cycle, Co. Ltd. of England. They started producing bikes with their own designs in 1902. In the early 1900's cars were relatively expensive. Motorcycles offered an inexpensive alternative means of transportation.

As time went on, automobiles became more affordable and the motorcycle business began to slow down. World War I saw a dramatic increase in the manufacture of motorcycles for use by the military. Harley-Davidson produced over 20,000 motorcycles by the end of the war [14]. This made Harley the biggest motorcycle manufacturer in the world. Unfortunately, consumer demand went down after the war and Harley was hard hit by the Great Depression with only 4,000 vehicles being produced in 1929 [14]. World War II saw an even greater increase in Harley-Davidson motorcycle production, with them making 90,000 cycles for the military. Bavarian Motor Works, BMW, supplied motorcycles to the German armed forces during World War II. It produced a motorcycle with a sidecar that featured a driven wheel in the sidecar and a lockable differential which gave the vehicle an off-road performance similar to a Jeep [9].

During the 1970's and 1980's Japanese motorcycles of all sizes almost put Harley Davidson out of business. They were easier to start, thanks to an electric starting system. They were more reliable and cheaper and faster than the American competition [36]. After a slump in Japanese cycle sales during the late 1970's, Harley was able to separate itself from its previous parent company, American Machine Foundry, and redefine itself. The company introduced a new engine and concentrated on making reliable motorcycles. They also pursued two additional marketing strategies. They made an effort to sell motorcycles to rich urban bikers, rubbies. If enough of these people bought motorcycles, it would not only increase their sales, but it would soften the image of the outlaw, dangerous biker. They also decided to emphasize the sale of Harley Davidson (H-D) branded merchandise of all types. This would provide additional revenue and help attract and maintain interest in the Harley name. Thanks to this turnaround (in quality and marketing); H-D dominates the large custom motorcycle niche in the United States [14].

Customer Profile

Around the world, motorcycles have historically been associated with subcultures. Some of these subcultures have been loose-knit social groups such as the café racers of 1950's Britain, and the Mods and Rockers of the 1960's. In the early 1980s, people who rode motorcycles were coined as ruthless and evil. It was believed that people who rode motorcycles were part of a gang, and should be feared. There were

many movies made during this era including “Mad Max” which helped shape and influence people’s beliefs about motorcycles and their riders.

During the late 80’s, social motorcyclist organizations became popular. When these groups started to organize and promote themselves as good people who just loved motorcycles, the perception that motorcycle owners were ruthless and evil changed. These new social groups were sometimes organized geographically, focused on individual makes, or even specific models. Examples of motorcycle clubs include: American Motorcycle Association, Harley Owners Group, Gold Wing Road Riders, and BMW MOA. Motorcycle organizations have enthusiastic members, and many raise money for charities through organized events and rides. Some organizations hold large international rallies in different parts of the world that are attended by many thousands of riders. In today’s world, there are approximately 8.8 million motorcycles owned by approximately 6.6 million owners. In addition to those who own a motorcycle, 23.5 million people operated a motorcycle in 2003 [35].

Examining owner profiles and buying patterns, companies are able to identify significant trends. Analyzing the trend data allows each participant in the market to apply the results in a practical way and use it in day to day business strategies, which will help to contribute to the industry’s growth and prosperity.

The following list indicates statistics about the average customer who purchases a motorcycle. In brief, the average motorcycle owner is:

- Male
- Married
- Age: 41
- Earns a median household income of \$55,850.
- Has graduated from a college or university [35]
- Occupation: Professional/Technical

Women are increasingly becoming part of the motorcycle landscape. Female ownership increased from 6.4% in 1990 to 9.6 % in 2003 [35]. Women from all subgroups are purchasing and riding motorcycles. Women are also becoming major customers in the sale of motorcycle apparel. Major competitors like Harley-Davidson have recently added a clothing line specifically designed to cater to women motorcycle riders [20]. Even though some women are not owners of a motorcycle, wives and girlfriends who ride behind “their man” more frequently want to dress the part. As a result, a whole new niche market has developed that can be capitalized upon by competitors.

Products and Services

The motorcycle industry offers a wide variety of products and services. With the main product of the industry being motorcycles, let’s first examine the different types of motorcycles that are available on today’s market.

For the purposes of this analysis, an examination of road or on-highway motorcycles was conducted. This category of bikes is made up of street and dual sport motorcycles. As a segment of the market, it can be divided into four basic types of motorcycle: standard, performance, touring and custom.

Standard: Standard class motorcycles are also known in the industry as street bikes or naked bikes. These are the basic form of motorcycles that are stripped down to their basic parts with an emphasis on functionality, performance, and ergonomics rather than on flashy body panels and paints jobs. These

bikes also allow the rider to sit in a straight, erect position instead of the exaggerated, forward-leaning riding position that is most common on sports bikes. Standard bikes were very popular in the 1970s and early 1980s, but declined in popularity as motorcycles evolved and niche markets developed for cruising, sport and touring bikes. Standard bikes range in price from \$2,700 to \$4,000 and have engines from 50 (cubic centimeters) or cc's to 250 cc's. They offer lower cost and are usually less complex than more expensive motorcycles.

Performance: Performance class motorcycles are sometimes referred to as sport bikes or “crotch rockets,” and they are typically much smaller and lighter than touring bikes or cruisers. They are basically consumer versions of the bikes used in motorcycle sports competition and they are the flashiest of all motorcycles. Honda and Kawasaki are the leading makers of these types of bikes [40]. Performance class motorcycles range in price from \$5,000 to \$6,000, with engines running from 251 cc's to 1,200 ccs. These bikes are designed for racing and are built for speed.

Touring: Touring class motorcycles are the ultimate long distance motorcycles. They are designed to meet the specific needs of long-distance touring and heavy commuting riders. These bikes are equipped with the biggest engines, great acceleration and cruising speed, and lots of storage including top trunks and saddlebags. Touring bikes also come with plenty of amenities like cruise control, stereo radio and communication systems, windshields, heated seats and grips, and more. They also have very large fuel tanks, air bags, ABS brakes and some even have air conditioning. Honda has the largest portion of the touring bike market with the Gold Wing 1500 leading the field [39]. Touring motorcycles cost from \$10,000 to \$18,000 and have about the same size engines as performance bikes [68].

Custom: Custom class motorcycles are a type of motorcycle that is highly stylized and very different from the design of a standard bike. Each custom built motorcycle is very unique and it is individually produced in a limited quantity, as opposed to stock bikes which are mass produced. Custom bikes have become fashionable status symbols and are very expensive to build. Shops that specialize in custom-built motorcycles have become very popular and have been featured in TV shows and other forms of media. Custom bikes range in price from \$12,000 to \$25,000 or more. High end custom bikes can cost \$100,000 or more. Their engines are usually 751 ccs to 1,200 + cc's. These custom bikes are built for style and individuality along with super heavyweight engines [68].

Choppers are a type of custom motorcycle that is radically customized and prominently features high handlebars and extended front forks that are stretched out to make the signature “chopper” look. The first choppers to gain national attention were the customized Harley-Davidson's seen in the 1969 film “Easy Rider.” These bikes have become extremely popular with the public and have driven the custom bike industry. It is also important to note that most bikes that are called choppers are actually custom cruisers or custom bikes, and are not true choppers.

Approximate Price Ranges of Motorcycles (Source: Various Dealerships 2003)		
Class	Price Range	Engine Size
Standard	\$2,700 - \$4,000	50 cc – 250 cc
Performance	\$5,000 - \$6,000	251 cc – 1,200 + cc
Touring	\$10,000 - \$18,000	251 cc – 1,200 + cc
Custom	\$12,000 - \$25,000	751 cc – 1,200 + cc

Other Products and Services: Many motorcycle dealers offer service on the bikes they sell and will often perform regular maintenance and repairs on a wide variety of motorcycles. Custom bike shops also

provide maintenance and repair services but they spend more of their time on customizing and building new bikes.

Most new dealers and custom bikes shops now offer a large variety of parts, accessories and clothing. This is one of the fascinating phenomena of the motorcycle industry today. The fashions and apparel associated with motorcycles has become extremely popular in recent years. In fact, you will often find that some showrooms have almost as much floor space devoted to the fashions and accessories as they have for their bikes. Another unusual twist is that many people who wear the biker gear never own or ride a motorcycle. It just appeals to an image that they are attracted to and many motorcycle products lines, like Harley-Davidson, use this as a great way to keep their name circulating in popular culture.

According to the Motorcycle Industry Council's 2003 retail sales figures for U.S. Motorcycle outlets, new motorcycles accounted for 57.4% of sales volume and used motorcycles was 12.7% of the market. Sales from parts, accessories and riding apparel took in almost 22% of total retail sales generated by all motorcycle outlets.

U.S. Industry Trends

The U.S. motorcycle industry is on the verge of the thirteenth year of consecutive growth. "In fact, the popularity of motorcycles in the U.S. has accelerated so rapidly that 24% more units have been sold in the past four years than in the entire previous decade" [3]. In 2005, the motorcycle industry was "approximately one billion and one hundred and forty-two million dollars at retail" [47]. This represents an "increase of 4.1 percent over the previous year and an increase of 55.8 percent since 2000" [47]. There has been a tremendous growth rate in the motorcycle industry which can be attributed to many variables within the United States economy.

An estimated 24 million people in the U.S. drove a motorcycle at least once in 2003 [3]. This projection is expected to continually rise over the next several years according to the Motorcycle Industry Council. There has been a 34 percent increase in the number of motorcycles since 1998, which translates into approximately 8.8 million motorcyclists in the United States [35]. Over one third of the nation's motorcycles were concentrated in California, Florida, New York, Ohio, and Texas [68]. Overall, there has been an average of "2.5 motorcyclist per 100 people in the United States in 2001, up from 1.5 per 100 in 1995" [68]. Although sales have been rapidly growing since 1998, a majority of purchases were made by older customers who have re-entered the market after previously being on a sabbatical for several years.

Industry "Big Dogs"

Since 1903, Harley Davidson has been the chrome standard in the motorcycle industry. The passion of Harley Davidson's customers towards their products has evolved into a lifestyle. The name and logo of Harley Davidson represents a symbol of American individualism. Customers are drawn to Harley Davidson for a variety of reasons. For some, the thrill of riding on the open road during the weekend is appealing. For others, it could have been hearing the distinctive sound of the legendary Harley Davidson V-twin engine. Whatever the reason, Harley Davidson's loyal customers have ensured their success over 100 years in the face of fierce competition.

Harley Davidson manufactures close to 30 different motorcycle models, which are primarily comprised of touring and custom heavyweight motorcycles [2]. Prices range from around \$6,000 for the Sportster to

over \$30,000 for a custom heavyweight motorcycle [20]. Harley Davidson charges a premium for its motorcycles because of their perceived value and the high demand for the company's products. Individuals will purchase a Harley Davidson sometimes for the pure purpose of displaying it outside of their house. Harley Davidson's motorcycles are often replicated by other Japanese manufacturers; however customers seek the "Harley experience," not just a motorcycle.

Harley Davidson produces motorcycles in each market segment of the motorcycle industry; however their primary focus is on the heavyweight segment. The heavyweight segment (over 650cc) has been the most rapidly growing part of the motorcycle market between the twentieth and twenty-first century [35]. North America was the largest market for heavy and super-heavyweight motorcycles, representing 56 percent of the total sales in the world market [68]. Between 1999 and 2003, sales of heavyweight motorcycles increased by 14% annually in North America, compared to about 2% growth in Europe and Asia [68]. Harley Davidson has been able to maintain a market share between 46.2% and 48.2% in the United States heavyweight and super-heavyweight market segment since 1993 [2]. Internationally, Harley Davidson has been unable to replicate the level of market dominance it achieved within the United States. However, during 2000-2003, Harley Davidson became the heavyweight market leader in Japan, pushing Honda into second place [20].

Harley Davidson also has a very profitable clothing line and general memorabilia line. Approximately 20% of Harley Davidson's revenue came from their clothing and general memorabilia sales in 2006, which is the highest in the industry [2]. Harley Davidson has been able to capitalize on their "cult" like following by marketing a wide range of products with their logo.

The Harley Davidson image and customer loyalty are the organization's greatest asset. The famed spread eagle signifies the only U.S. motorcycle in the industry and the American motorcycle lifestyle. Harley Davidson has been described as "the ultimate biker status symbol...a quasi religion, an institution, a way of life" [6]. In 1983, the Harley Owners Group ("HOG") was founded for Harley Davidson aficionados. "By 1999, worldwide membership had hit the half-million mark, and the number of local chapters totaled 1,157" [22]. This organization of loyal Harley Davidson enthusiasts continues to grow at a record breaking pace across the world. "The old saying is that if you can persuade the customer to tattoo your name on their chest, they probably won't switch brands." [19].

Honda, or the American Honda Motor Corporation, Inc., as it is known today, accounts for 10 percent of motorcycle sales in the United States and 24% of the world market. In fact, Honda has become the world's best selling motorcycle with 100 million sold to date. For 2007, Honda has a line of 107 motorcycle models to choose from. They carry everything from mini-bikes, motorcross and off-road (dirt) bikes, ATV's, cruising bikes, and even a custom line of police bikes. Honda has the widest variety of cycle products.

They have introduced a new heavyweight cycle, the Shadow Spirit 750, and the 781cc Interceptor, the AMA Superbike Champion from several years ago, continues to be a big seller and one of the fastest bikes going. Honda makes a line of large touring bikes that compete with the Harley-Davidson line. They include the VTX 1800T (V-twin engine) touring bike, the Super Hawk, the Valkyrie Rune, and the Honda Gold Wing. These bikes have lots of features and creature comforts and resemble the Harley Hog. In fact, the Gold Wing beats all contenders in its class by being voted best of 2006 by the Robb Report, a luxury lifestyle magazine [49].

Honda has always been involved in racing and has also had a great reputation for performance. Honda Racing has dominated World Grand Prix, Baja, Motorcross bike competitions and they have won many world championships. Their company motto is "Performance First" [24].

The Honda Riders Club of America (HRCA) has over 600,000 members and it is part of the Motorcycle Division of the American Honda Motor Co., Inc. When you purchase a motorcycle from Honda, you get one-year free membership in HRCA, which pays for bike safety training, discounts, magazine, event calendar, riding sites, etc. Their mission is to nurture a relationship with customers through direct communications and a comprehensive package that offers real benefits to its members. It also includes travel packages, insurance, discounts, 24-hour weather, key retrievals, emergency road service [28].

BMW is an international firm with over 94,000 employees and offices and manufacturing plants in 12 countries in addition to their headquarters in Germany. They produce more than a million vehicles a year.

Since the late 1980's, the motorcycle division of the BMW Group is called BMW-Motorrad. BMW Motorrad, in contrast to the BMW Group, has only about 3,000 employees and is similar to a medium sized company. BMW-Motorrad has five divisions, "project portfolio strategy, marketing, events and exhibitions, dealer development and rider training" [68]. The product portfolio unit makes sure the customer gets his motorcycle and related clothing and accessories along with any needed services. Marketing develops advertising and online material emphasizing the uniqueness and fun of owning a BMW motorcycle.

The events and exhibitions unit organizes events and exhibitions to promote BMW racing, including the Boxer Cup established in 1999. The dealer development division is responsible for establishing and maintaining the way BMW motorcycle dealerships present themselves to the public. They also control the computerized information system linking all BMW dealerships. The training division also helps dealers by providing educational material and holding sales workshops.

BMW makes four main families of motorcycles. Each type may contain special models designed for touring, as roadsters or for off-road use. The families are designated R, K, F, and G type motorcycles. The R type bikes have oil cooled twin cylinder flat head engines of just fewer than 1,200 ccs. The K type cycles have 4 cylinders in line water cooled engines of about 1,200 ccs. The F type bikes are available in single vertical cylinder models of 652 ccs and in twin vertical cylinder models of 800 ccs. The G type bikes are made in partnership with the Italian firm Aprilia. These motorcycles are smaller, single cylinder off road bikes [9]. They are seen as entry level BMW's and have water cooled engines of 650 ccs.

BMW's positioning strategy for its motorcycles is the same as for its cars. They emphasize luxury and performance along with the uniqueness of owning a BMW motorcycle. BMW likes to emphasize the fun and adventure possible with their motorcycles. They sponsor and participate in many off road competitions. BMW has won the grueling and prestigious Paris to Dakar rally six times [9]. A BMW K 1,200 S set a world land speed record of 174 mph for production motorcycle of its class recently [9]. BMW also makes the RT-P police motorcycle which is preferred by most law enforcement agencies worldwide [9]. BMW's positioning strategy enables them to price their motorcycles at the high end of the market and contributes to the profitability of the company. The BMW goal is to capture 10% of its major markets.

Custom Choppers

Paul Teutul, Sr., metalworker by trade and founder of Orange County Choppers, Inc., first began his business of building custom choppers out of his basement in Montgomery, NY. With the creative help of his oldest son, Paul Jr., the two were soon on their way to the top with the success of Paul Sr.'s first bike "True Blue" at Daytona Bikeoberfest in 1999. From that point on, Paul Sr. knew he had something and established Orange County Choppers, Inc. that same year.

The Teutuls quickly became recognized by chopper enthusiasts everywhere. They were not only making name for themselves in the custom chopper world, but were picked up by the Discovery Channel in 2002 as the basis for what is now the hit television series, American Chopper. Their popularity has led them to build custom theme bikes for some of the biggest names in corporate America, such as Microsoft, Lincoln, and Coca-Cola. Today, Orange County Choppers is regarded as one of the world's premier builders of custom motorcycles [57].

Anywhere you go, you are bound to see something with Orange County Choppers name or logo on it. Orange County Choppers has positioned itself to be the best in the business. They have built a brand, marketed it, promoted it and have reaped the profits from having a successful company. In addition to the company's home store in Montgomery, NY, Orange County Choppers have several authorized dealers in Texas, Florida, New Jersey and Florida. These dealers sell Orange County Choppers in their stores. This allows customers to purchase bikes up and down the East Coast.

Orange County Choppers pricing strategy is consistent with the rest of the bike builders in the market. Prices for a custom chopper start around \$30,000. Depending on the different aspects of the bike, wheels, engine, paint, etc., one could easily spend \$200,000 on a bike from Orange County Choppers. Orange County Choppers provides its customers with a wide array of products to meet their customers' demands. In addition to custom choppers, apparel and merchandise, American Chopper, a television show, aired on TLC. These provide the company with the opportunity to capitalize on the market through various mediums.

Savage Cycles, Incorporated, is a custom motorcycle shop located in Frostburg, Maryland. It was formed about five years ago by three partners who had a wealth of experience in the business and a dream of creating awesome bikes for a living. The firm builds custom motorcycles, does custom work on stock motorcycles, does general cycle maintenance on all makes and models, and sells apparel [64]. The firm actually consists of three companies: one company manufactures motorcycles (Savage Cycles Manufacturing, Inc.), another sells the finished product (Savage Cycles LLC), and the third firm markets and sells apparel and other small products bearing the company's name (Savage Cycles Sales, Inc.) [64]. Currently, the company employs two additional fabricators other than the original owners. All five employees are involved in the building and fabrication of every motorcycle [62]. Sean Snyder, the principle owner, has always tried to keep Savage Cycles a small company so that unique, well-built motorcycles remain the goal.

Their ability to wield a dream into reality gives Savage Cycles a competitive advantage in the motorcycle industry. Their recent build for Nationwide Insurance serves as a perfect example of the firm's craftsmanship and incredible vision. Although the management desires more business in the form of unique builds, the owners do not want to reach the point where they have too many builds at once and quality begins to suffer [64]. The firm has always considered their market to be the Mideast region, and sometimes even nationwide. They have utilized the Internet for both a webpage and a myspace.com account [64].

More recently, Savage Cycles has begun to do all types of service work and custom fabrication on stock motorcycles. This effort, according to management, is an attempt to create more steady business from the local area. The largest revenue earner for the firm still remains the countless custom built motorcycles, but service and customizing work has been on the rise for the company. Savage Cycles will service any brand motorcycle, and can customize any stock bike for customers. Savage Cycles has experienced moderate growth since its inception and continues to change its positioning within the industry in order to achieve brand equity.

The Savage Cycles management philosophy can best be summed up by two quotes that are attributed to co-owners Sean Snyder, Mike Dixon and Jeremy Gordon. The quotes are “Less people means less @#%\$ ups,” and “This ain’t no TV show, this is a custom bike business.” The quotes can be found on their web site and in the latest edition of Deep Creek Magazine, which features a four-page profile of the unique bike shop. Both quotes are prominently highlighted in the layout of the article and the management team went out of their way to put extra emphasis on what seems to be “words to live by” in the way they run their business. Both axioms permeate everything they do in their small shop [16].

As managers, the Savage Cycles team has a great deal of confidence in the team of employees they have assembled and each member of the team brings a wealth of knowledge to the table. Each employee has a specialty and they are treated as the expert in their area of craftsmanship. After they have agreed to work on a particular bike build, the Savage team puts their heads together to plan out how the work is going to progress and who is responsible for various parts of the project. From there, the management team simply lets their employees get to work on the bike and they get out of the way.

One of the big advantages with Savage Cycles having a small staff is that it is a shop where everyone works on the bikes. The co-owners are down in the shop, working side-by-side with the other employees. Everybody knows what is going on and there are very few layers of management. This is not a shop where you have an isolated owner who sits upstairs in some big office and rarely sees the day-to-day operation. Everyone works together very well and they are very close, literally, to each of their projects. V-twin Biker Magazine’s staff stated, “in fact, you could say that this group manages itself.”

Metropolitan Choppers, located in Frederick, Maryland, is a relatively new custom motorcycle shop in the industry that has been making waves since their induction in 2004. Donald Trump has dubbed Metropolitan Choppers the “Rolls Royce of Choppers.” Rick Hill and “Big” Dan Kessinger manage the shop together. Metropolitan Choppers, like most other custom-build companies, fabricates motorcycles, customize stock bikes, and sells apparel. Much like the Teutuls of Orange County Choppers, Rick Hill’s family originally owned Metropolitan Steel, which served as a perfect segway into the motorcycle industry. “Big” Dan Kessinger was a former employee of Metropolitan Steel and is now the manager of Metropolitan Choppers.

Metropolitan Choppers quickly gained recognition when several high-profile individuals purchased a custom motorcycle. Word of mouth marketing from these celebrities has spawned new interest from viable customers nationwide. As a result of this success, large corporations are now seeking out Metropolitan Choppers. For example, the recent success of the Treasure Island build has made the firm an attraction of its own in Las Vegas. A joint venture between Metropolitan Choppers and Treasure Island Casino and Resort is being established to launch a product line based off of the bike. This success has attracted the interest of other well-known casinos in sin city to adopt similar strategies with Metropolitan Choppers.

Metropolitan Choppers claims that each of their motorcycles is a unique work of art which cannot be duplicated by any other firm. Each machine is carefully crafted and designed intricately to coincide with a theme chosen by the purchaser. As a result, Metropolitan Choppers has positioned themselves in the market as a high-end, uniquely original motorcycle producer. The average price of a motorcycle purchased at Metropolitan Choppers is around \$100,000 [25]. Only the most affluent individuals or successful corporations could afford this price, which is the target market Rick Hill seeks to attract.

All three custom motorcycle shops operate similar businesses with similar strategies. Like any other custom shop, these three firms attempt to offer unlimited options to their customers. Each company is in different phases regarding their pursuit of establishing brand equity. Orange County Choppers has successfully established brand equity and is at the peak of popularity. In addition to becoming television

icons, the firm now offers apparel and memorabilia in addition to their uniquely designed motorcycles. Metropolitan Choppers is on the verge of establishing brand equity on a national level. Recent builds have been completed for 84 Lumber, Treasure Island, John Daly, and for the popular television show Fear Factor. Savage Cycles is on the other spectrum of brand equity. Only recently has the firm peaked interests on a national level with their Jack Daniel's and Nationwide Insurance themed bikes. All three custom builders have penetrated the market and stole market share from the "big dogs" who have historically dominated the industry.

Emerging Strategies to Compete Effectively

There are several strategies emerging for custom motorcycle companies to compete effectively against large motorcycle manufacturers. First, corporate themed bikes have been growing at an unprecedented rate over the last two years. These corporate bikes are a means for a custom motorcycle company to get national exposure and free advertising from their corporate customer. For example, Savage Cycles' Nationwide Insurance bike is currently being advertised through Nationwide's corporate newsletter and local newspapers. Nationwide is using their newly purchased corporate bike to position their company as the number one motorcycle insurance company in the United States. Corporate themed bikes are a strategy that has been widely successful and continues to grow.

Second, a custom motorcycle company will continue to take away sales from Harley Davidson if the customers' expectations can be met. Many companies in the custom motorcycle market have been outsourcing their motorcycle designs to artists. Customers in today's market are dreaming of a custom motorcycle that is difficult to conceptualize and the need for professional artists is required. Artists have the uncanny ability to transfer an idea to a medium. This method of creating a motorcycle design is out of the box type of thinking that has been effective and is expected to grow in the future.

Finally, modern methods of advertising have brought custom motorcycle companies to the forefront of pop culture. Advertising through internet networking website, myspace.com, has allowed custom builders to have one-on-one marketing with potential customers. Myspace has become an advertising avenue untapped by major motorcycle competitors. Cable television shows based on custom motorcycle shops have given viewers an up close and personal relationship with the company that major competitors can only dream about. These television shows have showcased the craftsmanship of custom motorcycle builders and have given potential customers another option when purchasing a motorcycle. By capitalizing on marketing opportunities that major corporations will not enter, custom motorcycle companies are seeing increased motorcycle sales.

Conclusion

As a result of cultural shifts in American Society towards customization and uniqueness, a new niche market for custom motorcycles has come to fruition. This niche market is constantly expanding and continually decreasing the amount of sales going towards stock motorcycles. Custom motorcycle shops are driving changes within the industry. A prominent example of this change is that now the stock industry offers more models than ever before to attract consumers. Honda currently offers 107 different models; however, the firm cannot meet every demand of every customer. Currently, the demographics of the economy are supportive of the growing niche market. Motorcycling has become mainstream; consequently, successful and affluent members of the baby boomer generation now find themselves wanting to ride. Lawyers, doctors, and other wealthy Americans want to join the motorcycling trend, but

still want to retain their individuality and uniqueness while flaunting their wealth. Buying a custom chopper represents this avenue.

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Optimization of Project Portfolios

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Abstract

The project portfolio optimization problem is a difficult practical problem, for which a comprehensive model and solution methodology has not been developed in the existing limited approaches in the literature. In this study, we fill this gap by formally defining and effectively modeling several complexities that are inherent in this problem, and developing efficient solution procedures. The proposed approach is the first such approach that models the endogenous uncertainty inherent in this decision process, and at the same time includes a computationally practical solution procedure. The implementation of the model by organizations can lead to significant increases in project returns. From a theoretical standpoint, a new and efficient formulation technique to model nonanticipativity in multistage stochastic programs with endogenous uncertainty is developed, enabling direct scenario based decomposition in such problems. In addition, a feasible dual conversion based tight lower bounding algorithm that can also be used for any similarly structured problem is developed.

1 Introduction

Project portfolio management involves research and development (R&D) projects aimed to design, test and improve a technology, or the process of building a technology. Technology development is often an essential part of the operational strategy of an organization, during which deployment or implementation decisions are made. In most cases, organizations have several potential technology projects with different characteristics that they can choose to invest in and develop using available resources. Selection of projects and allocation of resources to the selected projects are important decisions with huge economic implications for an organization.

Characteristics of technology projects involve resource levels required for research and development, and projected returns after deployment, which are unknown at the time of investment, but for which some information on the uncertainty is available. Given these uncertainties and resource limitations over a planning horizon, the project portfolio optimization problem deals with the selection of R&D projects and determination of optimal resource allocations for the current planning period such that the expected total discounted return or a function of this expectation for all projects over an infinite time horizon is maximized.

Depending on the application, the set of candidate projects may have several attributes. For instance, a technology project may require a deployment phase after development, which amounts to a delay in return realization. A technology can be developed over multiple years, however a fixed operating cost is incurred for each project that remains active, i.e. where development has started but is not complete. Furthermore, multi-way dependencies may exist between technologies, which implies that the joint return of two dependent technologies can be different from the sum of their individual returns.

Markowitz (1952) laid the background for modern financial portfolio theory, which has been studied extensively since then. Markowitz (1952) suggests that investors should select portfolios based on overall risk-reward characteristics of the securities, rather than investing on a single security with the best risk-reward characteristic. Tobin (1958) studies super efficient portfolios with risk free assets, while Sharpe (1964) develops the capital asset pricing models. Since then, many other modeling and optimization techniques have been proposed for financial portfolio optimization.

Although at first glance, it may seem that financial portfolio optimization theory could be directly applied to project portfolio management, there are clear differences between the two problems. One distinction is in the realization of returns. The realization time and the variance in the return of a project is dependent on the investment made on that project. However, for financial securities, both the risk and the time of return realization is independent of the amount of the security that is purchased. Assuming that no one investor will seek to make a single purchase of all or the vast majority of a company's stocks that will cause the price of the security to change by virtue of the purchase itself, the value of the security will solely be based on the performance of the company in question. A second difference between the two problems is about the correlation among project returns. In financial portfolio theory, the correlation in returns is assumed to be independent of the way in which resources are allocated. On the other hand, the correlation among the returns of projects is dependent on investment levels, because resources spent on one project are taken away from other projects, thus preventing early return realization in these projects. Finally, a third distinction is the dependencies of technology projects in terms of produced returns. In financial theory, the cumulative return from two purchased securities is assumed to be equal to the sum of the individual returns of the securities. However, as noted above, projects have dependencies which can have a positive or negative effect in the realization of cumulative joint returns.

Despite the importance and economic significance of project portfolio selection and the existence of several operations research models, the industrial use of these models has been limited. This is mainly due to the fact that none of the proposed models has been able to capture the full range of complexity that exists in project portfolios. Reyck et al. (2005) study the impact of project portfolio management techniques on the performance of projects and portfolios of projects. The authors identify certain key components required for an effective portfolio management approach, which include the following capabilities: capturing of financial returns and risks of assets, modeling interdependencies, determination of prioritization, alignment and selection of projects, modeling organizational constraints and ability to dynamically reassess the portfolio. Linton et al. (2002) provide a review of proposed project portfolio management methods, and categorize the existing methods into three groups. The first category contains approaches based on net present value (NPV) calculations, while the second group consists of scoring methods and the last group covers other decision analysis tools. However, none of the considered approaches are able to model and deliver the set of capabilities identified by Reyck et al. (2005).

The proposed models for project portfolio management include capital budgeting models, which

typically use accounting based criteria, such as return on investment or internal rate of return. These models capture interdependencies between different projects, but fail to model the uncertainty in returns and required investments (Luenberger 1998). More recent project portfolio models capture both the uncertainty in returns and interdependencies. However, these models assume that the required cash flows for projects are known, and the investment decisions consist of binary starting or stopping decisions for projects (Ghasemzadeh et al. 1999, Gustafsson and Salo 2005). One example where the amount of resources allocated to each project is treated as a decision variable is given by Norikin et al. (1998). The example is formulated as a stochastic integer program, but the interdependencies between multiple projects are not modeled.

Other approaches to project portfolio management include real options based methods. Despite some disadvantages from an optimization perspective, these methods are superior to NPV based methods. Bardhan et al. (2006) propose a multi-period optimization model where the objective is based on real options values of the portfolio calculated according to the results from Bardhan et al. (2004). Campbell (2001) and Lee et al. (2001) model project contingencies as real options to determine optimal startup dates for the projects. Tralli (2004) devises a real options valuation architecture from a decision tree analysis structure and presents a case study. Similarly, Wu and Ong (2007) combines the mean-variance model of classical financial theory with real options, and describe a project selection methodology based on the developed framework. However, one major disadvantage of real options based approaches is that they require the estimation of cash flows for the projects. Given these estimates, these models try to determine the optimum starting, continuation or completion times for the projects in a portfolio. Thus, despite its significance, the option of rebalancing through allocation of resources in each planning period is not modeled (Cooper et al. 2001). Chan et al. (2007) emphasize this problem and suggest a dynamic methodology based on a two-phase model of project evolution. However, the model does not capture the interdependencies or resource allocation decisions discussed above.

There are also other somewhat more simplistic approaches to the technology project portfolio problem, which either contain deterministic models or include several restrictive assumptions. Dickinson et al. (2001) present a model developed to optimize a portfolio of product development improvement projects. Using a dependency matrix, which quantifies the interdependencies between projects, a deterministic nonlinear integer programming model is developed to optimize project selection. April et al. (2003) describe a simulation optimization tool for technology project portfolio management. The tool utilizes metaheuristics to search for good technology portfolios, and is limited in capturing the interdependencies among technologies. Elfes et al. (2005) address the problem of determining optimal technology investment portfolios that minimize mission risk and maximize the expected science return of space missions. The solution approach described in the study is based on a deterministic linear programming formulation and sensitivity analysis. Lincoln et al. (2006) develop a method for prioritization of technology investments using a deterministic linear programming formulation to maximize an objective function subject to overall cost constraints. Goldner and Borener (2006) describe a quantitative framework to evaluate the performance of research portfolios, where the developed tool is used to evaluate and explore independent investments strategies, but no numerical optimization techniques are described.

In addition to these models, most strategic planners and project portfolio managers rely on tools based on expert opinions, such as Analytical Hierarchy Process and Quality Function Deployment, in planning the funding of technology development (Thompson 2006). Similar systematic evaluation methods are also proposed by Sallie (2002) and Utturwar et al. (2002), where the authors propose bilevel approaches in selecting technologies to invest. The latter study also contains an optimization

procedure based on a Genetic Algorithm implementation. Clearly, these tools are also very limited in their ability to fully quantify the complicated return and investment structure inherent in project portfolios.

In summary, the project portfolio optimization problem is a difficult practical problem, for which a comprehensive model and solution methodology has not been developed in the existing limited approaches in the literature. In this study, we fill this gap by formally defining and effectively modeling several complexities that are inherent in this problem, and developing efficient solution procedures. More specifically, contributions of this study include the following: A comprehensive model that captures all relevant concerns in project portfolio management has been developed. To the best of our knowledge, it is the first such approach that (i) provides an accurate representation of the stochastic decision process in project portfolio management, (ii) models the endogenous uncertainty inherent in this decision process, and at the same time (iii) includes a computationally practical solution procedure. In addition, from a theoretical standpoint, contributions are as follows: (i) a new and efficient formulation technique to model nonanticipativity in multistage stochastic programs with endogenous uncertainty is developed, (ii) the developed formulation enables scenario based decomposition in such problems, in addition to the application of other methods developed for classical multistage stochastic programs, and (iii) a tight lower bounding algorithm based on feasible dual conversion that can be used for any similarly structured problem is developed. As shown in Figure 1, our proposed methodology is able to capture all the important aspects required from a project portfolio optimization tool, as defined by Reyck et al. (2005), while all other existing methodologies fail to account for two or more of the complexities inherent in the project portfolio optimization problem.

The remainder of this paper is structured as follows. In Section 2 we describe a mathematical representation for the technology portfolio management problem and study its complexity. In Sections 3 and 4 we discuss multistage and two-stage stochastic programming formulations, while in Section 5 an efficient solution procedure for the resulting problems is described. In Section 6, we present some computational results and Section 7 is the conclusion with a discussion of possible extensions.

2 Mathematical Representation

The project portfolio optimization problem can formally be defined as follows. Assume a set \mathcal{N} of projects with annual performance levels $Z_i \in \mathbb{R}^+$, implementation times $\Delta_i \in \mathbb{R}^+$, required investment levels $\theta_i \in \mathbb{R}^+$, annual fixed activity costs $f_i \in \mathbb{R}^+$ and a set of depending technology projects $\mathcal{D}_i \subset \mathcal{N}$, for each $i \in \mathcal{N}$. Although only two-way dependencies between technology projects are used in this study, the proposed models can be extended to handle multi-way dependencies in a similar fashion. We let $Z_{ij} \in \mathbb{R}$ be the joint annual performance level for technology $i \in \mathcal{N}$ and $j \in \mathcal{D}_i$, and define it as a function of Z_i and Z_j . Furthermore, a sequence of investment planning periods $t = 1, 2, \dots, T$ with available resource levels, i.e. budgets $B_t \in \mathbb{R}^+$, are assumed. For presentation purposes, the models in the paper are described for a single resource application, however extension to multiple resources is trivial. The objective is to determine an investment schedule such that some function of the total discounted return over an infinite time horizon is maximized while total investment in a given period t does not exceed B_t . In typical applications, the decision maker is interested in the investment schedule for the current period only, which should take into account future realizations of the parameters. Hence, a realistic assumption is that the

	Stochastic	Inter-dependencies	Organizational constraints	Project Selection	Resource Allocation	Complete Dynamic Reassessment
April et al. (2003)	✓			✓	✓	
Bardhan et al. (2006)	✓	✓	✓	✓		
Campbell (2001)	✓	✓		✓		
Chan et al. (2007)	✓		✓	✓		✓
Dickinson et al. (2001)		✓	✓	✓		
Elfes et al. (2005)			✓	✓	✓	
Ghasemzadeh et al. (1999)		✓	✓	✓		
Gustaffson&Salo (2005)	✓	✓		✓		✓
Lee et al. (2001)	✓	✓		✓		
Luenberger (1998)		✓	✓	✓		
Norkin et al. (1998)	✓		✓	✓	✓	
Sallie (2002)		✓	✓	✓		
Utturwar et al. (2002)		✓	✓	✓		
PROPOSED APPROACH	✓	✓	✓	✓	✓	✓

Figure 1: Summary of the existing literature on project portfolio optimization and contributions of the proposed methodology

problem will be solved each planning period to determine the best investment policy for that period, considering the past and future investments.

In practice, almost all of the above parameters may contain a certain level of uncertainty. However, in most applications, the level of variance is significant only in two of the parameters, namely the returns Z_i and required investment levels θ_i . Note that Z_{ij} is defined as a function of Z_i and Z_j . Hence, for modeling purposes, we approximate all other parameters with their expected values, and assume that joint and marginal probability distributions of the returns and required investment levels for the technologies are known or well estimated. Once a mathematical model is developed that accounts for the stochasticity in these two parameters, uncertainty in other parameters can be captured through what-if analyses.

The following complexity analysis shows that even the simplest instances of the project portfolio optimization problem fall into the category of NP-hard optimization problems.

Proposition 1. *Project portfolio optimization is NP-hard.*

Proof. Proof We first show that the deterministic version of the problem is NP-hard. The proof of NP-hardness is by restriction to the bin packing problem. Consider an instance of the project portfolio management problem in which $B_t = B$, $\theta_i + f_i \leq B$, $\Delta_i = 0$, and $\mathcal{D}_i = \emptyset$ for all $i \in \mathcal{N}, t = 1, 2, \dots, |\mathcal{N}|$. Let \mathcal{S}^* be the optimal schedule for this instance and let t^* be the latest investment period in \mathcal{S}^* . It is easily seen that \mathcal{S}^* is optimal if and only if the optimal solution for an instance of the bin packing problem with bin capacities B and item sizes $\theta_i + f_i$ is t^* . It follows that stochastic version of the project portfolio optimization problem is also NP-hard. \square

Given the uncertainty in the problem parameters of the project portfolio optimization problem, it is natural to assume that the decision maker would be interested in maximizing the expected value -or a function of the expected value- of total return. For presentation purposes, we assume a risk-neutral objective function throughout the rest of this paper. However, several other objectives that capture the risk attitude of the decision maker can be modeled and solved using the methods described in this study. Given any such objective, the project portfolio management problem can be expressed as:

$$\max_{\mathbf{x} \in \mathcal{X}} \{g(\mathbf{x}) = \mathbb{E}[G(\mathbf{x}, \xi)]\} \quad (1)$$

where \mathbf{x} and ξ represent the vectors of decision variables and uncertain parameters (θ_i, Z_i) , respectively. In addition, $\mathcal{X} \subset \mathbb{R}^n$ is the set of feasible solutions and $G(\mathbf{x}, \xi)$ is the total return function. Optimization problem (1) is difficult to solve, since exact evaluation of the expected value function in the objective is not possible.

A natural temptation to solve (1) may involve replacing the uncertain parameters by their expected values, and then solving the resulting so-called mean value problem, which is

$$\max_{\mathbf{x} \in \mathcal{X}} \{G(\mathbf{x}, \bar{\xi})\} \quad (2)$$

where $\bar{\xi} = \mathbb{E}[\xi]$ is the expectation of the random vector ξ . If \bar{x} represents the optimal solution to (2), and x^* is the true optimal solution to the stochastic optimization problem (1), then clearly

$$\mathbb{E}[G(\bar{x}, \xi)] \leq \mathbb{E}[G(x^*, \xi)] \quad (3)$$

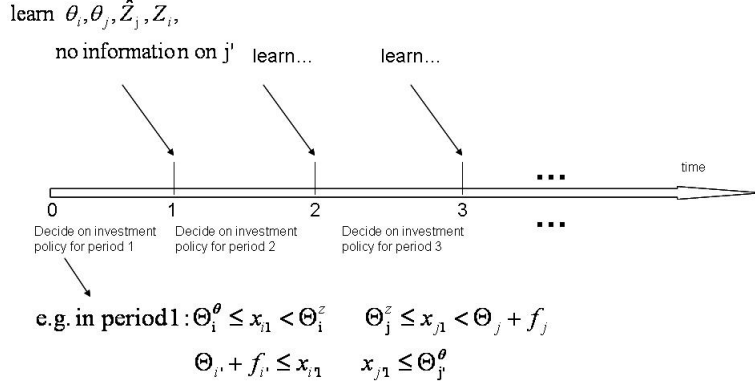


Figure 2: Decision process for the technology portfolio management problem, where realization of uncertainty is based on decisions made

The difference $\mathbb{E}[G(x^*, \xi)] - \mathbb{E}[G(\bar{x}, \xi)]$ measures how close the mean value solution is to the true solution, and is usually called the expected value of the stochastic solution (Birge and Louveaux 1997). However, the mean value problem usually does not reflect the decision process in a stochastic optimization problem correctly.

The decision process in the project portfolio management problem consists of recourse actions, by which the portfolio can be rebalanced at each period. Hence, an appropriate approach is to formulate problem (1) as a recourse problem, in which recourse actions can be taken after uncertainty is disclosed over the investment periods. In the following sections, we study two recourse models for the project portfolio management problem, and describe solution procedures for the two formulations.

3 The Multistage Stochastic Programming Model

The decision process in the project portfolio management problem consists of a multistage and multi-period structure, in which the goal is to determine an optimal allocation of the resources for the current planning period. However, the realization of uncertain parameters and the possibility of recourse actions in future periods must be accounted for in any optimal investment policy. Hence, resource allocations for the current period should position the decision maker in the best possible position against the uncertainties that will be realized in the future. The corresponding decision process for the project portfolio management problem can be described as follows, which is also represented in Figure 2, where examples of different investment levels leading to different information availability for projects i, i', j and j' are shown.

The resource requirement θ_i for each project i is known with certainty at the end of period t_θ^i , in which total investment in the project exceeds a threshold level Θ_i^θ , i.e. $t_\theta^i = \min_t \{t \mid \sum_{t' \leq t} x_{it'} \geq \Theta_i^\theta\}$, where x_{it} represents the investment for project i in period t . Similarly, we assume that the uncertainty in the return of a project is revealed gradually over its development based on certain threshold levels. This process is modeled by assuming that an initial performance assessment \hat{Z}_i will be available at the end of period $t_z^i = \min_t \{t \mid \sum_{t' \leq t} x_{it'} \geq \Theta_i^z\}$ upon investing an amount of Θ_i^z in the project. As a result of this assessment, probabilities of different performance levels

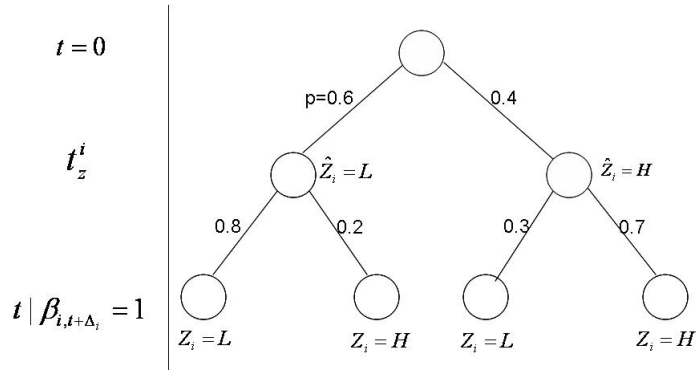


Figure 3: Tree showing gradual resolution of uncertainty in two phases

are updated. This assumption enables the modeling of the option of terminating a project if the initial assessment suggests that the probability of a high return is low for the project. Gradual resolution of uncertainty can be explained further as follows. Assume that Z_i can be realized at one of two levels: L, H with pre-development probabilities p_L and p_H , respectively. After investing an amount Θ_i^z in this project, an estimate \hat{Z}_i is made, which can be seen as an intermediate realization of the uncertain parameter. If all uncertainty is resolved when technology development is over, then the probabilities for the actual realizations of the possible outcomes will be dependent on the intermediate realizations. This investment dependent probability distribution is described in Figure 3, where probabilities of possible Z_i values are updated according to the estimates \hat{Z}_i which become available after investing Θ_i^z units of resources. If the development phase is continued, return Z_i will be known with certainty once all of the required resources are invested in project i . Multiple phases of gradual uncertainty resolution can be modeled by adding more layers to the described process, in the expense of adding more complexity to the stochastic problem.

The described process can be modeled as a multistage stochastic program, in which the uncertainty is in required investment levels, updated return estimates and final return levels. However, a complexity in this model is that the model contains endogenous uncertainty, i.e. realizations of the uncertain parameters are dependent on the investment decisions in current and future periods. Classical stochastic programming models assume that all stochastic processes in a given model are exogenous, which implies that the times of realizations of the uncertain parameters are not controlled by the decision maker, and the underlying scenario tree structure is known. However, this is not the case for the project portfolio optimization problem. Such problems are generally more difficult to formulate and solve than classical stochastic programming models, and there is very limited literature on such problems, which we discuss in Section 5.

As in many other stochastic programs, it is reasonable to assume for the project portfolio optimization problem that the random vector ξ has finite support or has a discrete distribution with K possible realizations, i.e. scenarios, $\xi^k := (\theta_i^k, \hat{Z}_i^k, Z_i^k)$, $k = 1, \dots, K$ with corresponding probabilities p_k . Then, it becomes possible to express problem (1) as one large mathematical program.

Before describing the mathematical model, we first introduce some new notation. In addition to the parameters described above, we let r be the discount factor throughout the planning period, \mathcal{D} be the set of technologies that have a dependency relationship with another technology, i.e. $\mathcal{D} = \{i | i \in \mathcal{N}, \mathcal{D}_i \neq \emptyset\}$, and also set $\bar{\Delta} = \max_i \{\Delta_i\}$, $\bar{\Delta}_{ij} = \max\{\Delta_i, \Delta_j\}$. We also let $Y_{kk'}$ and $H_{kk'}$ be the set of technologies with different realizations of resource requirements and intermediate

return estimates in scenarios k, k' , respectively, i.e. $Y_{kk'} = \{i | \theta_i^k \neq \theta_i^{k'}\}$ and $H_{kk'} = \{i | \hat{Z}_i^k \neq \hat{Z}_i^{k'}\}$. Furthermore, we define the following decision variables for the problem, where the superscript k , which indicates that the variables are defined for each scenario, is omitted for clarity.

- x_{it} : amount of investment in project i in period t , $t = 1, 2, \dots, T$
- τ_{it} : remaining required investment to complete the development of project i as of the end of period t , $t = 1, 2, \dots, T$
- y_{it} : 1, if $t > t_\theta^i$, $t = 2, \dots, T$; 0, otherwise
- h_{it} : 1, if $t > t_z^i$, $t = 2, \dots, T$; 0, otherwise
- α_{it} : 1, if project i is started on or before period t , $t = 1, 2, \dots, T$
0, otherwise
- β_{it} : 1, if development and deployment of technology i are completed on or before period t , $t = \Delta_i, \dots, T + \Delta_i$; 0, otherwise
- γ_{it} : 1, if project i is terminated prematurely in or before period t , $t = 2, \dots, T$
0, otherwise
- δ_{ijt} : 1, if development and deployment of dependent technologies i and j are completed on or before period t , $t = 1, 2, \dots, T + \bar{\Delta}_{ij}$; 0, otherwise

This leads to the following multistage stochastic integer programming formulation:
Multistage Project Portfolio Optimization Problem(MPPM):

$$\begin{aligned} \max \sum_{k=1}^K p_k \sum_{i \in \mathcal{N}} \left[\sum_{t \leq T-1} \beta_{i,t+\Delta_i}^k Z_i^k (1+r)^{-(t+\Delta_i)} + \beta_{i,T+\Delta_i}^k Z_i^k \left[\frac{(1+r)^{-(T+\bar{\Delta})}}{r} \right. \right. \\ \left. \left. + \sum_{l=0}^{\bar{\Delta}-\Delta_i-1} (1+r)^{-(T+\Delta_i+l)} \right] + \sum_{\substack{j \in \mathcal{D}_i \\ j > i}} \left[\sum_{t \leq T-1} \delta_{ij,t+\bar{\Delta}_{ij}}^k \tilde{Z}_{ij}^k (1+r)^{-(t+\bar{\Delta}_{ij})} \right. \right. \\ \left. \left. + \delta_{ij,T+\bar{\Delta}_{ij}}^k \tilde{Z}_{ij}^k \left[\frac{(1+r)^{-(T+\bar{\Delta})}}{r} + \sum_{l=0}^{\bar{\Delta}-\bar{\Delta}_{ij}-1} (1+r)^{-(T+\bar{\Delta}_{ij}+l)} \right] \right] \right] \end{aligned} \quad (4)$$

$$\alpha_{it}^k - \beta_{i,t+\Delta_i}^k \geq 0 \quad \forall i \in \mathcal{N}, \forall t \leq T, \forall k \quad (5)$$

$$\sum_{t' \leq t} x_{it'}^k - \left(\max\{\theta_i^k + t f_i\}, \max_{t' \leq t} \{B_{t'}\} \right) \alpha_{it}^k \leq 0 \quad \forall i \in \mathcal{N}, \forall t \leq T, \forall k \quad (6)$$

$$\sum_{i \in \mathcal{N}} x_{it}^k \leq B_t \quad \forall t \leq T, \forall k \quad (7)$$

$$x_{it}^k - B_t (\alpha_{it}^k - \beta_{i,t+\Delta_i-1}^k - \gamma_{it}^k) \leq 0 \quad \forall i \in \mathcal{N}, \forall t \leq T, \forall k \quad (8)$$

$$\beta_{i,t+\bar{\Delta}_{ij}}^k + \beta_{j,t+\bar{\Delta}_{ij}}^k - \delta_{ij,t+\bar{\Delta}_{ij}}^k \leq 1 \quad \forall i \in \mathcal{D}, \forall j \in \mathcal{D}_i, j > i, \forall t \leq T, \forall k \quad (9)$$

$$\beta_{i,t+\bar{\Delta}_{ij}}^k + \beta_{j,t+\bar{\Delta}_{ij}}^k - 2\delta_{ij,t+\bar{\Delta}_{ij}}^k \geq 0 \quad \forall i \in \mathcal{D}, \forall j \in \mathcal{D}_i, j > i, \forall t \leq T, \forall k \quad (10)$$

$$\tau_{it}^k - \tau_{i,t-1}^k + x_{it}^k - f_i (\alpha_{it}^k - \beta_{i,t+\Delta_i-1}^k - \gamma_{it}^k) \geq 0 \quad \forall i \in \mathcal{N}, \forall t \leq T, \forall k \quad (11)$$

$$x_{it}^k - f_i (\alpha_{it}^k - \beta_{i,t+\Delta_i-1}^k - \gamma_{it}^k) \geq 0 \quad \forall i \in \mathcal{N}, \forall t \leq T, \forall k \quad (12)$$

$$\tau_{it}^k + \theta_i^k \beta_{i,t+\Delta_i}^k \leq \theta_i^k \quad \forall i \in \mathcal{N}, \forall t \leq T, \forall k \quad (13)$$

$$\sum_{t' < t} x_{it'}^k - \Theta_{ik}^\theta y_{it}^k \geq 0 \quad \forall i \in \mathcal{N}, \forall t \leq T, t \neq 1, \forall k \quad (14)$$

$$\sum_{t' < t} x_{it'}^k - (\min\{\sum_{t' < t} B_{t'}, (\theta_i^k + (t-1)f_i)\} - \Theta_{ik}^\theta) y_{it}^k \leq \Theta_{ik}^\theta \quad \forall i \in \mathcal{N}, \forall t \leq T, t \neq 1, \forall k \quad (15)$$

$$\sum_{t' < t} x_{it'}^k - \Theta_{ik}^z h_{it}^k \geq 0 \quad \forall i \in \mathcal{N}, \forall t \leq T, t \neq 1, \forall k \quad (16)$$

$$\sum_{t' < t} x_{it'}^k - (\min\{\sum_{t' < t} B_{t'}, (\theta_i^k + (t-1)f_i)\} - \Theta_{ik}^z) h_{it}^k \leq \Theta_{ik}^z \quad \forall i \in \mathcal{N}, \forall t \leq T, t \neq 1, \forall k \quad (17)$$

$$\beta_{i,t+\Delta_i}^k + \gamma_{it}^k \leq 1 \quad \forall i \in \mathcal{N}, \forall t \leq T, t \neq 1, \forall k \quad (18)$$

$$\alpha_{it}^k - \gamma_{i,t+1}^k \geq 0 \quad \forall i \in \mathcal{N}, \forall t \leq T, \forall k \quad (19)$$

$$x_{i1}^k - \sum_{k'=1}^K p_{k'} x_{i1}^{k'} = 0 \quad \forall i \in \mathcal{N}, \forall k \quad (20)$$

$$x_{it}^k - x_{it}^{k'} + B_t \left[\sum_{j \in Y_{kk'}} (y_{jt}^k + y_{jt}^{k'}) + \sum_{j \in H_{kk'}} (h_{jt}^k + h_{jt}^{k'}) \right] \geq 0 \quad \forall i \in \mathcal{N}, \forall t \leq T, t \neq 1, \forall k, k' \quad (21)$$

$$x_{it}^k, \tau_{it}^k, \delta_{ijt}^k \geq 0 \quad \forall i \in \mathcal{N}, \forall j \in D_{i,j} > i, \forall t, \forall k \quad (22)$$

$$\alpha_{it}^k, \beta_{it}^k, \gamma_{it}^k, h_{it}^k, y_{it}^k \in \{0, 1\} \quad \forall i \in \mathcal{N}, \forall t, \forall k \quad (23)$$

The objective function (4) in the above formulation assumes risk neutrality, and represents the expected total discounted return of the project portfolio. The total return is expressed as a function of the individual and joint returns depending on the deployment status of a developed technology. Joint return terms \tilde{Z}_{ij} are defined such that they represent the difference between the actual joint return contribution Z_{ij} and the sum of two individual returns. In other words, if two technologies are both implemented by period t , then the joint return contribution for that period is calculated as $Z_{ij} = Z_i + Z_j + \tilde{Z}_{ij}$, where \tilde{Z}_{ij} can be positive or negative.

Constraint set (5) implies that project i must be started at least Δ_i periods before the corresponding technology is limited. Constraints (6) ensure that a positive investment must be made in order to start a project. Furthermore, (8) requires that an investment on a project can be made only if it is active, while (7) represents the resource limitations. Constraints (9)-(10) ensure that joint return from two dependent technologies is realized when the implementation of both technologies are complete. Constraints (11) calculate the required remaining investment for a technology development project in a given period, and (12) implies that the investment on a technology development project can not be less than the fixed cost incurred when the project is active. Constraints (13) ensure that a technology development project is complete only if the required remaining investment is 0. Furthermore, constraints (14)-(15) and (16)-(17) define indicator variables y_{it}^k and h_{it}^k , respectively. Constraints (18) state that a technology development project is either terminated successfully or unsuccessfully, while (19) ensures that a project is started before it is terminated.

In addition to the above, constraint set (20) represents the first stage nonanticipativity requirements, by ensuring that the decisions for the current period are the same for all scenarios. Notice that the nonanticipativity in other first stage variables are automatically satisfied if all first stage investment levels are the same. Since it is assumed that the uncertain variables are realized after certain levels of investment are made, a similar nonanticipativity structure must also be enforced between scenarios that share the same information history in later periods. In classical stochastic programming, nonanticipativity can explicitly be stated similar to (20), due to the exogenous

nature of uncertainty in these problems. Since the uncertainty is endogenous in the project portfolio management problem, the nonanticipativity is conditional on the investment level decisions in each planning period. Constraints (21) capture this dependency by ensuring that a given pair of scenarios will be distinguished when one or more of the uncertain variables that distinguish them are revealed. The time of realization of the uncertainty is determined by the binary variables y_{it}^k and h_{it}^k . Notice that (21) are defined as inequalities for each possible pair of technologies so that if no distinguishing parameters are known, then the investment levels in the two technologies have to be equal. In addition, assuming independence of the corresponding probability distributions, any two scenarios that differ only in the realization of the final return values will have the same investment policy, since all investment decisions are made before these realizations. Hence, the return levels do not play a role in the nonanticipativity requirements. Representation of endogenous nonanticipativity in this compact way is distinct and more efficient than the existing models in the literature, since it enables the use of scenario decomposition methods as well as some other solution approaches proposed for classical multistage stochastic integer programming problems.

4 The Two-stage Stochastic Programming Model

Although the actual decision making process for the project portfolio optimization problem contains multiple stages, a natural simplification is through a two stage approach, in which it is assumed that a realization of the random variables becomes known after investment decisions are made for the current period in the first stage. If \mathbf{x}_1 represents the first period decision variables and \mathbf{x}_2 is the vector of variables for the second stage which contains the remaining $T - 1$ periods, then the corresponding two stage stochastic program can be written as follows:

$$\max_{\mathbf{x}_1} \mathbb{E}[G(\mathbf{x}_1, \xi)] \quad (24)$$

$$\text{s.t. } A\mathbf{x}_1 = b, \mathbf{x}_1 \in \mathcal{X}_1 \quad (25)$$

where $G(\mathbf{x}_1, \xi)$ is the optimal value of the second stage problem

$$\max_{\mathbf{x}_2} g(\omega)^T \mathbf{x}_2 \quad (26)$$

$$\text{s.t. } T(\omega)\mathbf{x}_1 + W(\omega)\mathbf{x}_2 = h(\omega), \mathbf{x}_2 \in \mathcal{X}_2 \quad (27)$$

In the above representation, the second stage problem (26)-(27) depends on the realization ω of the random vector ξ , which determines the values of g, T, W and h .

This leads to the following two-stage stochastic integer programming formulation for the project portfolio management problem:

Two-stage Project Portfolio Optimization Problem (2PPM):

$$\max (4) \quad (28)$$

$$(5), (7), (9), (10), (13), (20), (22) \quad (29)$$

$$\sum_{t' \leq t} x_{it'}^k - \left(\max\{\theta_i^k + tf_i, B_1\} \right) \alpha_{it}^k \leq 0 \quad \forall i \in \mathcal{N}, \forall t \leq T, \forall k \quad (30)$$

$$x_{it}^k - B_t(\alpha_{it}^k - \beta_{i,t+\Delta_i-1}^k - \gamma_{i2}^k) \leq 0 \quad \forall i \in \mathcal{N}, \forall t \leq T, \forall k \quad (31)$$

$$\tau_{it}^k - \tau_{i,t-1}^k + x_{it}^k - f_i(\alpha_{it}^k - \beta_{i,t+\Delta_i-1}^k - \gamma_{i2}^k) \geq 0 \quad \forall i \in \mathcal{N}, \forall t \leq T, \forall k \quad (32)$$

$$x_{it}^k - f_i(\alpha_{it}^k - \beta_{i,t+\Delta_i-1}^k - \gamma_{i2}^k) \geq 0 \quad \forall i \in \mathcal{N}, \forall t \leq T, \forall k \quad (33)$$

$$\beta_{i,t+\Delta_i}^k + \gamma_{i2}^k \leq 1 \quad \forall i \in \mathcal{N}, \forall t \leq T, t \neq 1, \forall k \quad (34)$$

$$\alpha_{i1}^k - \gamma_{i2}^k \geq 0 \quad \forall i \in \mathcal{N}, \forall t \leq T, \forall k \quad (35)$$

$$\alpha_{it}^k, \beta_{it}^k, \gamma_{i2}^k \in \{0, 1\} \quad \forall i \in \mathcal{N}, \forall t, \forall k \quad (36)$$

In terms of formulation, the two-stage problem differs from the multistage model only in the definition of the constraints that involve the termination variables, since early termination decisions can only be made in the second stage. Similar to the *MPPM*, if the number of scenarios K is not large, problem (29)-(36) can be solved using standard integer programming methods. However, this is not possible for realistic instances of the project portfolio management problem, since they constitute much larger problems. A difference between *MPPM* and *2PPM* in terms of problem size is that, the cardinality of the scenario set is smaller in *2PPM*, since gradual revelation of uncertainty is not modeled.

The same solution procedure we describe in Section 5.3 in a multistage setting can efficiently be utilized for *2PPM*. Except that the nonanticipativity is only restricted to the first stage, so the Lagrangian is given as

$$L(\beta, \delta, x, \lambda) = \hat{g}_N(\beta, \delta) + \sum_{l=1}^N \left[\sum_{i \in \mathcal{N}} \left(\sum_{l'=1}^N \frac{\lambda_{i1}^{l'} x_{i1}^{l'}}{N} - x_{i1}^l \lambda_i^l \right) \right] \quad (37)$$

which can be expressed as

$$L(\beta, \delta, x) = \sum_{l=1}^N L_l(\beta_l, \delta_l, x_l, \lambda) \quad (38)$$

where

$$L_l(\beta_l, \delta_l, x_l, \lambda) = \hat{g}_N^l(\beta, \delta) + \sum_{i \in \mathcal{N}} \left(\sum_{l'=1}^N \frac{\lambda_{i1}^{l'} x_{i1}^{l'}}{N} - x_{i1}^l \lambda_i^l \right) \quad (39)$$

The corresponding Lagrangian dual problem for problem (29)-(36) is then

$$\min_{\lambda} \{D(\lambda) = \max\{\sum_{l=1}^N L_l(\beta_l, \delta_l, x_l, \lambda) : (29) - (36), \text{except}(20)\}\} \quad (40)$$

Computational results and the efficiency of the solution procedure for *2PPM* are discussed in Section 6.

5 An Efficient Solution Procedure for *MPPM* and *2PPM*

There are very few studies on stochastic programming problems with endogenous uncertainty. Jonsbraten et al. (1998) is the first to address such problems, in which an algorithmic procedure to solve this type of two-stage problems is described. The proposed method includes a branch and bound scheme to determine an optimal vector of decisions, each of which has a corresponding scenario tree. Goel and Grossmann (2004b) model the operational planning of offshore gas field developments as a multistage stochastic program with endogenous uncertainty. The stages of the problem contain decisions to install production and well platforms, which result with the realization of the uncertain

parameters for the fields in which installations are performed. The problem is formulated using disjunctions, and an approximation algorithm based on decomposition and restriction of the search space is described. A similar formulation is also given in Goel and Grossmann (2004a), in which a Lagrangian duality based branch and bound procedure is proposed to solve the problem. Held and Woodruff (2005) consider a network interdiction problem where the endogenous uncertainty is in the structure of the network. Stages of the problem contains interdiction decisions followed by shortest path calculations in the interdicted network. Several problem specific heuristic solution methods are described and compared in the study. More recently, Goel and Grossmann (2006) generalize the disjunctive programming formulation in Goel and Grossmann (2004b) to problems containing both exogenous and endogenous certainty. The authors also discuss a set of theoretical properties that leads to a reduction in the problem size. However, these results are only applicable to small size problems, since they are valid only when all possible scenarios are included in the problem. Viswanath et al. (2004) and Tarhan and Grossman (2006) consider somewhat different versions of the above class of problems. Viswanath et al. (2004) address a two-stage network problem, where in the first stage survival probabilities of arcs can be changed by investment decisions. Tarhan and Grossman (2006) consider gradual uncertainty revelation over time in the synthesis of process networks.

None of the above studies contain efficient solution procedures to solve problems with endogenous uncertainty, and almost all computational studies are performed on small size problems. The general disjunctive programming formulation and the solution suggested by Goel and Grossmann (2006) does not contain a direct decomposition structure, which is typically used in solving classical stochastic programming problems. In this study, we aim to fill this gap by developing a formulation scheme that is amenable to scenario decomposition, and is applicable to the general class of such problems. In addition, effective solution procedures for the resulting subproblems are also developed.

The sample average approximation (SAA) method is a Monte Carlo sampling technique that approximates a stochastic program by a smaller problem based on a random sample from the set of possible scenarios. Let ξ^1, \dots, ξ^N be an i.i.d. random sample of N realizations of the random vector ξ . Then the SAA problem for (1) is:

$$\max_{\mathbf{x} \in \mathcal{X}} \{\hat{g}_N(\mathbf{x}) = \frac{1}{N} \sum_{l=1}^N G(\mathbf{x}, \xi^l)\} \quad (41)$$

If v^* and \hat{v}_N represent the optimal values of the “true” and SAA problems respectively, it is well known that \hat{v}_N is a valid upper statistical bound for v^* . Furthermore, Shapiro (2003) shows that for multistage stochastic programming problems \hat{v}_N converges to v^* with probability 1 as $N \rightarrow \infty$, although no result is available on the rate of convergence. Hence, the choice of large values of N will lead to better approximations of the true objective function. However, since the computational complexity of the SAA problem increases exponentially with the value of N , it is more efficient to select a smaller sample size N , and solve several SAA problems with i.i.d. samples.

Let M represent the number of SAA problems solved, and let \hat{v}_N^m and $\hat{\mathbf{x}}_N^m$, $m = 1, \dots, M$, denote the optimal objective value and solution of the m th replication, respectively. Since generally only the first stage investment decisions have practical importance for the project portfolio management problem, we assume that $\hat{\mathbf{x}}_N^m$ represents these first stage decisions. Once a feasible solution $\hat{\mathbf{x}}_N^m \in \mathcal{X}$ is obtained by solving the SAA problem, the objective value $g(\hat{\mathbf{x}}_N^m)$ can be approximated by the

unbiased estimator

$$\hat{g}_{N'}(\hat{\mathbf{x}}_N^m) = \frac{1}{N'} \sum_{l=1}^{N'} G(\hat{\mathbf{x}}_N^m, \xi^l) \quad (42)$$

where N' is typically larger than N , since the computational effort required to estimate the objective value for a given solution is generally less than that required to solve the SAA problem. On the other hand, this phase may also be difficult for multistage problems, since it requires solving a multistage problem with endogenous uncertainty where only first stage decisions are known. Hence, any solution procedure must especially be efficient in calculating $\hat{g}_{N'}(\hat{\mathbf{x}}_N^m)$. One would also want to estimate the quality of the solution $\hat{\mathbf{x}}_N^m$. This can be done by computing an estimate of the optimality gap $v^* - g(\hat{\mathbf{x}}_N^m)$, where $g(\hat{\mathbf{x}}_N^m)$ can be estimated by (42), and v^* can be approximated by

$$\bar{v}_N^M = \frac{1}{M} \sum_{m=1}^M \hat{v}_N^m \quad (43)$$

The sampling procedure can be terminated once the optimality gap estimate is sufficiently small or after performing all M replications, and the best solution among the SAA solutions can be selected using an appropriate criterion. However, the variance of the optimality gap estimator is also important, and must be taken into account in determining the quality of a solution. One option is to add a multiple z_α of the estimated standard deviation of the gap estimator to the gap estimator, where $z_\alpha = \Phi^{-1}(1 - \alpha)$ and $\Phi(z)$ is the cumulative distribution function of the standard normal distribution (Kleywegt et al. 2002). If the sample sizes are not large, then z_α can be replaced by $t_{\alpha, \nu}$ from the t-distribution, where ν is the corresponding degrees of freedom. Then, an adjusted optimality gap estimator can be calculated by

$$\bar{v}_N^M - \hat{g}_{N'}(\hat{\mathbf{x}}_N^m) + z_\alpha \left(\hat{\sigma}_{\bar{v}_N^M}^2 + \hat{\sigma}_{\hat{g}_{N'}(\hat{\mathbf{x}}_N^m)}^2 \right)^{1/2} \quad (44)$$

where $\hat{\sigma}_{\bar{v}_N^M}^2$ and $\hat{\sigma}_{\hat{g}_{N'}(\hat{\mathbf{x}}_N^m)}^2$ are the estimates of the variances for the estimators of v^* and $g(\hat{\mathbf{x}}_N^m)$, respectively, and are calculated as

$$\hat{\sigma}_{\bar{v}_N^M}^2 = \frac{1}{(M-1)M} \sum_{m=1}^M (\hat{v}_N^m - \bar{v}_N^M)^2 \quad (45)$$

$$\hat{\sigma}_{\hat{g}_{N'}(\hat{\mathbf{x}}_N^m)}^2 = \frac{1}{(N'-1)N'} \sum_{l=1}^{N'} \left(G(\hat{\mathbf{x}}_N^m, \xi^l) - \hat{g}_{N'}(\hat{\mathbf{x}}_N^m) \right)^2 \quad (46)$$

Effective implementation of the above sampling procedure requires that the SAA problems can be solved efficiently for relatively large values of the sample size N . For a given set of scenarios, (4)-(23) is a mixed integer programming problem and applications of standard solution methods fail to produce a solution even when N is set to values less than 10. As an efficient solution procedure for the SAA problem, we propose a Lagrangian relaxation and decomposition scheme coupled with an efficient lower bounding heuristic, which we name as the feasible dual conversion algorithm. The development of such a procedure is especially important, since for most multistage stochastic problems, even finding a feasible solution to serve as a lower bound is difficult. We show in Section 5.2 that the minimum feasible dual conversion heuristic is an effective procedure in calculating tight lower bounds for the technology portfolio management problem.

5.1 A Lagrangian Relaxation and Decomposition Scheme

Model (4)-(23) is linked in scenarios through the nonanticipativity constraints (20) and (21). Let $\hat{g}_N(\beta, \delta)$ represent the objective function (4) with K and p_k replaced by N and $1/N$, respectively. Then by subjecting the nonanticipativity conditions to Lagrangian relaxation, we form the following Lagrangian

$$L(\beta, \delta, x, y, h, \lambda, \mu) = \hat{g}_N(\beta, \delta) + \sum_{l=1}^N \sum_{i \in \mathcal{N}} \lambda_i^l \left[\sum_{l'=1}^N \frac{1}{N} x_{i1}^{l'} - x_{i1}^l \right] + \frac{1}{N} \sum_{l=1}^N \sum_{l' \neq l} \sum_{i \in \mathcal{N}} \sum_{1 < t \leq T} \mu_{it}^{ll'} \left[x_{it}^l - x_{it}^{l'} + B_t \left[\sum_{j \in Y_{ll'}} (y_{jt}^l + y_{jt}^{l'}) + \sum_{j \in H_{ll'}} (h_{jt}^l + h_{jt}^{l'}) \right] \right] \quad (47)$$

where λ_i^l and $\mu_{it}^{ll'}$ are the Lagrange multipliers. Notice that the formulation of the nonanticipativity constraints (20) and the multiplication of the relaxed constraints (21) by $\frac{1}{N}$ in the above Lagrangian account for the scenario probabilities, and prevent the ill-conditioning in the Lagrangian dual as discussed by Louveaux and Schultz (2003). A major advantage of the described formulation of the nonanticipativity constraints is that when they are relaxed, the Lagrangian (47) can be decomposed by scenarios for given dual vectors λ and μ , and can be expressed as

$$L(\beta, \delta, x, y, h) = \sum_{l=1}^N L_l(\beta_l, \delta_l, x_l, y_l, h_l) \quad (48)$$

where

$$L_l(\beta_l, \delta_l, x_l, y_l, h_l) = \hat{g}_N^l(\beta, \delta) + \sum_{i \in \mathcal{N}} \left[\sum_{l'=1}^N \frac{\lambda_i^{ll'}}{N} x_{i1}^{l'} - x_{i1}^l \lambda_i^l \right] + \frac{1}{N} \sum_{i \in \mathcal{N}} \sum_{1 < t \leq T} \left[x_{it}^l \sum_{l' \neq l} (\mu_{it}^{ll'} - \mu_{it}^{l'l}) + B_t \left[\sum_{l' \neq l} \sum_{j \in Y_{ll'}} y_{jt}^{l'} (\mu_{it}^{ll'} + \mu_{it}^{l'l}) + \sum_{l' \neq l} \sum_{j \in H_{ll'}} h_{jt}^{l'} (\mu_{it}^{ll'} + \mu_{it}^{l'l}) \right] \right] \quad (49)$$

The corresponding Lagrangian dual problem for problem (4)-(23) is then

$$\min_{\lambda, \mu} \{ D(\lambda, \mu) = \max \{ \sum_{l=1}^N L_l(\beta_l, \delta_l, x_l, y_l, h_l, \lambda_l, \mu_l) : (5) - (19), (22), (23), \mu_l \geq 0 \} \} \quad (50)$$

Problem (50) is a nonsmooth convex minimization problem which can be solved by subgradient optimization methods (Hiriart-Urruty and Lemarechal 1993). At each iteration of these methods, the solution of $D(\lambda, \mu)$ is required to obtain a subgradient. Notice that $D(\lambda, \mu)$ is separable, and reduces to the solving N problems of manageable size, each of which corresponds to a single scenario. Components of the subgradient vector are then given by $\frac{\lambda_i^{ll'}}{N} x_{i1}^{l'} - x_{i1}^l \lambda_i^l$ and $x_{it}^l \sum_{l' \neq l} (\mu_{it}^{ll'} - \mu_{it}^{l'l}) + B_t \left[\sum_{l' \neq l} \sum_{j \in Y_{ll'}} y_{jt}^{l'} (\mu_{it}^{ll'} + \mu_{it}^{l'l}) + \sum_{l' \neq l} \sum_{j \in H_{ll'}} h_{jt}^{l'} (\mu_{it}^{ll'} + \mu_{it}^{l'l}) \right]$, where x_{i1}^l , y_{it}^l and h_{it}^l are the optimal solutions to the scenario subproblems.

For the project portfolio optimization problem, we propose a modified subgradient algorithm, in which step sizes in updating the dual variables are determined according to a weighted combination

of the subgradients from previous iterations. More specifically, a new step direction at iteration j is determined by

$$\hat{\Gamma}^j = \pi_0 \Gamma^j + \pi_1 \Gamma^{j-1} + \pi_2 \Gamma^{j-2} + \pi_3 \Gamma^{j-3} \quad (51)$$

where Γ terms represent the subgradients and π terms are weights such that $\pi_0 + \pi_1 + \pi_2 + \pi_3 = 1$. Individual π values can be selected according to an experimental analysis based on the problem considered. Updates of the multipliers are then performed using the following combined dynamic step size rule:

$$\lambda^{j+1} = \lambda^j - \max\left\{\frac{\phi}{j}, \frac{\kappa(\bar{L}^j - \underline{L}^j)}{\|\hat{\Gamma}^j\|}\right\} \hat{\Gamma}^j \quad (52)$$

$$\mu^{j+1} = \max\{0, \mu^j - \max\left\{\frac{\phi}{j}, \frac{\kappa(\bar{L}^j - \underline{L}^j)}{\|\hat{\Gamma}^j\|}\right\} \hat{\Gamma}^j\} \quad (53)$$

where ϕ and κ , $\kappa < 2$, are constants that can be modified during the algorithm. Above rule, which has been verified through computational studies, ensures that initial step sizes are large enough to prevent early convergence to a non-optimal solution. The implementation of the overall solution algorithm includes frequent lower bound calculations during the iterations of the subgradient method, and the convergence rate of the subgradient algorithm is especially important from an overall computational perspective. Hence, the stepsizes are determined as efficiently as possible to improve the convergence rate of the algorithm. Despite the large size of the dual vector for realistic instances of the problem, computational studies have shown that the convergence of the subgradient algorithm is relatively fast. Results of the tested models are discussed in Section 6.

It is well known that, due to the integrality requirements, the optimal solution of the Lagrangian dual gives an upper bound for the objective value of (4)-(23), which is at least as tight as the bound obtained from the LP relaxation of the problem. Furthermore, any Lagrangian dual solution is an upperbound for the original problem. However, a major difficulty in solving multistage stochastic programming problems is to determine good feasible solutions for tight lower bounds. Clearly, except in rare cases, the solutions of the Lagrangian dual will not satisfy the nonanticipativity constraints.

We present a heuristic procedure that uses the Lagrangian dual solutions in subgradient iterations to search for a feasible solution to the primal problem, which provides a lower bound for the optimal objective value. Given a Lagrangian dual solution, the method looks for a primal solution with minimum deviation from the dual solution. The search, which has produced very tight bounds in the computational studies described in Section 6, is implemented using integer programming models of manageable size. To ease the computational difficulty, the procedure is implemented gradually using subsets of scenarios, which are determined by the variable values and the objective value contributions of the scenarios in the dual solution. This procedure, which can also be applied as a bounding procedure in similar stochastic programming problems, is described in detail below.

5.2 The Feasible Dual Conversion Algorithm

The objective function for the project portfolio optimization problem is defined by the values of the binary variables β_{it} , which represent the periods that the return realizations begin. Hence, the corresponding values in a given Lagrangian dual solution describe some infeasible investment policy in which nonanticipativity constraints are not enforced but are only penalized. Clearly, the optimal

objective value of the primal problem is expected to be as close as possible or comparable to that of this infeasible policy. Although, due to the combinatorial nature of the problem, the optimal investment policy in the presence of nonanticipativity can be significantly different than the policy suggested by the given dual solution, one can obtain a “good” investment policy by converting the dual solution into a feasible solution by a minimal change in the β_{it} values in the Lagrangian dual solution. We present below an algorithm to achieve this, as well as a bound on the quality of the solution obtained through the algorithm. The feasible dual conversion algorithm performs such conversions in a systematic way that ensures the quality of the resulting solution as well as computational efficiency.

Algorithm 1 (Feasible Dual Conversion). *The steps of the algorithm are as follows:*

Step 1. Initialization : Let β^j represent the vector of corresponding values in a solution to the Lagrangian dual problem (50) at iteration j of the subgradient algorithm for dual variables λ^j and μ^j . Let $\underline{\beta}_{it}^l, \hat{g}_N, \underline{L}_l$ be the lowerbounds on β_{it}^l, \hat{g}_N and L_l for scenario l . Choose a scenario subset size S . Set $\underline{\beta}_{it}^l = 0$ for all $i, t, l, \mathbb{S} = \emptyset, \mathbb{S}' = \emptyset, \mathbb{N} = \{l_1, l_2, \dots, l_N\}$.

Step 2. Scenario subset selection : Rank all $s \in \mathbb{N}$ according to scenario objectives L_s^j , and form subset \mathbb{S} by selecting the first S scenarios among the ranked scenarios in \mathbb{N} . Let $\mathbb{S}' = \mathbb{S}' \cup \mathbb{S}$ and $\mathbb{N} = \mathbb{N} \setminus \mathbb{S}$.

Step 3. Variable fixing : For each $s \in \mathbb{S}$, determine period t_o^s in which s becomes distinguishable from all other scenarios according to scenario solutions β_{it}^s , i.e.

$$t_o^s = \min_t \{t | \min_{s' \neq s} \{ \sum_{j \in Y_{ss'}} (\beta_{j,t+\Delta_j}^s + \beta_{j,t+\Delta_j}^{s'}) + \sum_{j \in H_{ss'}} (\beta_{j,t+\Delta_j}^s + \beta_{j,t+\Delta_j}^{s'}) \} \geq 1\} \quad (54)$$

For each $i \in \mathcal{N}$ such that $\beta_{i,t+\Delta_i}^s = 1$, and $t \leq t_o^s$; if $\beta_{i,t+\Delta_i}^s - \beta_{i,t+\Delta_i-1}^s = 1$, then set $\underline{\beta}_{i,t+\Delta_i}^s = 1$.

Step 4. Feasibility determination: Check feasibility of (4)-(23) with the lower bounds on β_{it}^s for the scenario set \mathbb{S}' . If feasible, let $\hat{\beta}_{it}^s$ represent the corresponding values in this solution, and fix $\beta_{it}^s = \hat{\beta}_{it}^s$. If $\mathbb{N} \neq \emptyset$, go to Step 2.

Step 5. Minimum dual conversion : If (4)-(23) is infeasible, determine the minimum number of relaxations r_o required on $\underline{\beta}_{it}^s = 1$ for $s \in \mathbb{S}$ to obtain a feasible solution. Find the best possible feasible solution that can be achieved by relaxing at most r_o of the bounds $\underline{\beta}_{it}^s$. Fix $\beta_{it}^s = \hat{\beta}_{it}^s$. If $\mathbb{N} \neq \emptyset$, go to Step 2.

Step 6. Bound calculation : Let $\hat{\mathbf{x}}$ and \hat{g}_N represent the final solution vector and objective function value. If $\hat{g}_N > \hat{g}_N$, set $\hat{g}_N = \hat{g}_N$. For each scenario l , calculate $\dot{L}_l(\hat{\mathbf{x}}, \lambda^{j+1}, \mu^{j+1})$. If $\dot{L}_l > \underline{L}_l^{j+1}$, set $\underline{L}_l^{j+1} = \dot{L}_l$.

After the initialization of the algorithm in Step 1 according to a Lagrangian dual solution obtained in a subgradient iteration, Step 2 identifies the scenarios with the maximum possible contribution to the total expected return. In Step 3, projects that determine nonanticipativity relationships and that are also likely to deviate from the Lagrangian solution are identified. The β_{it} variables for these projects are fixed so that they are completed on or before the time suggested by the ideal policy from the dual solution. Almost in all cases, this will lead to an infeasible solution, which is checked in Step 4. Then, a conversion procedure is implemented in Step 5. In this phase, first

the minimum number of relaxations on the fixed β_{it} variables required to obtain a feasible solution is determined by solving an integer programming problem, which is assumed to be easily solvable for scenario subset size S . Note that such a feasible solution always exists. Another option is to minimize a weighted sum of the relaxations, where the weights are determined by the contribution of each technology into the overall objective function. Then, given this minimum requirement for feasibility, an optimization is performed to determine the best possible solution by performing at most that many relaxations on fixed β_{it} variables. Again, it is assumed that such an optimization can be performed efficiently for S scenarios. The procedure is repeated $\frac{N}{S}$ times, which results with a feasible solution for the primal problem. In Step 6, bounds on the objective values are updated to simplify the solution process in later iterations. Indeed, in the overall implementation, a history of all such solutions are maintained, and used to determine the best possible lowerbound on scenario subproblems at each iteration. Despite the additional memory requirement, it has been observed that this significantly reduces the solution times for the scenario subproblems.

One may think that a better approach would be such that all β_{it} values in the Lagrangian dual solution are fixed in Step 3. However, this may significantly increase the computational complexity of the optimization problems solved in Step 5. Also, by minimizing the number of required relaxations, Step 6 minimizes the computational difficulty of the subsequent optimization problem, and the deviation from the dual solution is kept minimal with respect to technologies with the highest return levels. The following propositions define a bound on the quality of the solution produced by the feasible dual conversion algorithm, which translates to an upper bound on the duality gap.

Proposition 2. *Let i^s represent a project i in scenario s , and let I_β be the set containing all i^s such that $\beta_{it}^s = 1$ for some t . For a given set \mathbb{S} of scenarios, group i^s according to the order of completion in the dual scenario solutions, i.e. projects completed first in each scenario represent a group, as well as those completed second, third, etc. In case of ties, assign groups arbitrarily. Let R^n , $n \leq |\mathcal{N}|$, represent the cardinality of the largest compatibility set in group n , where projects i^s and $j^{s'}$ are defined to be in the same compatibility set if $\beta_{i,t+\Delta_i}^s = \beta_{j,t+\Delta_j}^{s'} = 1$, $\beta_{i,t+\Delta_i}^s = 1$ does not imply $\beta_{j,t+\Delta_j}^{s'} = 0$ or vice versa, and if they are compatible with the projects in the maximum cardinality compatibility set in group $n-1$. Then, for any application of the feasible dual conversion algorithm on \mathbb{S} ,*

$$r_o \leq |I_\beta| - \sum_{n \leq |\mathcal{N}|} R^n$$

Proof. Proof Clearly, an upper bound on r_o is $|I_\beta|$. Note that, to obtain feasibility, a relaxation of the lower bound on β_{it}^s or $\beta_{jt}^{s'}$ is required if i^s and $j^{s'}$ are not compatible. Hence, required number of relaxations for each group will be minimum if β_{it}^s is set to 1 for all members of the maximum cardinality compatibility set, and the variables corresponding to the remaining projects in the group are relaxed. By the definition of compatibility, a feasible solution can always be obtained by fixing $\sum_{n \leq |\mathcal{N}|} R^n$ of the β_{it}^s variables, where $i^s \in I_\beta$, at their lowerbounds. Hence an upper bound on the number of relaxations required for feasibility is $|I_\beta| - \sum_{n \leq |\mathcal{N}|} R^n$. \square

The above bound on the number of relaxations is easy to calculate, since the size of the groups formed in the bound calculation procedure is in the order of S . The procedure requires the identification of the maximum cardinality compatibility set, which is equivalent to solving the NP-hard maximum clique problem on a compatibility graph. As noted, the size of the groups enable easy

determination of this set. On the other hand, less tight bounds can be obtained by using bounds known for the maximum clique problem and selecting a clique arbitrarily to fix some of the variables. Proposition 3 uses the bound on r_o to develop a bound for the quality of the solutions obtained by the feasible dual conversion algorithm.

Proposition 3. Consider a ranking of projects $i^s \in I_\beta$, i.e. $\langle i_{(1)}^s, i_{(2)}^s, \dots \rangle$ such that $z_{i_{(1)}^s} \geq z_{i_{(2)}^s} \geq \dots$, where z_i^s is the contribution of project i to the scenario objective in the dual solution. Define $r_o^U = |I_\beta| - \sum_{n \leq |\mathcal{N}|} R^n$, and let t_o^s represent the period that scenario s becomes distinguishable from all other scenarios according to a modified dual solution obtained by assuming no investment is made in project i^s prior to period $t + 1$, if $\underline{\beta}_{it}^s = 1$ and $i^s \in \{i_{(1)}^s, i_{(2)}^s, \dots, i_{(r_o^U)}^s\}$ or $\underline{\beta}_{it}^s = 0$. Furthermore, assume that z_c^s represents the return in scenario s from the optimum single-scenario investment schedule over periods t_o^s, \dots, T for all projects that are not completed by t_o^s according to the modified dual solution. For the optimum partial schedule calculations, assume that for i^s such that $\underline{\beta}_{it}^s = 0$ for all t , $\theta_i = \tau_{i, t_o^s}$, if $\tau_{i, t_o^s} < \theta_i$ in the modified dual solution and all x_{it}^s satisfy modified nonanticipativity for $t \leq t_o^s$. If $F_N^*(x)$ is the optimal objective function value for the SAA problem with N scenarios, and $F_N(\hat{x})$ is the objective value of a solution generated by the feasible dual conversion algorithm, then

$$F_N^*(x) - F_N(\hat{x}) \leq \sum_{k=1}^{N/S} \sum_{s \in \mathbb{S}^k} \left\{ -z_c^s + \sum_{i=i_{(1)}^s}^{i_{(r_o^U)}^s} z_i^s \right\}$$

Proof. Proof Consider the first iteration of the feasible dual conversion algorithm, and assume that S scenarios with highest scenario objectives are selected. Notice that an upperbound for the contribution of these scenarios in the optimal solution is given by $\sum_{s=1}^S L_s(x, \lambda, \mu)$. Let ΔZ represent the total change in the objective value of the feasible solution for scenario s compared with the dual solution. Clearly, $\Delta Z \leq \sum_{i=i_{(1)}^s}^{i_{(r_o)}^s} z_i^s$, since a feasible solution always exists with r_o relaxations on the bounds $\underline{\beta}_{it}^s = 1$. Without loss of generality, assume that these relaxations correspond to i^s with the highest contributions to the objective function. We show that the modified dual solution described above is feasible. Suppose this solution is not feasible, which implies that the corresponding investment schedule does not satisfy the modified nonanticipativity requirements. Since the modified dual solution consists only of projects with $\underline{\beta}_{it}^s = 1$, any change in the schedule would require a relaxation in these bounds. This contradicts with the condition that a feasible solution exists with r_o relaxations on the bounds. Furthermore, any partial investment schedule for periods after t_o^s would not violate feasibility, since there is no nonanticipativity requirements after period t_o^s . Hence, it is possible to improve this feasible solution by reoptimizing the allocations in each scenario s for periods after t_o^s . This will lead to an improvement of $\sum_s z_c^s$ in the objective value, implying that $\Delta Z \leq \sum_{i=i_{(1)}^s}^{i_{(r_o)}^s} z_i^s - \sum_s z_c^s$. It follows from Proposition 2 that the bound can be expressed similarly by replacing r_o with r_o^U . Since the algorithm performs N/S iterations to obtain a feasible solution, the total difference is the sum over all iterations, and the result follows. \square

Calculation of the above bound requires the solution of small optimization problems for each scenario. These problems include only a subset of the projects in the portfolio, and contain periods after t_o^s . Noting that these small problems can be solved significantly fast, the difficulty of bound calculations is only dependent on the number of scenarios considered.

Using the bounding schemes discussed, a branch and bound algorithm with branching on the nonanticipativity constraints that are not satisfied in the solution of the Lagrangian dual can be implemented to close the duality gap. In the case of the project portfolio management problem, the nonanticipativity constraints are on the continuous variables x_{it}^k . Hence a branching rule could use the average investment in the scenario solutions of the dual problem, or the most frequent occurrence of x_{it}^k values to branch on. However, the branch and bound scheme is usually computationally efficient only for very small scale problems. On the other hand, duality gaps are not significantly high for the approximate solutions produced by the feasible dual conversion algorithm for larger models as noted in Tables 3 and 4. Thus, in most instances, it will suffice to obtain approximate solutions through the feasible dual conversion algorithm, and use them as the solutions to the SAA problems. In parallel with this analysis, computational studies in Section 6 have been implemented without the branch and bound step for efficiency purposes.

5.3 Solution Algorithm Overview

The overall procedure to solve the project portfolio optimization problem is summarized below, which is also shown in Figure 4.

Algorithm 2 (Solution Algorithm for *MPPM* and *2PPM*). *The general solution algorithm can be summarized as follows:*

Step 1. Obtain N samples from the set of scenarios, and form the SAA problem with these scenarios.

Step 2. Perform Lagrangian relaxation on the SAA problem, decomposing the problem into individual scenario subproblems.

Step 3. Use subgradient algorithm with the proposed step size measure to obtain an upper bound for the SAA problem.

3a. If computationally feasible, solve the LP relaxation of (4)-(23), and set the corresponding dual values as the initial Lagrangian multipliers. Use a rounding heuristic to obtain an initial lowerbound on the problem, i.e if $\beta_{it}^k \geq 0.5$ and $\beta_{it'}^k \geq 0.5$ for all $t' > t$ in the LP relaxation solution, then set $\hat{\beta}_{it}^k = 1$, else set $\hat{\beta}_{it}^k = 0$. Then use the feasible dual conversion algorithm.

3b. At each iteration j of the algorithm, determine a lowerbound for the scenario subproblems by calculating $\hat{L}_l(\mathbf{x}^l, \lambda^{j+1}, \mu^{j+1})$, and selecting the minimum.

3c. Based on an improvement threshold for the dual solution or at every f_o iterations, apply the feasible dual conversion algorithm, to obtain a lowerbound for the SAA problem, as well as for the scenario subproblems.

3d. Use the best lowerbounds for the scenario subproblems as the starting solution for the subproblems at iteration $j + 1$.

4. Calculate the duality gap upon convergence of the subgradient algorithm. If the gap is less than or equal to ϵ , go to step 5. Else, if computationally feasible, use branch and bound to close the duality gap, by branching on the nonanticipativity conditions.

5. Repeat Steps 1-4 M times. Each solution is a candidate solution for the true problem.

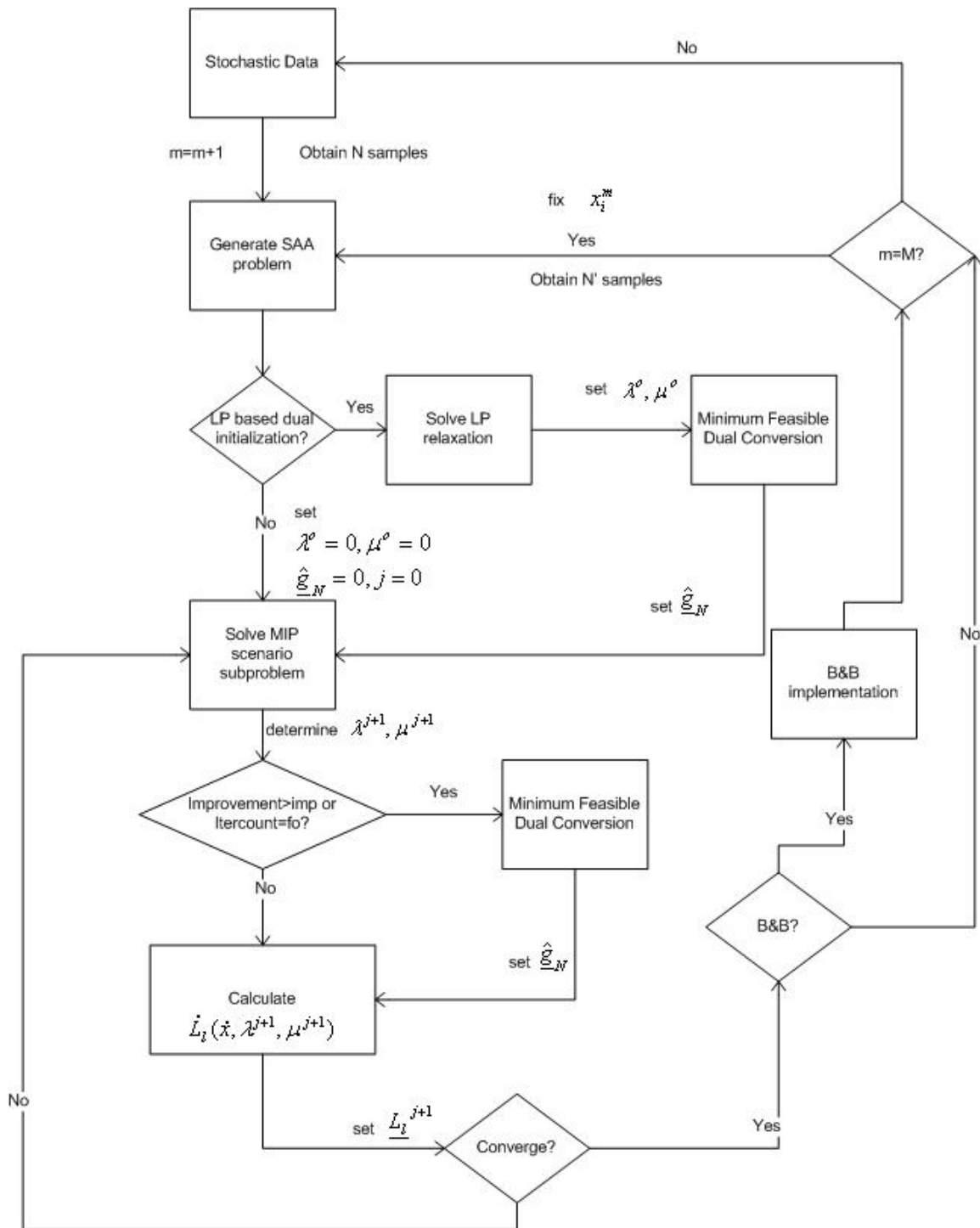


Figure 4: Solution algorithm for *MPPM* and *2PPM*

6. For some or all of the candidate solutions, perform N' replications by fixing the values of the first stage variables according to the solution, and repeating steps 1 – 4 with these fixed values to estimate the objective value of the candidate solutions.

7. Select a solution as the best solution using an appropriate criterion.

For the lower bounding procedure, both the LP relaxation based and dual solution based heuristics can be applied and the maximum objective value can be selected as the better lowerbound. Computational studies have shown that the LP relaxation based heuristic can often produce good solutions.

6 Computational Results for *MPPM* and *2PPM*

Computational tests for the developed solution procedures were conducted on two sets of project portfolio data under different algorithmic configurations. The data sets consist of five and ten technology projects and are represented as 5T and 10T in the results tables. The stochastic data for the ten project instance is shown in Table 1. The probability distributions for the uncertain parameters, i.e. required investment levels, initial return estimates and realized return levels, were assumed to be discrete with low and high levels. Corresponding probabilities for each case are also listed in Table 1. The probability distributions for the uncertain parameters, i.e. required investment levels, initial return estimates and realized return levels, were assumed to be discrete with low and high levels. Although the dependence of the probability distributions of return estimates and realizations are modeled to reflect a gradual resolution of uncertainty, all other stochastic parameters are assumed to be independent. Joint return effects are defined according to the description in Section 2. Several implementations with varying sample sizes and number of replications are displayed in Tables 3 and 4. The number preceding the letter S in the table notation represents the number of samples, while the number preceding the letter R is the number of replications.

Computations were performed on a PC with an Intel Core 2 Duo 2.0 GHz processor and 2GB of internal memory, using ILOG CPLEX Version 10.0. Although the computational studies were conducted on a single computer, the proposed solution procedure can easily be parallelized by solving the scenario subproblems on multiple machines to improve the solution times significantly.

The first two columns after the problem size information in Tables 3 and 4 display the time in seconds per replication of the SAA implementation and the expected value estimation for a given solution, respectively. The next column is the average duality gap, which is an average of the gap over all replications. The adjusted optimality gap estimate is given in the last column, and is calculated according to (44), based on the best solution obtained using the developed procedure. The sample size N' to estimate the corresponding objective value of a candidate solution was selected as 100 and 50 for 5T and 10T implementations. As it is shown in these results tables, the calculations of the objective values when the first stage decisions are fixed can be performed significantly faster than the solution of the SAA problem. Table 2 displays the first stage solutions for all tested configurations of the SAA algorithm. In most cases, different configurations return the same solution, based on the methodology used to select the best solution among the candidate solutions. Furthermore, for these instances, the two stage and multi-stage solutions are not significantly different than each other.

Overall, the computational results show that the developed procedure is effective and efficient in solving the project portfolio optimization problem, which is a difficult multistage stochastic program with endogenous uncertainty. Even without the implementation of a branch and bound procedure to close the duality gap, obtained lower bounds are very close to the Lagrangian upper bounds. As expected, the duality gap is less in instances with small sample sizes, while the optimality gap estimate is very low for large sample sizes. For the latter case, the variances are much lower and convergence of \bar{v}_N^M and $\hat{g}_{N'}(\hat{\mathbf{x}}_N^m)$ occur significantly faster, in the expense of slower computation times. The selection of the best solution out of several SAA solutions was done in two steps. In the first step, candidate solutions were identified based on the frequency of occurrences in the SAA solutions. Then the expected returns were estimated for these candidate solutions as described above, and the solution with the highest expected return estimate was selected. In Figure 5, we show the different levels of variance and convergence in this process on the 5T instances for both *MPPM* and *2PPM*. The horizontal line in each plot represents the value of the estimate \bar{v}_N^M for the corresponding algorithmic configuration. The effects of large sample sizes are evident in these plots, as it can be seen that convergence to the corresponding objective value is much faster in these cases. In addition, when compared with the two-stage model, convergence is better in the multi-stage case, mainly due the flexibility in a multistage model in rebalancing the portfolio in later stages. Hence, the results for different scenarios do not vary significantly.

7 Conclusions and Future Work

Project portfolio optimization problem has not been studied at the detailed level considered in this study before. It was also noted that the problem has a unique structure with endogenous uncertainty of the stochastic parameters, and development of a solution methodology would also contribute to the general class of such problems. We have presented a detailed and comprehensive description of the problem, the solution characteristics, and an efficient solution approach that can be used to solve this large-scale problem.

Implementation of the proposed models in project portfolio selection by organizations will lead to significant increases in returns, as all relevant inputs and uncertainty are captured in the models, as opposed to existing project portfolio selection tools. The developed methodology is in the process of being used by the Federal Aviation Administration (FAA) in determining resource allocations to a portfolio of aviation modernization technologies. A significant contribution of the developed models is that they include a common but less studied characteristic of endogenous uncertainty. Problems of this type are usually difficult to model, since the nonanticipativity conditions require comparisons of scenario pairs. We present a compact decomposable structure which can be exploited by methods that are commonly used in the solution of classical stochastic programming problems. It must be noted that even if the endogenous uncertainty were to be ignored, the resulting problem would be a multistage stochastic integer program with several stages for which no general solution procedures are available. Hence, to handle the difficulty, an effective lower bounding algorithm and performance bounds have been developed as a part of the overall solution procedure. The algorithm has been tested with promising results, and it is believed that such a procedure can be implemented in several other similar problems. Additional extensions of the study are possible in several areas. Integration of risk is an important part of the technology portfolio selection, since most practical decisions are made while considering risks associated with the investment decisions. This can be analyzed through the introduction of other objective functions capturing risk, such

as value-at-risk models. One other extension includes capturing the effects of dependencies in probability distributions on the investment decisions.

Table 1: Data for the ten project test instance of stochastic project portfolio optimization problem

Attributes / Projects	A	B	C	D	E	F	G	H	I	J
Fixed activity cost (mil.\$)	0.2	0.1	0.3	0.2	0.2	0.05	0.1	0.2	0.05	0.3
Min. req. inv. (mil.\$) / probability	2 / 0.35	3 / 0.3	4 / 0.5	2 / 0.4	1 / 0.5	1 / 0.6	5 / 0.5	1 / 0.5	2 / 0.55	1 / 0.3
Max. req. inv. (mil.\$) / probability	4 / 0.65	5 / 0.7	6 / 0.5	6 / 0.6	3 / 0.5	3 / 0.4	7 / 0.5	1 / 0.5	4 / 0.45	3 / 0.7
Implementation time (yrs)	5	2	3	3	2	3	1	4	2	2
Min. initial return est. (mil.\$) / prob.	1.5 / 0.6	1 / 0.4	1.5 / 0.14	0 / 0.225	0 / 0.5	2 / 0.25	3 / 0.83	2 / 0.67	1.5 / 0.5	1 / 0.5
Max. initial return est. (mil.\$) / prob.	4.5 / 0.4	3.5 / 0.6	4.5 / 0.86	3.5 / 0.775	1 / 0.5	5 / 0.75	7 / 0.17	3 / 0.33	4 / 0.5	4.5 / 0.5
Prob. of min. return after low initial real.	0.8	0.8	0.8	0.6	0.5	0.7	0.5	0.4	0.7	0.6
Prob. of max. return after low initial real.	0.2	0.2	0.2	0.4	0.5	0.3	0.5	0.6	0.3	0.4
Prob. of min. return after high initial real.	0.3	0.3	0.3	0.2	0.5	0.3	0.2	0.1	0.5	0.4
Prob. of max. return after high initial real.	0.7	0.7	0.7	0.8	0.5	0.7	0.8	0.9	0.5	0.6
Dependent	-	C	B	E	D	-	J	-	-	G
Joint effect after min-min return (mil.\$)	-	-0.5	-0.5	0	0	-	0.5	-	-	0.5
Joint effect after min-max return (mil.\$)	-	-1.5	-2	0	0	-	-0.5	-	-	0
Joint effect after max-max return (mil.\$)	-	-3	-3	-0.5	-0.5	-	-3	-	-	-3

Table 2: First period solutions for different configurations of the SAA algorithm for the ten project test instance of stochastic project portfolio optimization problem

Project / SAA Configuration	10T5S100R-MPPM	10T10S50R-MPPM	10T25S20R-MPPM	10T50S10R-MPPM	10T10S50R-2PPM	10T25S20R-2PPM	10T50S10R-2PPM
A							
B							
C							
D							
E							
F	1.05	1.05	1.05	1.05	1.05	1.05	1.05
G	0.75				0.75	0.75	0.75
H	1.2	1.2	1.2	1.2	1.2	1.2	1.2
I						0.75	
J		0.75	0.75	0.75			
First Period Budget	3	3	3	3	3	3	3
First Period Investment	3	3	3	3	3	3	3

Table 3: Computational Results for *MPPM* - * and ** indicate that the best solutions were the same

Instance	app. #of rows	app. #of columns	sec/rep	sec/rep (soln.)	avg. ality (%)	du-gap	\bar{v}_N^M	$\hat{g}_{N'}(\hat{\mathbf{x}}_N^m)$	$\hat{\sigma}_{\bar{v}_N^M}^2$	$\hat{\sigma}_{\hat{g}_{N'}(\hat{\mathbf{x}}_N^m)}^2$	adj.opt.gap est.
5T5S100R-MPPM	4,500	3,000	572	5.69	1.189		82.009	81.583	0.889	0.672	2.875
5T10S50R-MPPM	11,000	5,500	780	6.85	1.170		80.695	81.745	0.956	0.398	1.231 *
5T25S20R-MPPM	45,000	13,500	1398	23.09	2.438		80.373	81.117	0.731	0.217	1.164 *
5T50S10R-MPPM	146,000	27,000	3552	77.52	4.408		78.583	80.421	0.889	0.073	0.084 *
10T5S100R-MPPM	8,500	6,000	1706	84.32	1.020		228.596	230.736	5.851	2.090	3.383
10T10S50R-MPPM	22,000	11,000	1860	122.34	1.280		229.444	232.035	2.836	5.580	3.095 **
10T25S20R-MPPM	88,000	27,000	3480	204.10	1.870		229.033	232.314	2.034	1.754	0.534 **
10T50S10R-MPPM	290,000	54,000	3552	652.45	2.438		225.321	230.022	9.226	1.365	1.678 **

Table 4: Computational Results for *2PPM* - * and ** indicate that the best solutions were the same

Instance	app. #of rows	app. #of columns	sec/rep	sec/rep (soln.)	avg. ality (%)	du-gap	\bar{v}_N^M	$\hat{g}_{N'}(\hat{\mathbf{x}}_N^m)$	$\hat{\sigma}_{\bar{v}_N^M}^2$	$\hat{\sigma}_{\hat{g}_{N'}(\hat{\mathbf{x}}_N^m)}^2$	adj.opt.gap est.
5T5S100R-2PPM	2,500	1,500	58	2.28	0.769		82.230	83.210	0.833	0.774	1.505 *
5T10S50R-2PPM	4,500	3,000	69	4.50	1.753		80.808	81.701	0.741	0.346	1.150 *
5T25S20R-2PPM	11,500	7,000	168	12.01	2.770		79.900	81.356	0.617	0.185	0.299 *
5T50S10R-2PPM	23,000	14,000	204	28.05	3.060		79.394	81.650	1.582	0.104	0.289 *
10T5S100R-2PPM	4,500	3,000	795	33.27	0.586		232.231	232.282	3.613	3.152	5.047 **
10T10S50R-2PPM	8,500	6,000	992	39.60	0.894		232.679	232.793	2.458	2.483	4.243 **
10T25S20R-2PPM	21,500	14,000	1446	48.12	1.709		228.650	230.204	1.747	2.564	2.516
10T50S10R-2PPM	43,000	28,000	2040	66.70	2.625		228.610	231.917	1.268	1.804	0.128 **

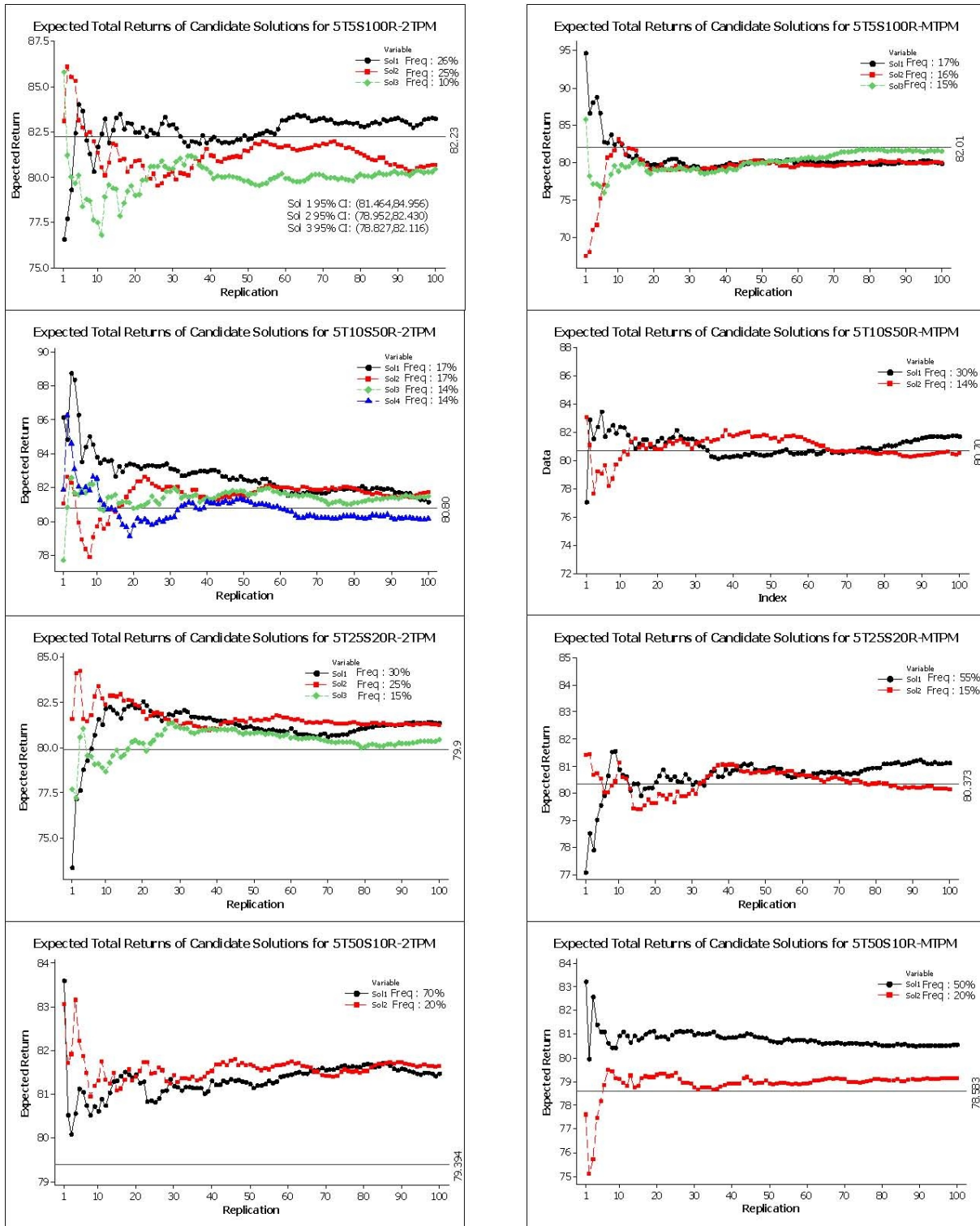


Figure 5: Estimation of expected value of the objective function for candidate solutions using samples sizes of $N' = 100$

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AN OPTIMIZATION MODEL FOR CONCURRENT ENGINEERING: INCORPORATING LIFE CYCLE COSTING AND SUPPLY CHAIN DESIGN EARLY IN THE NEW PRODUCT/SERVICE DEVELOPMENT PROCESS

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ABSTRACT

The primary purpose of this paper is to develop a model to help determine optimal product/service, process and supply chain configurations in a concurrent fashion. For that purpose, a concurrent engineering framework and an optimization model that incorporate supply chain design and life cycle costing concepts are developed. In order to demonstrate and validate the proposed model, a numerical example is presented. The model results are compared to those from a sequential design process and indicate that the proposed model can achieve better overall results. Conclusions, implications, and directions for future research are also discussed.

Keywords: Concurrent Engineering, Life Cycle Costing, Mathematical Programming, Optimization, Supply Chain Design.

INTRODUCTION

Increased competition and growing customer demands continue to pressure manufacturing and service firms to improve their products, services, and processes in order to survive in the marketplace. As a result, firms are looking for new product and service designs that will result in a competitive edge and for innovative ways to improve processes that will result in costs savings and higher profits [13].

In addition, spiraling costs and growing environmental concerns associated with product disposal, which can even exceed a product's purchase price, have caused an increasing number of firms to adopt Life Cycle Design (LCD) and Concurrent Engineering (CE) methodologies to achieve improved product designs, reduce total costs, and meet customer demands [28]. For example, General Mills found a way to save over \$760,000 annually in product disposal costs by redesigning one of its products and optimizing its manufacturing process and supply chain activities using CE techniques. In a similar case, Medtronic, Inc. integrated CE into the design of one of their medical products and saved over \$2.1 million annually by reducing chemical use and waste [1].

Concurrent Engineering can be thought of as an approach to pursuing the different goals involved in New Product Development (NPD). In this sense, the modeling scope focuses on the strategic level of decision-making since product and supply chain design represent infrequent decisions that involve long term forecasting and planning horizons.

The Concurrent Engineering paradigm also involves integrating various NPD development goals in a parallel, rather than sequential fashion. From a decision making stand point, CE results in a more complicated decision-making process that requires the concurrent optimization of a larger and more complex set of objectives subject to a larger set of constraints. Thus, it is likely that multiple conflicting goals will be experienced when using Concurrent Engineering as a NPD tool. For example, the purchasing department may be interested in selecting a low cost supplier to provide certain parts, which may result in lower quality levels. This could create a conflict with the marketing department, interested in developing a product that minimizes the rate of failures in order to maximize customer satisfaction. As such, an appropriate concurrent engineering model should bridge functional boundaries and incorporate different engineering, financial, operations and marketing goals.

The primary objective of this paper is to develop a model that will help determine the optimal product/service, process and supply chain configurations in a concurrent fashion. Despite the publication of several hundred papers on Concurrent Engineering there is little application of mathematical programming or optimization techniques to Concurrent Engineering¹. Most of the CE research has focused on qualitative analysis, discussion, and techniques. Furthermore, it has been observed that there is a paucity of published research in the area of supply chain modeling at the product development phase [2]. Thus, the purpose of this paper is to help close this gap by developing a quantitative model that addresses the need to simultaneously optimize the product, the process, and the supply chain designs, as well as to model the inherent conflict among the different objectives.

Our research is focused on the following goals:

- To develop a concurrent engineering framework that incorporates supply chain design and life cycle costing concepts.
- To develop an optimization model that incorporates the tradeoffs faced in the development of new products.
- To develop a numerical example in order to demonstrate and validate the model as well as the framework.

The remainder of this paper is organized as follows: A review of the literature related to concurrent engineering is followed by an overview of our proposed framework. Next, we outline the model developed as well as the methodology used in our study. In order to validate our concurrent engineering approach, we examine the mapping of our model solutions with respect to those from the sequential design approach. Subsequently, we show that a concurrent engineering approach can result in a better solution than the traditional design approach. Finally, we conclude with a discussion of the implications and limitations of our research study, and an outline of future research directions.

¹ The current state of the art will be discussed in depth in the Literature Review section.

LITERATURE REVIEW

The topic of concurrent engineering has been studied for several years [3] [6] [18] and continues to be a research topic of interest [5] [19] [24]. Despite several hundred papers on Concurrent Engineering there is little application of mathematical programming or optimization techniques to Concurrent Engineering. In general, most papers have simply provided qualitative insights into the problem.

In that line of work, Eversheim *et al.* developed a conceptual model to support the integration of design and process planning that incorporates performance measures such as responsiveness, time-to-market, cost, quality and life cycle considerations [9]. Similarly, Fixson developed a multi-dimensional conceptual framework that enables comprehensive product architecture assessments. The framework builds on existing product characteristic concepts such as component commonality, product platforms, and product modularity, providing a tool to link product, process, and supply chain design decisions [15]. Tan *et al.* developed a distributed processing framework for evaluating design decisions, detecting and resolving conflicts in design choices made by team members [30]. The method proposed by the authors is based on iterative design changes suggested by individual team members. However, such a system is limited in its ability to optimize a decision over a large number of alternatives, and could require an unreasonable length of time to resolve all of the conflicts.

On the quantitative modeling side, Lamghabbar *et al.* used a mathematical programming technique to find the optimal values of the product and the process design. The objective function was modeled as a quality loss function and the constraints were represented by the production requirements, the product's specification limits, the parts' dimensional limits and the process capability [21]. The authors also performed a parametric analysis of the objective function by applying an interactive multi-objective goal programming technique. Acknowledging that multiple conflicting objectives can be experienced when using CE, Schniederjans *et al.* developed a goal programming approach to model decision making in CE by considering conflicting objective criteria of cost and time. We should note that none of the above described models took into account the product's life cycle or any supply chain consideration.

Overall, CE research has focused on combining production with product design issues. Papers that recognize the need to incorporate supply chain design issues with product and process design (thus creating a three-dimensional challenge) have started to emerge recently. Dowlatshahi (1996) had noted that little or no work is being done on the interface of product design and logistics [7]. Subsequently, Fisher suggested matching the supply chain with the product structure [14] and Dowlatashi (1999) developed a conceptual interface for Design for Logistics, focusing on facilitating the collaboration between the design and the logistics functions in order to encourage logistics involvement in the early phases of product design in a concurrent engineering environment [8]. Appelqvist *et al.* developed a conceptual framework for supply chain decision making and proposed an approach to integrate product life cycle modeling systems. The authors also reviewed the current modeling practices through a literature survey. Their main finding was a lack of published research in the area of supply chain modeling at the

product development phase, even though it is in the product development phase where the majority of product life-cycle costs are determined [2]. In this line of research, the idea of Three-Dimensional Concurrent Engineering (3D-CE) was proposed by Fine [11]. 3D-CE represents a framework for product, process and supply chain design [12], which encourages the concurrent determination of the product, the manufacturing process and the suppliers. The framework acknowledges that with today's fast industry clock-speeds, every new product constitutes a high-risk, short-life project [20].

From a quantitative modeling perspective, Feng *et al.* formulated a stochastic integer programming model based on quality loss function and different process capability indices that enables the simultaneous determination of tolerances in the product design as well as the selection of suppliers for the various components of the product [10]. Similarly, Fine *et al.* developed a 3D-CE optimization model that enables the representation of the interrelations among multiple objectives [13]. The authors proposed a goal-programming modeling approach and demonstrated the model through a discussion of integrality versus modularity in product and supply chain designs. However, none of the models above takes into account life cycle costing or considered the forward supply chain.

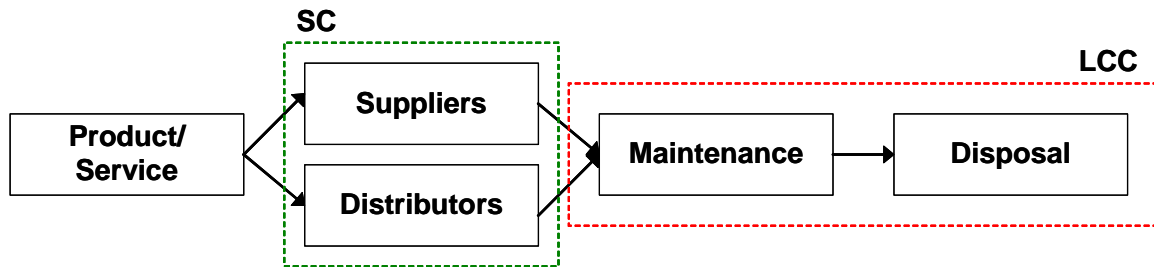
The relatively few articles found in the literature focus on using multiple objective criteria in solving concurrent engineering problems. With the exception of the last two references, the rest of the 3D-CE papers simply provide qualitative insights into the problem. Furthermore, the scope of our model is more extensive than those of the papers described above, since none of the studies offers a quantitative methodology that takes into account a product lifecycle approach and its associated life cycle costs in order to analyze the various 3D-CE tradeoffs. Nevertheless, common ground is found in the utilization of optimization techniques in CE as well as the use of multicriteria decision methods and embedded models.

In summary, our paper is aimed at developing a quantitative model to implement the principles of the concurrent engineering paradigm, which has been discussed primarily in a qualitative manner in the literature. This paper represents an attempt to close the gap between qualitative and quantitative modeling through the development of a comprehensive quantitative model that includes a life cycle costing approach as well as the modeling of the forward supply chain.

FRAMEWORK

This research paper is in part motivated by the mistakes made by developers of new products in bringing those products to market rapidly and effectively. Traditionally, decisions on the development of new products are taken in a serial pattern (See Figure 1). First, a product design is selected from a set of alternative designs, taking into account marketing, financial and engineering goals. Next, the selected design is usually transferred to the production planning department which is in charge of developing the manufacturing plan taking into consideration operational goals such as capacity utilization and production balancing. Finally, the product and the production design decisions are submitted to the logistics department which determines the different supply sources. However, as pointed out by Gunasekaran, the designs produced by this serial pattern are subject to a number of problems [18].

FIGURE 1
Traditional Sequential Design Approach



In the first place, the process is slow and, consequently, market opportunities may be missed. A key challenge for corporations today is the increasing velocity of change (i.e., clockspeed) in the business environment. Mendelson *et al.* found that higher industry clockspeed is associated with faster execution in product development and manufacturing, such as shorter development times [22]. As a higher level of industry clockspeed means faster product obsolescence and more rapid changes in supply conditions, we should expect the pace of product development to accelerate. Thus, firms will need to revise their design processes and act faster in order to seize opportunities and, ultimately, survive.

At the same time, the serial process discussed above results in sub-optimal decisions, since the decisions made at each stage represent, at best, locally optimal choices. In this sense, careful consideration must be given to addressing the impact that design decisions will have on the rest of a product's life cycle because, even though the actual product design cost usually accounts for only 5 to 10% of the total life cycle cost, the decisions made at the design stage usually determine 70 to 80% of the total life cycle cost [6]. For example, sales margins may easily be offset in the downwards supply chain by the costs of product returns, which can take various forms: from consumer convenience returns to repair and maintenance returns, or end-of-life returns.

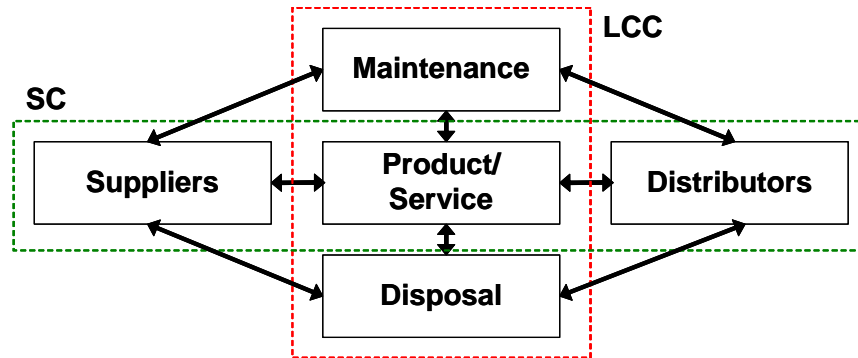
In addition to returns, companies are increasingly expected to take responsibility for the full life cycle of their products including the disposal, which extends the impact of the decision made at the design stage far beyond the purchase [17]. The European Union, for example, recently adopted the Waste Electrical and Electronic Equipment (WEEE) act that makes producers responsible for environmentally friendly disposal solutions and for organizing product take-back from consumers at no cost. One should expect this trend to expand to other economic regions. As a result, companies such as Sony expect that changes in the regulations may cost as much as 1-2% of revenues, a significant number considering the small profit margins of some products [20].

Furthermore, the development of new products/services may present companies with a particularly difficult challenge. That is, some companies will need to develop not only a new product and a new process to manufacture it, but also a new supply chain to feed that process and distribute the product. As a consequence, those companies will need to take into account additional strategic supply-chain issues at the product design stage, such as the level of

dependency resulting from sourcing decisions, i.e., the level of risk incurred by a firm as a consequence of its reliance on external suppliers.

Recognizing the above-mentioned flaws of the sequential design process, we propose a concurrent engineering (CE) framework that takes into consideration all of the above mentioned costs at the product and supply chain design stages (See Figure 2).

FIGURE 2
Proposed Concurrent Engineering Framework

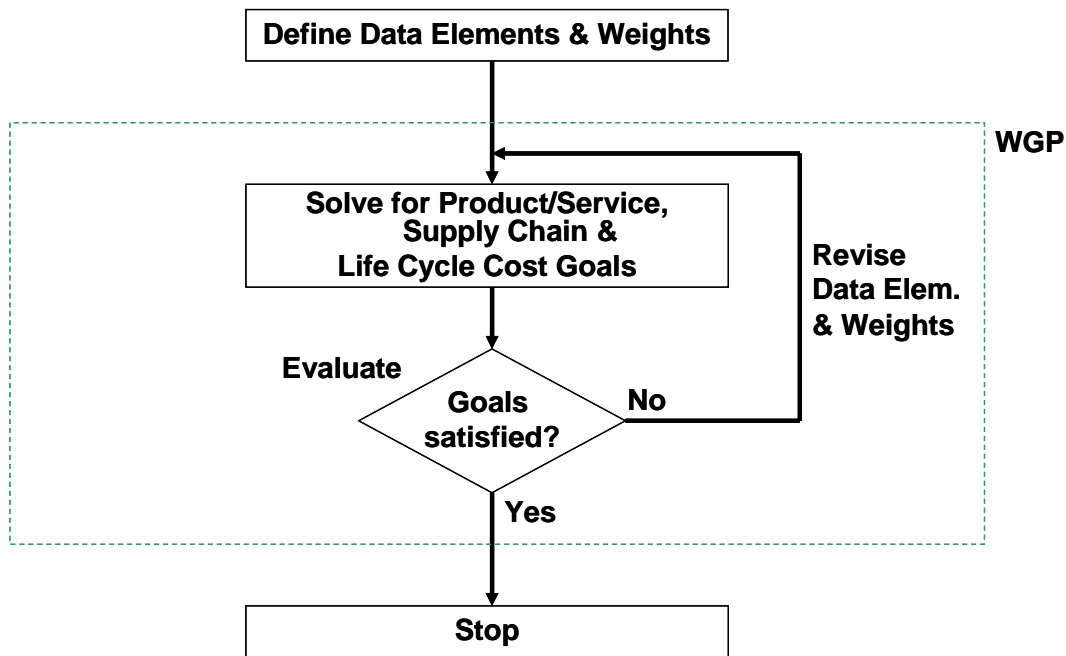


Our proposed concurrent engineering framework requires not only that design decisions are made in parallel and that different product and process issues be incorporated into the early stages of design [13] but also represents an approach to deal with the above discussed needs to adopt a life cycle cost approach and to incorporate strategic supply chain considerations in the design stage. In essence, the goal of our concurrent engineering framework is to ensure that all the impacts of the decisions are considered at the design stage, before actual full-scale production begins.

MODEL

Based on our proposed framework, we developed an optimization model that employs a Weighted Goal Programming (WGP) technique to simultaneously solve for the best configuration of product/service and supply chain (See Figure 3). Since designing a new product/service requires one to consider a large number of performance measures and trade them off against one another, Schniederjans *et al.* suggested that multicriteria methods should be used in new product development planning [27]. We used goal-programming (GP) as the modeling tool because it represents a flexible technique that can easily accommodate a large number of objectives and it has a large body of reported implementations in different modeling areas [4] [26] [29].

FIGURE 3
Weighted Goal Programming (WGP) Model



In their CE model, Fine, et al. focus on five goals common to product design and supply chain decisions—fidelity, cost, lead-time, partnership, and dependency—and use mathematical programming to determine an optimal solution. Their measure of fidelity describes “the degree to which the product element’s design conforms to the tasks it is intended to perform,” and their measures of partnership and dependency describe aspects of supply-chain risk and reliance on external suppliers [13].

However, a model that supports CE should also take into account a variety of costs and other performance measures associated with the various stages of the product life cycle. For this reason, our model includes various product design, supply chain, and life cycle cost goals inherent to the new product development process seeking to evaluate the impact of choosing a certain design alternative. The model takes into consideration different interactions between goals, such as the interaction between the customer fit and warranty costs, demonstrating the advantages of including data related to field failures at early stages of the NPD decision making process.

In order to accomplish our research objectives, we extended the model proposed by Fine, et al., transforming it into WGP model that includes not only product design and supplier related measures, but also forward supply chain and life cycle costs measures. In our product design decision, we seek to achieve a certain measure of fidelity while achieving specific marketing and manufacturing/assembly cost goals. Our supply chain design decision include target goals for lead-time, the number of suppliers, and the number of distributors while also taking into account different supply chain management cost goals. Finally, in our life cycle cost decision, we take into consideration specific goals related to maintenance, warranty, and disposal alternatives.

METHODOLOGY

To explore the validity of implementing a comprehensive concurrent engineering approach and compare it to the use of a sequential design approach, we developed an experiment that explicitly quantifies the tradeoffs among the model components that were described in the previous section.

Specifically, we developed a numerical example in order to demonstrate and validate the proposed model and framework. The experiment consisted of three parts. First, we constructed 30 instances of a NPD data set where the values of the parameters in each instance were randomly generated.

Second, using the Premium Solver Platform from Frontline Systems, Inc., we solved each instance using the two different approaches, first using a traditional sequential approach and then using our CE goal programming model. In the sequential design approach (see Figure 1), the different decisions were modeled as a sequence of three goal programs. Thus, the product/service design decision was addressed in the first place. Based on the product/service configuration selected in step one, the supply chain decisions were tackled next. Finally, based on the product/service and supply chain configurations selected in steps one and two, the maintenance and disposal decisions were considered last. The results of those decisions were then combined adding together the different life cycle costs (i.e., Total Life Cycle Costs = Design + Production + Maintenance + Disposal costs), and also adding together the deviations from the different supply chain and product/service life cycle goals.

In the case of our concurrent engineering model, we addressed all those decisions concurrently, determining the total deviation from the supply chain and product/service life cycle goals as well as the total life cycle cost simultaneously. Finally, we compared and analyzed the results of each approach in order to draw conclusions and implications.

RESULTS

The results of our model along with the results obtained from the sequential design approach are displayed in Table 1. A detail of the results obtained for each approach can be found on Appendix A.

TABLE 1

Summary of results for the concurrent engineering approach vs. the sequential design approach

	Approach	
	CE	Sequential
Average Total Life Cycle Costs (Design + Production + Maintenance + Disposal costs)	\$1,596,991.00	\$1,806,654.00*
Average Deviation from Goals (Supply Chain and Product/Service Life Cycle Goals)	7.15	9.39*

* Indicates statistically significant differences from the CE approach at the $\alpha = .05$ level (n = 30)

The outcomes of the experiment indicate that the CE model yields better solutions, on average, than the traditional sequential design model. Specifically, our proposed CE approach resulted in average total life cycle costs that were 11.61% lower than those obtained using the sequential approach. In addition, our proposed CE approach resulted in an average deviation from the goals that was 23.77% lower than the one obtained using the traditional sequential approach.

CONCLUSIONS AND IMPLICATIONS

The objective of this study was to develop a model to help determine optimal product/service, process and supply chain configurations in a concurrent fashion. For that purpose, we developed a concurrent engineering framework and an optimization model that incorporate supply chain design and life cycle costing concepts and applied it to a new product development example. The results of our model were then compared to the results from a sequential design approach. A number of relevant implications arise from this research study.

First, our results indicate that the concurrent engineering model provides solutions that are at least as good as the solutions obtained using the sequential design approach. The results clearly stress the importance of incorporating strategic supply chain considerations and adopting a life cycle cost approach early in the design stage.

On the other hand, the serial design process results in sub-optimal decisions because the decisions made at each stage represent locally optimal choices. Therefore, careful consideration must be given to addressing the impact that design decisions will have on the rest of a product's life cycle, as indicated by our results. By ensuring that all the impacts of the decisions are considered at the design stage, before actual full-scale production begins, our concurrent engineering model provides a way to overcome the limitations of the sequential design process.

Overall, our model represents a simple and suitable tool for enhancing and facilitating the development of new products and services. The model, which is unique in terms of incorporating supply chain design and life cycle costing concepts to solve new product/service development problems, can be applied to different manufacturing and services sectors. In addition, our concurrent engineering approach permits the inclusion of as many objectives as a firm requires.

Essentially, our model can be extended to any number of objectives by simply incorporating additional data elements for each objective.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Our model is subject to a limitation inherent to planning models: inaccurate parameter data can invalidate its informational benefits. An additional limitation of the model is its complexity since it requires the collection and processing of a substantial parameter database.

Additionally, the case data represents a simplified model in terms of the number of product and supply chain configurations. Even though the data used constitutes a representative, but certainly not exhaustive, new product design problem, the reduced scope and complexity is a limitation to our model's ability to accurately serve as a generalizable model. Further research using data of sufficient size and scope should be done in order to fully validate the proposed model. An ideal direction for future research would be to develop a case study in which the method will be implemented using real data.

The technique we used as our modeling tool was goal programming. This is a widely used multi-criteria decision making technique that has been employed in many application areas. However, we should note the potential weaknesses of this technique [29]. In particular, its sensitivity to changes in the goal values that are determined subjectively prior to the implementation of the model itself as well as the sensitivity to changes in the corresponding goal weights [23] [25]. As a consequence, the users of the WGP model should pay attention to the values they determine for the goals and weights. The goal programming literature offers alternative procedures for the determination of weights, such as the one proposed by Gass [16], which uses analytical hierarchy process to quantify weights, or the ones identified by Tamiz et al. [29].

Another interesting alternative to our WGP model would be to develop a multiobjective optimization model for concurrent engineering that incorporates fuzzy logic to represent different model components. The use of fuzzy logic to represent objectives as fuzzy membership functions or fuzzy sets is a suitable method for solving multiple criteria decisions that allows the decision maker to set preferences for goals when there is vague and unclear information.

Finally, different extensions to our concurrent engineering model can be identified. Since our WGP model is quite flexible, it can be extended to include different combinations of new product development and supply chain design goals in a concurrent fashion. In this sense, the model could be extended to include expected demand parameters (a forecast that would be generated by the marketing department using a forecasting model) to calculate expected profits. The model could also be extended to include other aspects that are relevant to in-house production (such as capacity utilization) in order to analyze the usage of the available production resources.

Overall, our preliminary results validate the concurrent engineering model and warrant further investigation. We hope that the present paper will represent the initial step towards the implementation of the aforementioned extensions.

APPENDIX A

The solutions for each model are detailed in the following table.

Replication #	Approach			
	Concurrent Engineering		Sequential Design	
	Total Life Cycle Costs	Deviation from Goals	Total Life Cycle Costs	Deviation from Goals
1	\$1,670,249.47	7.21	\$1,878,595.66	9.50
2	\$1,630,820.95	6.50	\$1,833,799.48	9.20
3	\$1,622,929.48	7.09	\$1,869,719.98	9.00
4	\$1,400,507.88	7.38	\$1,739,548.05	9.19
5	\$1,592,722.92	7.44	\$1,789,609.58	9.53
6	\$1,631,773.21	6.70	\$1,827,208.62	8.67
7	\$1,651,077.69	7.16	\$1,864,770.68	8.86
8	\$1,661,916.16	7.06	\$1,730,541.63	9.24
9	\$1,572,606.46	7.35	\$1,714,113.40	9.31
10	\$1,617,142.09	7.43	\$1,769,880.30	9.52
11	\$1,606,803.40	7.37	\$1,846,919.34	9.63
12	\$1,673,215.56	6.67	\$1,880,801.16	8.86
13	\$1,636,175.25	7.21	\$1,878,289.39	9.90
14	\$1,639,403.64	7.09	\$1,785,022.73	9.28
15	\$1,539,095.84	7.07	\$1,801,536.67	9.83
16	\$1,665,761.60	7.27	\$1,847,678.08	9.88
17	\$1,661,624.09	7.47	\$1,748,259.40	9.62
18	\$1,272,984.36	7.02	\$1,688,839.33	9.73
19	\$1,580,070.40	7.20	\$1,710,999.69	9.29
20	\$1,329,905.90	6.98	\$1,843,196.57	9.29
21	\$1,607,250.80	7.33	\$1,827,940.21	9.50
22	\$1,625,599.43	7.48	\$1,683,773.50	9.34
23	\$1,581,139.93	7.43	\$1,820,209.98	9.65
24	\$1,631,230.18	7.42	\$1,863,962.87	9.31
25	\$1,684,210.56	7.49	\$1,862,536.84	9.69
26	\$1,531,088.34	7.43	\$1,632,392.78	9.57
27	\$1,603,467.21	7.29	\$1,885,696.06	8.71
28	\$1,678,685.74	7.11	\$1,861,735.62	9.69
29	\$1,596,295.01	7.11	\$1,870,485.55	8.93
30	\$1,613,965.61	5.90	\$1,841,567.76	9.88

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SecCPFR – A Design Science Approach to Securing the Collaborative, Planning, Forecasting, and Replenishment (CPFR) Business Processes

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ABSTRACT

This paper addresses the lack of security and process integration of the Collaborative, Planning, Forecasting, and Replenishment (CPFR) approach. Following a design science paradigm, we develop an approach that allows for CPFR's business models to be represented using the atomic concepts of: intelligent agent, role, task, and resource. An ontological analysis and the development of the DL formalisms for the SecCPFR are presented. The proposed framework allows for the separation of duties (SOD) and permission-role assignments with semantic web technologies enabling CPFR processes to be executed in a secure and coordinated manner.

Keywords: *Design Science, CPFR, Role Based Access Control, Semantic Web, Secure CPFR*

INTRODUCTION

The “bullwhip effect”, which serially affects all the players in the supply chain, relates to the natural tendency of the supply chain to amplify, delay, and oscillate demand information (Forrester, 1958). Some of the main issues derived from the demand distortion are excessive inventory investments, poor customer service, lost of revenues due to shortages, and flawed investment decisions about capacity needs (Lee et al., 1997). Swaminathan and Tayur (2003) explain that the Collaborative, Planning, Forecasting, and Replenishment (CPFR) approach is a new and growing movement in industry to deal with demand uncertainty. CPFR aims to make pertinent information available to all member of the supply chain to improve its efficiency. In particular, seamless flow of information across the supply chain helps to coordinate and improve the accuracy of the critical demand forecasting and capacity planning information. The ultimate CPFR's goal is that buyer's purchases forecast and the seller's sales forecast match each other (Caridi et al. 2005). CPFR was developed as an industry effort to provide data models and high-level process maps for collaborative demand forecasting and planning.

According to the Voluntary Inter-industry Commerce Standards Association (VICS), several leading retailers and manufacturers have successfully adopted CPFR and have obtained benefits such as reducing working capital and fixed capital, reducing operation expensive, improved technology ROI, and growing sales (www.VICS.org). However, several barriers must be overcome to fully realize CPFR benefits. Barratt (2004) identifies the lack of information

accuracy, lack of process visibility, and fear of losing confidentiality of shared information prevent organizations from engaging in collaborative planning. In addition, CPFR guidelines do not include sharing process knowledge across partner organizations and do not consider how private and proprietary information and knowledge can be systematically and securely shared while maintaining information assurance concerns.

It has been recognized that one of the most important challenge for security researchers is how to integrate information sources across different organizations securely (Thuraisingham, 2005). In this research, we posit that CPFR business processes have a high level of inter-organizational information and knowledge sharing that demands a secure and coordinated environment to be executed effectively. Therefore, it is our research objective to enhance the security and knowledge sharing of the Collaborative, Planning, Forecasting, and Replenishment (CPFR) business processes by the application of semantic technologies. Based on the best of our knowledge, this is the first attempt to apply emerging technologies, such as semantic web technologies, to enhance the security of CPFR business processes.

To develop this research, we adopt the design science paradigm (Hevner et al., 2004; Walls et al. 1992) as a research method. Design science research addresses classes of problems that solve relevant and unsolved problems, or solve problems in a more effective and efficient manner. Design science research applies kernel theories from the knowledge domain to develop novel IT artifacts (Hevner et al. 2004). This paper is organized as follows. Section 2 presents the literature review and its analysis. Section 3 explains the conceptualization of the CPFR universe of discourse. Section 4 presents the description Logic model for knowledge representation of CPFR. Finally, we present the conclusions and future research.

LITERATURE REVIEW

In this research, we integrate streams of research in the areas of design science, access control, semantic web technologies, including intelligent agents, knowledge representation, and ontologies to enhance the security of CPFR.

Design Science Paradigm

The design science paradigm has its roots in the engineering and the sciences of the artificial (Simon 1996). Design science research addresses classes of problems that solve relevant and

unsolved problems, or solve problems in a more effective and efficient manner. In other words, design science is a fundamentally problem-solving paradigm (Hevner et al. 2004).

Benbasat and Zmud (2003) suggest that the IT artifact and its immediate nomological network should be the core of IS research. Hevner et al. (2004) highlights that the main contribution of design science research is the IT artifact per se. Several controversial IT artifact definitions exist in the literature. We refer the interested reader to Alter (2006) for a compendium of IT artifact definitions. Hevner et al. (2004, pp. 77) define an IT artifact as “constructs (vocabulary and symbols), models (abstraction and representations), methods (algorithms and practices), and instantiations (implemented and prototype systems)”. In this research, we adopt the Hevner et al. (2004) IT artifact definition.

Kernel Theories

Kernel theories from the application domain are applied, modified and/or extended (Hevner et al. 2004) to develop the theoretical basis for design artifact. Next we present the kernel theories that are used to develop the SecCPFR design artifact.

Access Control

Sharing valuable information and knowledge resources entails the risks of possible unauthorized access and usage that may lead to foregone returns on information and knowledge assets.

Research has identified that the most common security mechanisms used to overcome information security issues are the following: authentication mechanisms, authorization, access control, data integrity and data confidentiality policies, integrity of transactions and communications, non-repudiation, end-to-end integrity and confidentiality of message, audit trail, and distributed enforcement of security policies. Here, communication security addresses confidentiality and integrity of the data transmitted as well as non-repudiation, while access control addresses authentication, separation of duty (SOD), and delegation (Joshi et al 2001; Oh and Park 2003). The main objective of access control is, based on business rules, to grant or deny the access requested from a particular user. Access control requirements vary from one environment to another. In the enterprise environment, access control must maintain high degree of information sharing and strong confidentiality (Oh and Park, 2003).

Role-Based Access Control (RBAC) models classify the elements of the system into users, roles, permission, operations, and objects (system resources). The primary benefit of RBAC over previous security mechanisms such as mandatory access control and discretionary access control is the ability of RBAC to accommodate the changing roles of users. RBAC adds *roles* as a layer of abstraction to simplify the association between *users/actors* (agents) and *permission*. Access control policies that specify users' permissions to specific system resources are defined through

the relationships between users, roles and permissions. Sandhu et al. (1996) define a family of RBAC models that include role hierarchies and constraints that allow system administrators to assign users permissions to system resources using roles. Roles are organized and managed using role hierarchies that define the inheritance structure of roles. Role hierarchies for an organization commonly reflect the organizational structures and the hierarchy of responsibility in the organization. Constraints add pragmatic consideration and exceptions to the relationships role hierarchies and are a useful tool in implementing organizational policy for access to system resources (Park et. al, 2001). Because permissions to users are assigned through roles, the administration is made easier (Bhatti et al., 2004). Role-Based Access Control (RBAC) facilitates security administration by allowing organizations to centrally manage and control access to information and processing resources. It is important to mention that the National Institute of Standards and Technology (NIST) adopted RBAC as a National Standard in 2004 (csrc.nist.gov/rbac). In this research, we posit that by integrating RBAC's separation of duties and permission-role assignments with semantic web technologies enable CPFR processes to be executed in a secured and coordinated manner.

Semantic Web

The Semantic Web is an extension of the current Web in which information is given “*well-defined meaning*” to allow machines to “*process and understand*” the information presented to them (Berners-Lee et al. 2001). The Semantic Web vision comprises *Ontologies* for common semantics of representation and ways to interpret ontology; *Knowledge Representation (KR)* for structured collections of information and inference rules for automated reasoning in a single system; and *Intelligent Agent* to collect content from diverse sources and exchange data enriched with semantics (Berners-Lee et al., 2001). This vision provides the foundation for enhancing the security of CPFR. Developments in semantic technologies make semantic web content unambiguously computer-interpretable and amenable to agent interoperability and automated reasoning techniques (McIlraith et. al., 2001).

Ontology

Even though the word ontology comes from Philosophy, where it means a “systematic explanation of being”, research about ontology has become a very pervasive phenomenon in the computer science field (Guarino, 1998). In general terms, ontologies provide a shared and common understanding of specific domains that can be communicated between disparate application systems, and therein provide a means to integrate the knowledge used by online

processes employed by organizations (Klein et al., 2001). Ontology describes the semantics of the constructs that are common to the online processes, including descriptions of the data semantics that are common descriptors of the domain context. Ontology documents can be created using standardized content languages like BPEL, RDF, OWL, and DAML to generate standardized representations of the process knowledge (Sivashanmugam et al., 2004; Thomas et al., 2006).

Moreover, Jasper and Uschold (1999) identify that ontologies can be classified into: a) ontology for knowledge reuse; b) ontology as specification; c) ontology as a provider of common access of heterogeneous information; and d) ontology as a search mechanism. In this research, we develop ontologies that are aimed at enhancing the security and information sharing of organizations adopting or currently using the CPFR approach. Such ontologies will be used to alleviate the interoperability and semantic problems related to integrating disperse and heterogenous information systems.

Selecting the language for the implementation of the ontology is one of the most crucial tasks in the ontology development process. Several ontology languages have been developed. In fact, at least 11 different languages can be identified from literature: KIF, Ontolingua, LOOM, OCML, FLogic, SHOE, XOL, RDF(S), OIL, DAML+OIL, and OWL (Gomez-Perez et al., 2004). The reader is referred to Gomez-Perez et al. (2004) for a comprehensive explanation of each ontology language. For this research, we select *SHIQ* Descriptions logics, which is equivalent to DAML+OIL, presented by Li and Horrocks (2004) to develop the ontologies for the SecCPFR.

Description Logics

Description logics (DL) are logical formalisms for knowledge-representation (Li and Horrocks, 2004; Gomez-Perez et al., 2004). A description logics is divided into two parts: 1) T-BOX, which contains intentional knowledge in the form of a terminology and is built through declarations that describe general properties of concepts; and 2) A-Box, which contains extensional knowledge, which is specified by the individual of the discourse domain (Baader et al., 2003; Gomez-Perez et al., 2004). DL provide a formal linear syntax to express the description of top-level concepts in a problem domain, their relationships and the constraints on the concepts and the relationships that are imposed by pragmatic considerations in the domain of interest. The basic description logics language is the *AL* (Attributive *Language*) which provides a minimal set of concept descriptions including atomic concept, atomic concept negation (\neg), concept intersection ($C \sqcap D$), universal value restrictions ($\forall R.C$), and limited existential value restriction ($\exists R.C$). We refer the

interested reader to Bader, et. al., (2003) for a full explanation of description logics notations, theoretical foundations and applications. In this study, we adopt the *SHIQ* Descriptions logics presented by Li and Horrocks (2004). Li and Horrocks argue that *SHIQ*'s expressive power made it to be equivalent to DAML+OIL. In addition, OWL is based on the SH family of description logics which supports Boolean connectives, including intersection, union and complements, restrictions on properties transitive relationships and relationship hierarchies.

DL-based knowledge representation provides the formalism to express structured knowledge in a format amenable for normative reasoning by intelligent software agents. In this research, we develop DL-based semantic knowledge representation including the access control constraints for CPFR demand forecasting business processes.

Intelligent Agents

An intelligent agent is "a computer system situated in some environment and that is capable of flexible autonomous action in this environment in order to meet its design objectives" (Jennings and Wooldridge, 1998). The agent paradigm can support a range of decision-making activity, including information retrieval, generation of alternatives, preference order ranking of options and alternatives, and supporting analysis of the alternative-goal relationships. The specific autonomous behavior expected of intelligent agents depends on the concrete application domain and the expected role and impact of intelligent agents on the potential solution for a particular problem for which the agents are designed to provide cognitive support (Muller, 1997).

Agents have been conceived to be a key technology to solve the problems related to communications in distributed environments (Liang and Huang, 2006). Recently, agent technologies have been applied in the context of supply chains (Nissen and Sengupta, 2006). Sikora and Shaw (1998) develop and validate a multi-agent framework for the coordination and integration of heterogeneous information systems. Their work illustrates how agents can be used to represent organizational functions. Nissen and Sengunta (2006) study the application of agent technologies in supply chain. In particular, they successfully demonstrate how agents can be used to automate and facilitate procurement activities and decisions in the area of maintenance, repairs, and operations (MRO). Liang and Huang (2006) develop a multi-agent-based demand forecast systems where agents share information and forecasting knowledge to control inventory and minimize the total cost of supply chain. In this research, we posit that *Intelligent Agents* can be effectively used to support CPFR business processes.

Collaborative Planning, Forecasting, and Replenishment (CPFR)

In essence, successful supply chain management involves the coordination of activities performed by independent companies in order to deliver a product or service to the end customer (Lee and Whang, 1998). However, several factors have been identified to affect the success of supply chains. Demand uncertainty has always been a topic of interest for the academic and practitioner communities. In this regard, one of the most interesting phenomena in demand forecasting is “bullwhip effect” or “Forrester effect”.

Several efforts have been made to alleviate the “bullwhip effect”. For instance, Swaminathan and Tayur (2003) explain that a new and growing movement is taken place in the industry. This new movement is known as the collaborative planning, forecasting, and replenishment (CPFR) approach. The rationale behinds CPFR is that because the information is made available to all member of the supply chain, the supply chain operations become more efficient. The key is that the forecast is coordinated and it conveys richer information. According to the Voluntary Inter-industry Commerce Standards Association (VICS), several leading retailers and manufacturers have successfully adopted CPFR and have obtained benefits such as reducing working capital and fixed capital, reducing operation expensive, improved technology ROI, and growing sales (www.VICS.org).

After analyzing CPFR’s technical guideline, we realized that such guidelines do not include sharing process knowledge across partner organizations and do not consider how private and proprietary information and knowledge can be systematically and securely shared while maintaining information assurance concerns. Similarly, Barratt (2004) identifies the lack of information accuracy, lack of process visibility, and fear of loosing confidentiality of shared information prevent organizations from engaging in collaborative planning. In next section, we illustrate how a core CPFR business process can be secured through the application of RBAC and semantic web technologies.

DESIGN OF SECURE CPFR (SECCPFR)

Kishore et. al (2006) investigate the characteristics of the multi-agent-based integrative business information systems (MIBIS) universe based on the literatures in both the integrative business information systems (IBIS) and multi-agent systems domains. They propose eight minimal ontological foundation constructs for the MIBIS universe of discourse, including *goal*, *role*, *interaction*, *task*, *information*, *knowledge*, *resource*, and *agent*. Likewise, (Singh and Salam,

2006) proposed that essential set of concepts fundamental to model eBusiness Processes are: *business enterprise, agent, business activity, resource, coordination, information and knowledge.*

Being consistent with previous research in MIBIS, eBusiness Processes, access control, and based on the CPFR's business processes, we proposed that CPFR's business models can be represented using the following atomic concepts: *agent, role, task, and resource.* Figure 1 shows the different atomic concepts and their relationships for the SecCPFR.

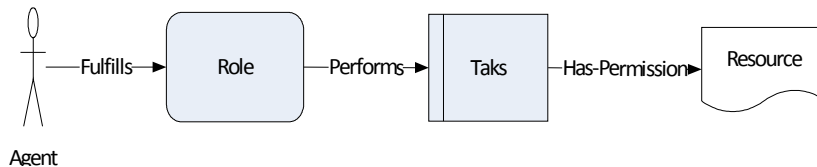


Figure 1. SecCPFR's Atomic Concepts- Universe of Discourse

A SecCPFR business process can be formulated as a quadruplet $SecCPFR=f(Ag,RI,T,R)$; where, *intelligent agents* (Ag) represent business organizations and fulfill roles (RI) and are capable of performing *tasks* (T) that consume and/or produce information *resources* (R) needed to achieve a CPFR business goal. We formalize the definition of the atomic concepts of SecCPFR as follows:

- Definition 0:** *Be= Business enterprises* are represented by agents
- Definition 1:** *Ag=Intelligent agents* perform activities on behalf of business enterprises to enact eBusiness processes
- Definition2:** *RI= Based on access control policies, Resources* allow *Activities* to be performed on them.
- Definition 3:** *Activities= Activities* require access to *Resources* in order to perform business tasks
- Definition 3.1:** *Activities* have permission to read, create, delete, and write *Resources*
- Definition 4:** *R= Resources* are either consume or produce by *Activities*
- Definition 4.1:** *Resources* permit *Activities* to read, create, delete, and write them

Here, *information* and *knowledge* are central resources. They are used by actors in business enterprises to perform their assigned tasks in order to accomplish their goals. To prevent unauthorized access to resources (information and knowledge), the proposed framework grants or revokes permissions based on the roles assigned to each intelligent agent and the tasks that the resources allow to perform on them.

The Description Logics for SecCPFR's Atomic Concepts are presented in table 2.

Atomic Concept	Description	Description Logics
Agent	An Agent concept represents a Business Enterprise and fulfills a Role for the Business Enterprise.	$Agent \subseteq (\geq 1 \text{ Represents} \cdot \text{BusinessEnterprise}) \wedge (\geq 1 \text{ Fulfills} \cdot \text{Role})$
Role	A Role concept is fulfilled by an Agent and performs at least one Business Activity	$Role \subseteq (\geq 1 \text{ IsFulfilledBy} \cdot \text{Agent}) \wedge (\geq 1 \text{ Performs} \cdot \text{Task})$
Task	A Task is performed by a Role, has at least one permission to a Resource, coordinates Resources and has a Begin Time and End Time.	$Task \subseteq (\geq 1 \text{ hasLabel} \cdot \text{StringData}) \wedge (\geq 1 \text{ isPerformedBy} \cdot \text{Role}) \wedge (\geq 1 \text{ hasPermission} \cdot \text{Resource}) \wedge (\geq 1 \text{ isCoordinatedBy} \cdot \text{Resource}) \wedge (= 1 \text{ hasBeginTime} \cdot \text{DateTimeData}) \wedge (= 1 \text{ hasEndTime} \cdot \text{DateTimeData})$
Resource	A Resource is a thing owned by exactly one Business Enterprise and permits Business Activities to perform operations on it and coordinates Business Activities	$Resource \subseteq (= 1 \text{ hasID} \cdot \text{StringData}) \wedge (\geq 1 \text{ Permits} \cdot \text{Task}) \wedge (\geq 1 \text{ Coordinates} \cdot \text{Task})$

Table 2. The Description Logics for SecCPFR’s Atomic Concepts (Adapted from Singh and Salam 2006)

An Illustrative Example of SecCPFR

Even though all CPFR business processes are important, we select the core business process of *Create Order Forecast* to initially evaluate our design artifact. We illustrate how the atomic concepts of the Universe of Discourse can be used to enhance and model the security of CPFR. *Create Order Forecast* process has been identified as strategic and tactical process (Caridi et al., 2005) and involves and requires high degree of collaboration, security, and integration. Figure 3 depicts the dataflow of the *Create Order Forecast* process. The *Create Order Forecast* dataflow describes the information exchanged in an initial order forecast for products within a planning period. (CPFR Technical Specifications, VICS 1999).

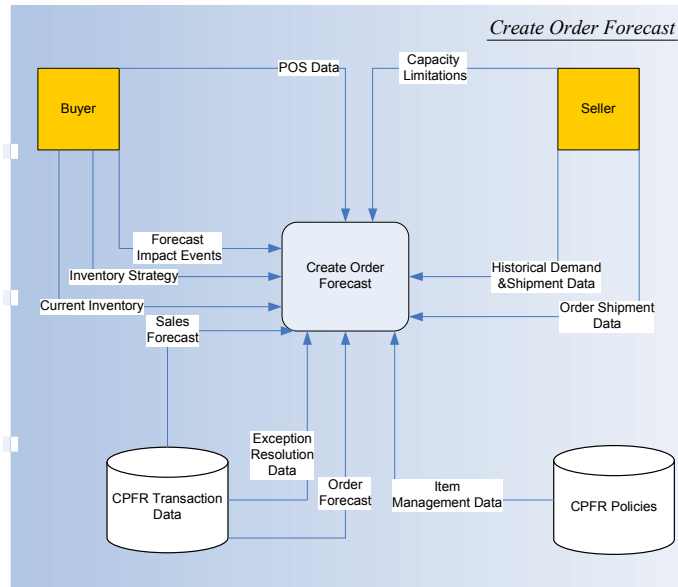


Figure 3. *Create Order Forecast* Data Flow (Adapted from CPFR Technical Specifications, VICS 1999)

An analysis of those business processes allows us to identify the following atomic concepts:

- i) Agents: Buyer agent, Seller agent
- ii) Tasks: Communicate POS Data; Communicate Forecast Events; Communicate Inventory Strategy; Communicate Current Inventory; Communicate Order; Communicate Capacity Limitation; Communicate Historical Demand & Shipment; Communicate Order Shipment Data; Create Order Forecast;
- iii) Resources: POS Data, Forecast Impact Events, Inventory Strategy, Current Inventory, Sales Forecast, Exception Resolution Data, Order Forecast, Capacity Limitation, Historical Demand & Shipment Data, Item Management Data.

Buyer agents and Seller agents represent Sellers and Buyers respectively in the *Create Order Forecast* process. Figure 4 shows how the *Create Order Forecast* process can be mapped using the atomic concepts of SecCPFR.

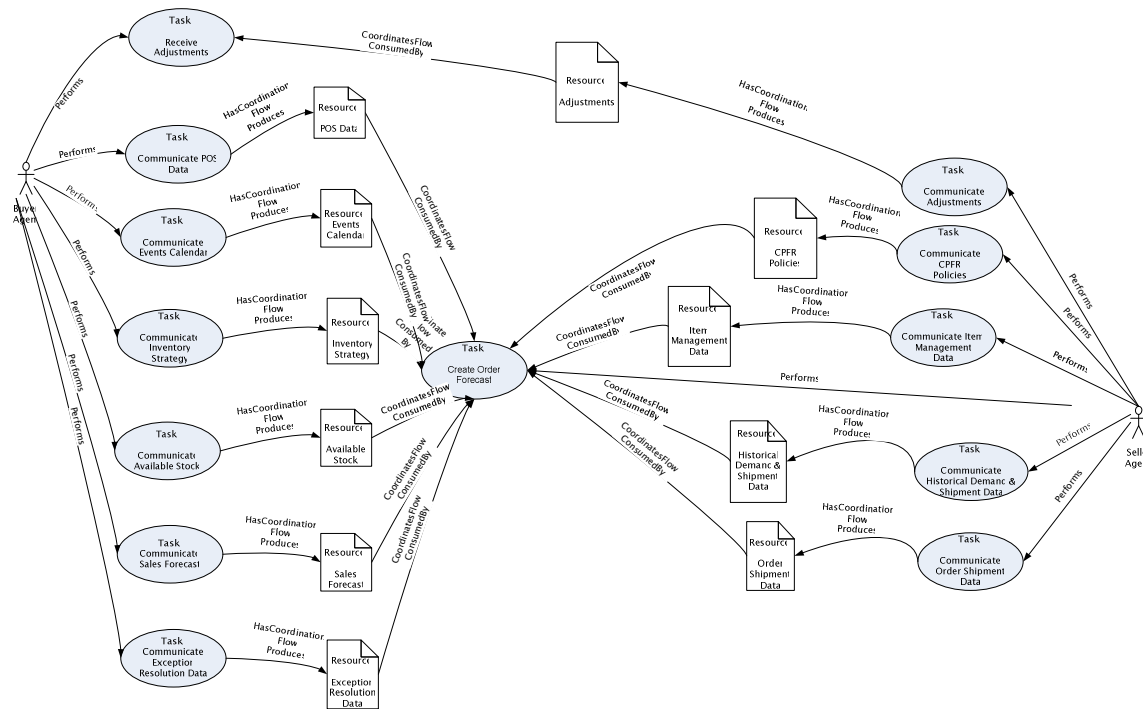


Figure 4. Semantic activity-resource coordination in *Create Order Forecast* Process

After mapping the core business processes of CPFR, it is clear that the security knowledge does not form part of the CPFR technical specifications. Here, CPFR is enhanced by incorporating the roles-activities permissions needed to perform planning and forecasting activities. Using the RBAC model (Sandhu et al., 1996), we show, in Table 3, the role-activity-resource permissions for CPFR's *create order* business process. In addition, based on the universe of discourse, the semantic activity-resource coordination depicted in Figure 4, and the VICS-CPFR data model, we develop the Description logics (DLs) to represent the buyer and seller characteristics along with all the resources involved in the processes of Create Order Forecast.

Role	Fulfilled by	Business Activity	Permission Type (Write, Read, Create, Delete)	Resource
BuyerRole	Buyer Agent	Communicate POS Data	Read/Write	POS Data
		Communicate Forecast Events	Read/Write	Forecast Impact Events
		Communicate Inventory Strategy	Read/Write	Inventory Strategy
		Communicate Current Inventory	Read/Write	Current Inventory Data
		Communicate Order	Read/Write	Order

SellerRole	Seller Agent	Communicate Capacity Limitation	Read/Write	Capacity Limitations
		Communicate Historical Demand & Shipment	Read/Write	Historical Demand & Shipment Data
		Communicate Order Shipment Data	Read/Write	Order Shipment Data
		Create Order Forecast	Read/Write	Order Forecast Sales Forecast Exception Resolution Data Item Management Data POS Data Forecast Impact Events Inventory Strategy Current Inventory Capacity Limitations Historical demand & Shipment Data Order Shipment Data
			Create/Write/Read	Order Forecast

Table 3. RBAC for role-activity-resource permissions for the CPFR's *Create Order* business process

Next, we provide the ontological engineering using DL-based definitions for the activity resource coordination for CPFR. We utilize DL as the knowledge representation formalism for expressing structured knowledge in a format that is amenable for intelligent software agents to reason with it in a normative manner. Understanding the inherent relationships among business processes within and between organizations is a key topic of the information systems field. The use of standard description logics in developing semantic models allow this approach to be a truly implementable framework using W3C's OWL(Web Ontology Language) and OWL-DL without losing theoretical robustness. It is important to highlight that these demand requirement characteristics are intended to serve as examples and are not exhaustive.

Due to space limitation, we only provide the DL for Buyer Agent and its role; Seller Agent and its role; POS Data, and Communicates *POSData*:

A buyer agent represents a buyer business enterprise as it follows:

$$\begin{aligned}
 BuyerAgent \subseteq & \\
 & (=1 Represents. Buyer) \wedge \\
 & (=1 Fulfills. BuyerRole)
 \end{aligned}$$

A buyer can only perform the tasks associated with the *BuyerRole* as it follows:

$$\begin{aligned} \text{BuyerRole} \subseteq & \\ & (=1 \text{ isRepresentedBy} . \text{BuyerAgent}) \wedge \\ & (=1 \text{ Performs} . \text{CommunicatePOS}) \wedge \\ & (=1 \text{ Performs} . \text{CommunicateForecastEvents}) \wedge \\ & (=1 \text{ Performs} . \text{CommunicateInventoryStrategy}) \wedge \\ & (=1 \text{ Performs} . \text{CommunicateCurrentInventory}) \wedge \\ & (=1 \text{ Performs} . \text{CommunicateOrder}) \end{aligned}$$

A seller agent represents a seller business enterprise as it follows:

$$\begin{aligned} \text{SellerAgent} \subseteq & \\ & (=1 \text{ Represents} . \text{Seller}) \wedge \\ & (=1 \text{ Fulfills} . \text{SellerRole}) \end{aligned}$$

A seller can only perform the tasks associated with the *SellerRole* as it follows:

$$\begin{aligned} \text{SellerRole} \subseteq & \\ & (=1 \text{ isRepresentedBy} . \text{SellerAgent}) \wedge \\ & (=1 \text{ Performs} . \text{CreateOrderForecast}) \wedge \\ & (=1 \text{ Performs} . \text{GenerateOrder}) \wedge \\ & (=1 \text{ Performs} . \text{CommunicateCapacityLimitation}) \wedge \\ & (=1 \text{ Performs} . \text{CommunicateHistoricalDemandShipment}) \wedge \\ & (=1 \text{ Performs} . \text{CommunicatesOrderShipment}) \wedge \\ & (=1 \text{ Performs} . \text{CommunicatesReceiveOrder}) \end{aligned}$$

Buyers communicate their POS Data using standardized ontology for specifying the resource.

$$\begin{aligned} \text{POSData} \subseteq & (\text{Resource}) \wedge \\ & (= 1 \text{ hasID} . 1) \wedge \\ & (= 1 \text{ CoordinatesFlowProducedBy} . \text{CommunicatePOS}) \wedge \\ & (= 1 \text{ CoordinatesFlowConsumedBy} . \text{CreateOrderForecast}) \wedge \\ & (= 1 \text{ Permits} . \text{CommunicatePOS}) \wedge \\ & (= 1 \text{ Permits} . \text{CreateOrderForecast}) \end{aligned}$$

The buyer agent communicates *POSData* to coordinate the *Create Order Forecast* activity.

$$\begin{aligned} \text{CommunicatePOSData} \subseteq & (\text{Task}) \wedge \\ & (= 1 \text{ IsPerformedby} . \text{BuyerRole}) \wedge \\ & (= 1 \text{ HasCoordinationFlowProduces} . \text{POSData}) \wedge \\ & (= 1 \text{ HasPermissionRead} . \text{POSData}) \wedge \\ & (= 1 \text{ HasPermissionWrite} . \text{POSData}) \end{aligned}$$

Using Protégé (www.protege.stanford.edu), we develop the T-BOX for SecCPFR design artifact. We use tools like Protégé and Racer (www.racer-systems.com) to verify the conformance to DL formalism and modeling requirements and model consistency of the DL for the SecCPFR. Protégé generates OWL-DL for schema and instance level documents for verification and implementation of semantic knowledge representations

that can be used by intelligent agents to reason and make inferences. DL-based knowledge representation provides the formalism to express structured knowledge in a format amenable for normative reasoning by intelligent software agents, which provide the foundation for semantic interoperability among heterogeneous systems.

CONCLUSIONS AND FUTURE RESEARCH

Following a design science paradigm, we integrate research streams in the areas of access control and Semantic Web technologies to develop a theoretically grounded approach to enhance the security of CPFR business processes. Based on RBAC (Sandhu et al., 1996), a national security standard adopted by the National Institute of Standards and Technology (NIST) and the ontological foundation constructs for the multi-agent-based systems (MIBIS), we proposed the universe of discourse for the SecCPFR. Our universe of discourse, represent the CPFR's business models using the four atomic concepts: *agent, role, task, and resource*. SecCPFR enhances CPFR business processes by providing systematic mechanisms that prevent unauthorized access to information resources, provide non-repudiation mechanisms, and allow for segregation of duties. Our general framework in this paper uses description logics as the theoretical basis. This framework was presented using DL formalism for theoretical soundness. This forms the basis for the development of machine interpretable knowledge representation in the OWL-DL format.

Finally, we showed a description logics model knowledge representation of the business process of *Create Order Forecast* of CPFR as an illustrative example. All DL knowledge representations presented in this paper have been developed, validated and checked for consistency using Protégé and Racer. As future research, we plan to map and develop the DL formalisms for all the CPFR business processes and to perform simulations and experiments to demonstrate the validity of the proposed framework.

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