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# **ACCOUNTING MAJOR PROGRAM ASSESSMENT: IMPROVING CURRICULUM PERFORMANCE WITH MAJOR SPECIFIC EXIT EXAMINATIONS**

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## **ABSTRACT**

U.S. business schools fail to lead in advocating culminating assessment devices in their undergraduate programs. Successes at the secondary level both in the United States and abroad suggest that much more could be done in higher education, especially in the practical professions including accounting. This paper describes the efforts of one university in developing a major assessment instrument delivered to all of its graduates in its BBA accounting program, and suggests improvements on its five-year experience as to how curriculum can be better measured and improved. Well-orchestrated efforts by faculty in developing and modifying a comprehensive curriculum instrument over time can generate substantial gains for both teachers and learners.

## **INTRODUCTION**

Regional accreditation bodies in the United States, and international accreditation associations such as AACSB, have been promoting faculty activities for work on student success in knowledge retention devices, assurance of learning, and assessment controls (Martell & Calderon, 2005; AACSB, 2006). While the ETS has developed a major field test examination, there is little else available for universities at the standardized level to employ. Needed is an instrument that focuses on the major area, accounting, and allows for subject (course) and item analysis over time.

## **RESEARCH ISSUES**

The need for analysis of strength of the accounting major is especially important as accounting is clearly a professional distinction within B-Schools much less blurred than other disciplines. (AAA, 1986; Arthur Andersen, et al., 1989). Employers seek graduates that can turnkey as much material as soon as possible (AECC, 1990; AACSB, 2006; AICPA, 2006). In both public accounting and private industry, the expectation continues that recruits should be able to converse with the common body of knowledge of the profession.

## **INSTRUMENT DESIGN**

The major specific exit exam (MSEE) in accounting studied in this paper was originally conceived as being administered every other semester in the capstone strategy course to the BBA program in the AACSB accredited College of Business at this mid-size public university in the Southeast. In this way, students from the other majors—management, marketing, supply chain, and general business would each have their own exam. In the alternating semesters, the ETS major field test was planned to be administered. Since the course housing this terminal testing experience was not accounting, special arrangements had to be made with lock-down computer controls, adherence to time, and procedures to insure proper test to proper student inside of controlled library facilities. It was believed by the faculty that both the ETS and the MSEE could not be run in the same semester, as the course site also had other capstone experiences-COMP-XM and simulation requirements.

After several administrations, the accounting faculty were able to move the test site out of the capstone BBA course, and into the culminating course in the Accounting major, Auditing and Assurance Services.

Generally, students would be taking both the general BBA capstone and the Accounting major course in the same, final semester, but this enhancement made for better logistics. Initially the number of questions on the MSEE was a total of only 50 multiple choice questions, but in the past few administrations we have expanded to 75 to address all the outcomes. Item analysis of the individual question results is an ongoing process. Summary results of the MSEE to date appear in the following tables.

### ASSESSMENT RESULTS

The College of Business has seven desired learning outcomes in its BBA program:

- Communication skills
  - Written
  - Oral
- Ethical and social responsibility
- Thinking skills
- Interpersonal skills and appreciation for diversity (teamwork)
- Use of technology in business
- Dynamics of the global economy
- Knowledge of the business environment

Appendix A illustrates how these learning outcomes at the BBA level serve as the component framework of the College’s comprehensive assurance of learning plan for the BBA and illustrates how these integrate with various assessment methods.

A formal Assessment Committee meets and establishes guidance for a variety of assessments across the BBA program. Student awareness of the holistic plan is critical, and formal exit testing in the major is key to the assessment design. Appendix B provides the basics for the plan, and is actually a page drawn from the syllabus of the culminating course (auditing and assurance services) in the BBA-Accounting program. Appendix B also shows the individual learning outcomes, and weights as tested on the MSEE.

The accounting faculty were interested in targeting “Knowledge of Business” especially as it applied to the accounting discipline, but would not intentionally exclude questions that might surface pertaining to other outcomes. Faculty were interested not only in assurance of learning on part of the student, but also on improvements in teaching on the part of the faculty. Accordingly, analysis of the assessment results each term provided an excellent forced review of actions taken to date, analysis of current data, plans for future semesters, and overall closing the loop in the teaching and learning process. The faculty agreed that once weak questions were identified, they would be monitored over semester semesters, and if proven continuously weak, then eventually replaced with questions that were presented with greater clarity.

**Table 1: Spring and Fall 2008 Semesters—BBA Capstone Course Site**

Accounting Major Learning Outcome	Question Count	Student Count (n)	Weighted Count	Correct Responses	Percentage Correct
1a Financial	20	37	740	366	49%
1b Managerial	10	37	370	217	59%
1c Tax	10	37	370	164	44%
1d/e AIS/Auditing	10	37	370	161	44%
Composite	50	37	1,850	908	49%

Table 1 shows the results of our first reporting period on this type of assessment. While the College of Business had a well-lubricated program of individual course embedded assessments of every major course in the discipline at least once per year, we had no prior experience of having such a wide-scale broad major field test, and especially in individual majors. Individual faculty in the Accounting Discipline typically hold expectations that performance as measured by the percentage correct would likely be uniform over the four accounting major learning outcomes.

The data analysis in Table 1 also reveals that the courses in Accounting Information Systems/Auditing and Tax pulled the average down with Managerial served as the sole outcome above the average. The Institution had experimented with a combined course for Accounting Information Systems with Auditing & Assurance Services for several years. The data in Table 1 reflect the limitation of accounting major outcomes 1d and 1e to a total of 10 questions. We subsequently reverted to a more standard curriculum of having separate courses for AIS and Auditing, and this lent itself well to having 10 questions in each discipline area outcome.

The Accounting Faculty are not pleased with the results. All questions were reviewed for clarity and reasonableness and found to be appropriate. The faculty decided to review especially all questions where 50% or fewer students answered the questions correctly. 70% correct was believed to be a great target to achieve, but several forces worked against student performance. Length of time since student took specific courses where the outcome components are addressed, several students not having had all the appropriate accounting coursework when they sat for the assessment in the capstone management class, and the absence of a longer testing history, all contributed to faculty thinking to hold strong on the current instrument for another semester. The faculty considered a number of issues that may affect improvements, including curriculum reform, including residency requirements, course sequencing, and statute of limitations on course credit.

**Table 2: Spring 2009 Semester—BBA Capstone Course Site**

Accounting Major Learning Outcome	Question Count	Student Count (n)	Weighted Count	Correct Responses	Percentage Correct
1a Financial	20	24	480	211	44%
1b Managerial	10	24	240	135	56%
1c Tax	10	24	240	108	45%
1d/e AIS/Auditing	10	24	240	135	56%
Composite	50	24	1,200	589	49%

Table 2 describes the results from the second reporting period of the Accounting MSEE. The Accounting Faculty were looking forward to analyzing these results at both the separate learning outcome level as well as at the specific question level. While the Accounting Information Systems/Auditing components increased, and the Managerial remained relatively high, low performances continue in the Financial and Tax. We have noted that the higher performing areas tend to be those which the student is currently studying, or has studied more recently than the other areas. Knowledge retention assessments are run in separate accounting courses but this practice is not done in the BBA Strategy capstone course.

The overall composite score of 49% correct (identical to the prior year) was viewed as unacceptable for the long run by the Accounting faculty. All questions were reviewed for clarity and reasonableness and six of the 50 were identified as being possibly ambiguous (See Appendix C). Item analysis results verified that these questions were low in performance correct. The Accounting Faculty determined that curriculum reform was necessary and drafted proposals for Catalog changes affecting the Accounting Major, strengthening the program, with specific additional outcomes of business application software



knowledge and accounting profession and ethics. In addition, the outcomes of Accounting Information Systems and Auditing became separated to agree to specific course areas now required for students entering under more recent Catalogs. The Assessment Committee of the College of Business charged the Discipline Faculty with revising the instrument (the MSEE) to agree to these modifications.

**Table 3: Fall 2010 Semester—BBA Capstone Course Site—Updated 75 Questions**

Accounting Major Learning Outcome	Question Count	Student Count (n)	Weighted Count	Correct Responses	Percentage Correct
1a Financial	20	18	360	210	58%
1b Managerial	10	18	180	102	57%
1c Tax	10	18	180	59	33%
1d AIS	10	18	180	101	56%
1e Auditing	10	18	180	88	49%
2 Software Apps	7	18	126	71	56%
3 Prof / Ethics	8	18	144	68	47%
Composite	75	18	1,350	699	52%

In Spring Semester, 2010 a change was made to include new questions, and these changes were continued into Fall Semester, 2010. Table 3 includes data for our fourth reporting period (fifth semester) on the Accounting MSEE, and the second semester expanding to 75 (rather than 50) questions, discarding unreliable questions, and attempting to build an assessment that measures student performance in achieving learning outcomes. The Accounting faculty responded to the Assessment Committee's concerns for assuring clarity in the questions by reviewing all questions and effecting replacement on four of the 75 questions. Table 4 illustrates the improved success made with the question replacements.

The overall composite score increased from 49% to 52%. The faculty continue to be concerned with a performance weakness in the tax learning outcome—still at 33%. On the other hand, the faculty are pleased with student performance increasing on the software applications learning outcome from 42% to 56%. The faculty are also satisfied that question improvements on the four questions make for a stronger assessment:

**Table 4: Student Results following Question Enhancements**

Learning Outcome	Question Reference Number	Percentage Correct Fall 2009	Percentage Correct Fall 2010
1a Financial	001	6%	33%
1a Financial	019	33%	83%
1b Managerial	029	50%	89%
1c Tax	031	11%	39%

Faculty Discipline meetings invested time to discuss the current data results. Faculty syllabi, teaching delivery, and other factors were evaluated. Sequencing Accounting Information Systems (ACCT 4330), Taxation of Individuals (ACCT 3250), along with Intermediate Financial Accounting II (ACCT 3352), as required pre-requisites to the Auditing and Assurance Services Course (ACCT 4480), and with improvements sought at the University level for residency and historical time limitations on ACCT course

work were thought to strengthen the overall product. The Accounting Faculty looked forward to having the Major Specific Exit exam housed in ACCT 4480, the culminating course in the Major.

**Table 5: Fall 2011 Semester—Auditing Course Site—75 Questions—15% Grade Component**

Accounting Major Learning Outcome	Question Count	Student Count (n)	Weighted Count	Correct Responses	Percentage Correct
1a Financial	20	14	280	174	62%
1b Managerial	10	14	140	75	54%
1c Tax	10	14	140	59	42%
1d AIS	10	14	140	77	55%
1e Auditing	10	14	140	100	71%
2 Software Apps	7	14	98	45	46%
3 Prof / Ethics	8	14	112	61	54%
Composite	75	14	1,050	591	56%

Table 5 provides the results for the fifth reporting period (sixth semester) on the Accounting MSE, and the third semester expanding to 75 (rather than 50) questions, discarding unreliable questions, and attempting to build an assessment that measures student performance in achieving learning outcomes. It should especially be noted that the risk factor student perception likely changed with this administration as well, with a heavier weighting of the exam as component into the student’s final course grade in the Auditing & Assurance Services course. The Accounting faculty responded to the Assessment Committee’s concerns for assuring clarity in the questions by reviewing all questions and effecting replacement on four of the 75 questions.

Until the Fall 2011 Semester, the assessment was administered in the BBA capstone Strategic Management course, with course weight on that course final grade of 7.5%. With the relocation of the assessment to the Auditing & Assurance Services course, the Accounting Major Culminating course, weight was increased to 15% of final grade (as was agreed to do by all Discipline Majors within the College of Business for the Fall 2011 administration). The faculty are pleased with the increasing progression of successful responses by the accounting majors, as shown comparatively in the following Table 6 with immediate two prior administrations of the MSE.

**Table 6: Student Results following Enhancements on Questions and Grade Weighting**

Semester (and n)	Possible Points	Mean Actual Points	Percentage Correct	Mean Exam Time
Fall 2009 (18)	75	35.6	47.5%	1:27:18
Fall 2010 (18)	75	38.7	51.6%	1:42:59
Fall 2011 (14)	150	84.4	56.3%	1:51:35

Faculty believe the increased mean examination time is a favorable indicator, as students perceive there is more at risk relative to final grade, and that their results affect the final grade in the culminating course of their major, and the GPA of their major.

Based upon the three year trend in Table 6, the overall composite score increased from 48% to 52%, and then to 56%. The faculty continue to be concerned with a performance weakness described in Table 6 in

the tax learning outcome—improving from 33% to 42%, but still less than any satisfactory benchmark of 50%. Also, the software applications outcome which did improve from 2009 (42%) to 2010 (56%), dipped down to 46%, possibly attributable to the fact that not all students took their entire curriculum at our Institution. The greatly improved results on the auditing outcome, from 49% to 71% is not unexpected, as all students were captive to that course this semester, and for the first time, all students had all pre-requisites for the MSEE in the culminating course. With the previous housing in the BBA capstone Strategic Management course, there were always students who did not have the ACCT 4480 because of timing issues where students took the Strategic Management course in a semester preceding the Auditing & Assurance Services course.

The faculty continue to be satisfied that question improvements implemented in 2010 on the four questions make for a stronger assessment. Table 7 shows the additional improved performance for 2011.

**Table 7: Student Results following Question Enhancements with 2011 Comparisons**

Learning Outcome	Question Reference Number	Percentage Correct Fall 2009	Percentage Correct Fall 2010	Percentage Correct Fall 2011
1a Financial	001	6%	33%	43%
1a Financial	019	33%	83%	86%
1b Managerial	029	50%	89%	86%
1c Tax	031	11%	39%	71%

Faculty syllabi, teaching delivery, and other factors were reviewed. A larger n was expected with the 2012 and 2013 sittings, following which more detailed question item analysis will be applied. Sequencing Accounting Information Systems, Taxation of Individuals, along with Intermediate Financial Accounting II, as required pre-requisites to the Auditing and Assurance Services course, along with improvements sought at the University level for residency and historical time limitations on ACCT course work will strengthen the overall product. As the tradition of quality assessment continues on the campus, our students take the concept of rigor and performance more seriously, are actually saving notes and text resources from prior courses, and are experiencing the joy of learning. The Accounting Faculty believe having the Major Specific Exit exam housed in the discipline's rightful place, the culminating course in the Major, and controlled by faculty in the discipline, is critical to evolving student success on the culminating assessment.

### **SUGGESTIONS FOR FUTURE RESEARCH**

Efforts of faculty in developing and modifying a comprehensive curriculum instrument over time can generate substantial gains for both teachers and learners. More work is needed relating students performances on major field assessment to major learning outcomes and overall assessment of learning plans at their institution. Faculty work and improvement on individual questions within the key courses in the major may contribute to improved testing on a major specific exit examination. Integration of simulation software such as COMP-XM in a well-designed curriculum may prove to be an effective catalyst. Also, correlation with component success on the Major Field Test in Business sponsored by the Educational Testing Service may suggest whether individual institutions are aligned with the broader national market. Benchmarking against peer schools is another possibility.

It is also recognized that a significant number of Accounting Major graduates will strive for certification as part of their self-development and career success as a personal outcome. Therefore, another fruitful area for future research would be to relate the institution's major learning outcomes and major field

assessments to current requirements for professional accounting certifications. Cross study with patterns of graduates' success with CPA licensure in the institution's state and other states in which their students are likely to practice accounting, auditing and assurance services and taxation would render confidence and increased external validity. A valuable continuation of this line of research would then be to investigate the relationship of students' performance on the major field assessment exit examination to performance on the CPA exam.

**APPENDIX A**

**BBA Level -- Comprehensive Assurance of Learning Plan**

Component	Method
<p>B.B.A. Program Learning Outcomes</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Communication Skills               <ul style="list-style-type: none"> <li>o Written</li> <li>o Oral</li> </ul> </li> <li><input type="checkbox"/> Ethical and Social Responsibility</li> <li><input type="checkbox"/> Thinking Skills</li> <li><input type="checkbox"/> Interpersonal Skills and Appreciation for Diversity (Teamwork)</li> <li><input type="checkbox"/> Use of Technology in Business</li> <li><input type="checkbox"/> Dynamics of the Global Economy</li> <li><input type="checkbox"/> Knowledge of the Business Environment (Course Specific Concepts)</li> </ul>	<p>Formative Course Embedded Assessment:</p> <p>All learning outcomes of at least one section of every core and major required course assessed every two years through formative course-embedded assessment.</p> <p>Every full-time professor required to conduct one formative course-embedded assessment per calendar year, with reports included in annual performance review portfolio as part of minimum expected performance.</p>
<p>Major Specific Knowledge</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Accounting</li> <li><input type="checkbox"/> Marketing</li> <li><input type="checkbox"/> Management</li> <li><input type="checkbox"/> Supply Chain</li> </ul>	<p>Summative Assessment:</p> <p>Major specific exit exams (MSEE) administered in “capstone” major courses every semester:</p>
<p>Common Body of Business Knowledge</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Business Core</li> </ul>	<p>Summative Assessment:</p> <p>College of Business Fundamentals Exit Exam (internally developed) administered in capstone strategy course (MGMT 4750) fall semesters and alternate summers.</p> <p>ETS Major Field Test in Business (nationally normed) administered in capstone strategy course (MGMT 4750) spring semesters and alternate summers.</p>
<p>Integration and Application of Business Knowledge</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Demonstration of business acumen and decision making skills</li> <li><input type="checkbox"/> Demonstration of ability to work with a variety of financial and operational data.</li> </ul>	<p>Summative Assessment:</p> <p>Capsim’s Comp-XM Exam administered in capstone strategy course (MGMT 4750) every semester. Students required to run a company in simulation, make decisions across all functional areas to generate balanced scorecard results, and answer quiz questions using financial and operational reports. Exam is nationally normed.</p>
<p>Stakeholder Satisfaction (Indirect)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> EBI Student Satisfaction Survey</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Annually; compared to peer schools</li> </ul>

## APPENDIX B

### Accounting Major Level – Final Exit Assessment (drawn from final course--auditing syllabus, and cover page to the actual instrument)

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**THE ACCOUNTING MAJOR:**  
*Major Specific Exit Examination (MSEE)*  
*Major Learning Outcomes [LOs] Embedded Assessment*  
*The Accounting, Business Law, and Taxation Discipline:*  
*College of Business at the X, Y, & Z University*

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**This assessment includes seventy-five (75) questions and ties to the Accounting Discipline's Mission and Major Learning Outcomes:**

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Consistent with the mission of the College of Business, the mission of the Accounting Discipline is to prepare accounting majors for professional careers in accounting. In addition to the BBA learning outcomes, upon completion of the program, accounting majors should be able to demonstrate. . .

LO1. Technical competence in the Discipline's functional areas of

- a) Financial accounting and reporting (20: #1-20)\*
- b) Managerial cost accounting (10: #21-30)\*
- c) Income taxation (10: #31-40)\*
- d) Accounting information systems (10: #41-50)\*
- e) Auditing and assurance services (10: #51-60)\*

LO2. Skills in application of accounting software and other business software for processing accounting information (7: #61-67)\*

LO3. Knowledge of ethical concerns and recognition of other ongoing issues and practices in the accounting profession (8: #68-75)\*

***\*This assessment carries the number of questions associated with the major learning outcomes described parenthetically above.***

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## **USING RUBRICS AS A TEACHING TOOL FOR GUIDING BOTH ASSESSMENT AND IMPROVEMENT OF STUDENT LEARNING IN BUSINESS SCHOOLS**

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### **ABSTRACT**

The paper discusses how rubrics may be used to evaluate and assess student learning by providing an organized approach to determine student success on learning outcomes. In addition to its benefits in the assessment aspect of the process assurance of learning, rubrics can be a useful tool in guiding students to improve their learning by focusing on important criteria which will be measured. The paper provides an overview of some recent research on rubrics, including development of rubric designs focusing on critical and integrative thinking, and communications skills. The paper includes rubric designs used by the authors in accounting courses.

### **BENEFITS OF RUBRICS IN BUSINESS EDUCATION**

A key aspect of assessment is to help faculty gauge student learning in order to determine how well desired student learning outcomes have been met. Rubrics can provide an organized approach to assessing these outcomes at the course level—as well as at the business school and university levels. As reported by Bisoux (2013), the new accreditation “Standard 8- Curricula Management and Assurance of Learning—Giving context to assurance of learning” of the Association to Advance Collegiate Schools of Business (AACSB) focuses on “Curricula Management and Assurance of Learning.” AACSB momentum for Assurance of Learning (AACSB International, 2006; AACSB International Accreditation Coordinating Committee, 2007) started in the late 1990s, picked up more speed in the early 2000s, and has continued to have B-Schools focus on assurance of learning and meet its “Assurance of Learning Standards.” With many business schools seeking to attain or hold on to AACSB accreditation, meeting assurance of learning standards and the assessment concept of “rubrics” to help faculty gauge student learning has continued and taken on increased emphasis.

As important as rubrics are for evaluation and assessment purposes, however their use for improving learning should not be overlooked. In addition to the benefits of improved evaluation and assessment, providing students with the rubrics assessment instrument can also improve student learning by making students aware of the important criteria related to what they need to learn. When they can clearly see how they will be evaluated, it is more likely that they will focus on these important criteria which include the student’s ability to think critically and integrate their knowledge.

As noted in Kordecki (2007), “*Outcome-focused and Assessment-based*” are no longer terms exclusive to the purview of general education and selected liberal arts courses; the failure to encompass adequate exposure to individual expression in the teaching and learning process yields lemmings and nerds in industry where much of what is needed reduces to sound critical thinking and communication.” We suggest that with efforts in study of and application of teaching and learning innovations and tools such as rubric designs, business school educators can effectively help students transition to successful business professionals.

Working with accounting educators, the AICPA (2005) developed its “AICPA Core Competency Framework” which it maintains on its “Core Competency & Educational Competency Assessment” web site. Since the accounting body of knowledge is always changing—and accounting professionals may change their career focus within accounting, rather than traditional accounting subject matter distinctions,

the Framework focuses on skills which will have long-term value whether the accountant stays in one area of accounting or changes focus to another.

Although the competencies were written with future accounting professionals in mind, we believe that they apply to other business professionals as well. The competencies comprise the three areas of functional or technical competencies, personal competencies related to individual attributes and value, and broad business perspectives competencies which are the perspectives and skills relating to understanding of internal and external business contexts. The broad business perspective competencies include such skills as “Strategic/Critical Thinking,” the ability to link data, knowledge and insight together from various disciplines to provide information for decision-making, to be in tune with the “big picture” perspective and be able to communicate the vision, strategy, goals and culture of organizations, “Industry/Sector Perspective,” the ability through research and analysis to identify the economics accounting and broad business financial risks and opportunities in the business and “International/Global Perspective,” the ability to identify and communicate the variety of threats and opportunities of doing business in a borderless world. These and other competencies in the Broad Business Perspectives emphasize the types of higher level skills that can be addressed and assessed by quality rubric designs in accounting courses.

Another major impetus for utilizing teaching techniques such as rubric designs that will help assess multiple skills in accounting courses comes from the current focus on accounting education resulting from the recommendations of the Pathways Commission on Accounting Education in its final report “Charting a Strategy for the Next Generation of Accountants” issued in July, 2012 and available on the Commission’s web site. As noted on the site, “This report summarizes two years of collective effort by over 50 individuals representing a diverse array of stakeholders in a broadly defined accounting profession – encompassing public and corporate accounting, education, and government.” A joint venture of the American Accounting Association (AAA) and the American Institute of CPAs (AICPA), the Pathways Commission took the 2008 challenge of the U.S. Treasury Advisory Committee on the Auditing Profession (ACAP) to study the possible future structure of accounting education for the accounting profession in order to develop pathways to the profession.

As noted in the Pathways Commission Report (p. 10), “A fundamental premise adopted by the Pathways Commission was that the education of accounting professionals should be based on a comprehensive and well articulated vision of the role of accounting in the wider society—and that the development of useful business information, preparation, and attestation to informative financial information and the production of reliable data for management decision-making requires that those involved in the information chain have an education commensurate with the challenges and responsibilities inherent in their work.” The report made seven major recommendations—the fourth which was “Develop curriculum models, engaging learning resources, and mechanisms for easily sharing them, as well as enhancing faculty development opportunities in support of sustaining a robust curriculum.” Whereas the Pathways Commission Report was geared to the accounting profession, again we believe that it also has worthwhile wider implications for other disciplines in business schools, and for the integrative learning which ideally takes place in business schools.

As noted by Bishop-Clark & Dietz-Uhler (2012), rubrics which provide guidelines identifying various components and levels of student work are a proven way to apply criteria to evaluate student work--generally qualitative data, especially material generated by students in various course assignments ranging from papers and essays to presentations and team work. For meaningful reliability, these authors suggest establishing rules on coding such as having a minimum of at least two people reviewing the data and agreeing on its interpretations, and concluding that if reviewers or coders agree at least 80% of the time, then the interpretation of the coding is deemed reliable.

## EXAMPLES OF RUBRIC DESIGNS FOCUSING ON CRITICAL THINKING

The Washington State Critical Thinking Rubric (Washington State University Center for Teaching, Learning, & Technology, 2006), offers a good starting point for instructors on nailing down critical and integrative thinking. In their rubric entitled “Guide to Rating Critical & Integrative Thinking” they provide the following seven criteria to assess students’ work:

1. Identify problem, question, or issue
2. Consider context and assumptions
3. Develop own position or hypothesis
4. Present and analyze supporting data
5. Integrate other perspectives
6. Identify conclusions and implications
7. Communicate effectively

On each of the 7 criteria the instructor rates the student work on a scale from 1 to 6 as either “Emerging” (1 and 2), “Developing” (3 and 4) or “Mastering” (5 and 6). As an example for Criteria 3 “Develop own position or hypotheses,” an “Emerging” rating would be given when “Position or hypothesis is clearly inherited or adopted with little original consideration,” a

“Developing” rating would apply when “Position includes some original thinking that acknowledges, refutes, synthesizes or extends other assertions, although some aspects may have been adopted,” and a “Mastering” rating would apply when “Position demonstrates ownership for constructing knowledge or framing original questions, integrating objective analysis and intuition.” For Criteria 4 – Present and analyze supporting data” an “Emerging” rating would be given when “Data/evidence or sources are simplistic, inappropriate, or not related to topic,” a “Developing” rating would apply when “Appropriate data/evidence or sources provided, although exploration appears to have been routine,” and a “Mastering” rating would apply when “Information need is clearly defined and integrated to meet and exceed assignment, course or personal interests.”

The Washington State Critical Thinking Rubric was modified at Miami University’s Center for the Enhancement of Learning, Teaching, and University Assessment (Shore, C. and Taylor, B., 2013) into a “Critical thinking/integration paper rubric” comprising the following 8 criteria:

1. Identifies and summarizes the **problem/question** at issue (and/or the source’s position)
2. Identifies and presents the STUDENT’S OWN **perspective and position**
3. Identifies and considers OTHER salient **perspectives and positions** that are important to the analysis of the issue
4. Identifies and assesses the key **assumptions**.
5. **Comparison contrast** of views
6. Identifies and assesses the quality of **supporting data/evidence** and provides additional data/evidence related to the issue.
7. Identifies and considers the influence of the **context** on the issue.
8. Identifies and assesses **conclusions, implication, and consequences**.

The four rating criteria of this Miami University instrument are “Scant,” “Minimally Developed,” “Moderately Developed,” and “Substantially Developed.”

An example regarding the second criteria “Identifies and presents the STUDENT’S OWN **perspective and position**,” a “Scant” rating would be given if the student “Fails to acknowledge the existence of valid counter arguments,” a “Minimally Developed” rating would apply if the Student “Fails to acknowledge the possible validity of other positions,” a “Moderately Developed” rating would apply when the student “Recognizes that there are other valid points of view,” and the highest “Substantially Developed” rating would apply when the student “Recognizes counterarguments that might be made and responds to them.”

Another rubric entitled “Rubric for Analytical Writing Assessment” from Truman State University (2012) identifies the four criteria of “Critical Thinking,” “Organization,” “Style,” and “Mechanics” and provides for rating along a four-point scale from 0 to 3. As an example, for the “Critical Thinking” criteria a “0” rating would apply when the student “Demonstrates no real integration of ideas (the author’s or those of others) to make meaning,” a “1” would be appropriate when “Begins to integrate ideas (the author’s or those of others) to make meaning,” a “2” would apply when the student “Displays some skill at integrating ideas (the author’s or those of others) to make meaning,” and the highest “3” rating would be earned when the student “Is adept at integrating ideas (the authors or those of others) to make meaning.”

According to Bishop-Clark & Dietz-Uhler (2012), good rubrics reflect content analysis that should be not only deductive but also systematic, and also lead to findings that could fit into a theoretical or applied context. Accordingly, accounting and any applied social science is fruitful ground for rubrics. Bishop-Clark and a computer science team (2007) reports that an effective means of analysis is to code data included from students’ responses to essay questions—either on individual paper copies or by pasting responses into an Excel spreadsheet and then having separate coders entering their respective scoring codes. Naturally, there will be trade-offs on how much time to invest in this process to obtain inter-rater reliability.

Applications to the various disciplines can be tailored. Mason, et al. (2008) studied diagnostic skills of physics students by providing a problem for students to solve. Student solutions would then be scored on a rubric especially created for the study, including specific criteria for application of principles formulas, and approach to evaluation. This study has special appeal as it demonstrated use by having both the researcher and the student using the rubric to evaluate students’ solutions. In business school classrooms, it might prove to have class breakout activities of small groups of three to four students engaged in “peer-review” with the application of the rubric device.

### **SOME RECENT RESEARCH ON RUBRICS**

Recent research has investigated rubrics in various educational settings. Several interesting studies are discussed below. In a small study attempting to evaluate the growth and development in critical thinking skills in Managerial Accounting students, Decker and Ebersole (2007) found no difference in the performance of a student group evaluated by rubrics throughout the term, compared to a control student group evaluated using traditional measures. Those authors attribute these disappointing results to several factors. First, they used a 10 point scale, which may have made it difficult for students to differentiate performance at each level. Second, the rubric used language unfamiliar to students (clarity, breadth, relevance, precision, accuracy). Third, students reported the rubric was too complex to be effective. Finally, the rubric was used to evaluate performance on open-ended exam questions. Rubrics might be more appropriate for different assignment types. If students do not actively use the rubric, improved learning does not occur. Effective design is critical to the success of rubric use by students.

In another study Vandenberg et al. (2010) analyzed three sections of a financial accounting course requiring students to complete projects involving writing assignments. Students in two sections taught by one author were provided with rubrics for guidance, while students in the third control section taught by another author were just given the standard set of instructions. The authors found that on an overall basis, students in the section provided the rubrics scored significantly higher on two of the three sections of the project. However the results of a student survey conducted as part of the research showed that there was no statistical difference in students’ feelings about professor communication, project clarity and satisfaction with the project as a whole. The authors concluded that although the rubric may have helped the students perform better, the students themselves did not seem to realize this. The authors recognize the

limitations in the study related to having different instructors teach the students provided the rubric versus the control group—and suggest future changes to control for differences in teaching style by having all instructors participating in the research teach a semester without use of the rubric and then teach the next semester with the rubric. The authors also expressed intention to increase sample sizes in their future research to see if results confirm their preliminary results of increased student achievement through use of rubrics.

Durkee (2011) used a rubric to evaluate employing metaphor to develop critical thinking, research and writing skills in senior undergraduate accounting students and graduate accounting students. Using metaphor to explain accounting practice expands the student learning experience beyond mere learning of rules. In addition, using a metaphor requires students to consider accounting from another point of view, thus developing critical thinking skills needed in the work world. The rubric measured the students' ability to master the assignment from start to finish, including identifying the problem, gathering information, proposing strong solutions and communicating effectively. Using creative accounting strategies prepares students for success after graduation. Using a rubric was found to be an effective method for developing and assessing creative work in accounting.

The AICPA and other professional organizations identify skills needed for success in the accounting profession. These skills, along with the evolution of International Financial Reporting Standards (IFRS) and the ability to address ethical issues have greatly increased the expectations for student learning in the Introductory Accounting classes. Young and Warren (2011) use “challenge problems” scored using rubrics to evaluate the critical thinking skills of their students in the Introductory Accounting classes. The advantages to using rubrics were (1) a challenge problem requiring the student to transfer knowledge from one situation to another (critical thinking skill) is more like the real world problems students will face in their careers upon graduation, rather than a question with four choices, one of which is the “correct” answer (2) students received feedback on strengths and weaknesses in their critical thinking skills (3) faculty could be responsive to the requirements of professional organizations by quickly make a change to the introductory curriculum and evaluate what critical thinking skills needed to be addressed in subsequent courses. Rubrics add qualitative feedback benefitting both faculty and student.

### **IMPLICATIONS AND EXAMPLES OF OUR RUBRICS**

It is our hope that teaching business will be enhanced with the use of rubric guides.

In our paper and presentation we will share rubric designs used in our accounting courses (Appendix A). We hope to stimulate discussion and encourage future research relating to the use of rubrics at various levels of instruction and the development of rubric design instruments that may be used both in the classroom and for take-home assignments. We expect that increased interest in rubric designs will not only assist the faculty in grading students but will help the process of overall assurance of learning—as well as actually increase the learning of students in the important areas of critical and integrative thinking.



**APPENDIX A  
EXAMPLES OF RUBRIC DESIGNS**

**Grading Rubric for Accounting Essays & Discussion** Student: \_\_\_\_\_

Item: Assessment name/number \_\_\_\_\_ Date: \_\_\_\_\_

(Note: sufficient length is required—default score = 0) Evaluator: \_\_\_\_\_

<b>CRITERION</b>	<b>Rating Scale:</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Critical Thinking</b>	<i>Content Performance</i> (usually tied to specific paragraphs in student work)					
I	Identification and recognition of key items and concepts (generally Bloom scale of application and lower)					
II	Throughput, argument development, recording selection (generally Bloom scale of analysis or synthesis)					
III	Decision-making, judgment, output (generally Bloom scale of evaluation)					
<b>Communication Elements</b>	<i>Delivery Performance</i> (usually tied to overall student response)					
IV	Writing rules—grammar, punctuation, sentence clarity (items that generally would surface on Spell Check, but also correct usage and parallelism)					
V	Organization coherence—paragraph development, business application, readability by those in the discipline (diction, language, precision, tone, appeal—effective and efficient professional presentation style)					
<b>TOTALS</b>	Combination of five criteria					
<b>GRAND TOTAL RAW SCORE =</b>						

Scale Converter:	Raw Score, Converted Score				
A level work generally	20,100	19,95	18,93	17,90	
B level work generally	16,88	15,85	14,83	13,80	
C level work generally	12,78	11,77	10,75	9,73	8,71
D level work generally	7,69	6,67	5,65	4,63	3,60
F level work generally	2,40	1,20	0,0		

Next is a sample case followed by application of the rubric.

## Sample Assessment Instrument

Course: Managerial Accounting

Topic assessed: Cost volume profit analysis

In at least three separate strong paragraphs of minimum 100 words each, respond to the following questions:

- I. Define contribution margin per unit. Specify the general formula algebraically for cost volume profit (CVP) analysis for a business that wishes to determine the breakeven point in number of units of a single product to produce and sell. Provide examples of at least two cost items in a business that would be considered variable, and at least two cost items that would be considered fixed. Ignore income taxes.
- II. Management wishes to pursue CVP analysis vigorously for its overall planning. How would the general formula specified in I. above be modified for consideration of a targeting net income, income taxes, and multiple products? What are the constraints and limiting assumptions underlying the valid use of CVP?
- III. Management has approached you to assist in identifying alternative models or tools to CVP and help evaluate whether such alternatives may be superior in guiding their planning. Identify at least two approaches other than CVP that management might use to assist with business planning and defend your selections.

### A Sample Student Response

- I. Contribution margin is the same as gross margin and is defined as selling price less cost of goods sold. It tells you how much the company makes on its gross activities. It is not too difficult to calculate this. The general formula is  $\text{Breakeven X} = \text{Fixed costs} / \text{Contribution margin per unit}$ . Depreciation is always a variable cost, and so is salesman's commission. Examples of fixed costs are salaries of the chief executive officer and utilities.
- II. The formula now becomes  $\text{Breakeven X} = \text{Fixed Costs} + \text{Tax Effects} / \text{Weighted Average contribution margin per unit}$ . The tax effects have something to do with subtracting out a tax rate and trying to plug in some kind of income amount. I cut class on the day you discussed what was meant by weighted average, but I should get partial credit because I know the formula. Assumptions used for CVP generally include relevant range, stable pricing, clarity in definition of which costs fixed and variable, known product mix, uniform elasticity of demand, no change in inventories.
- III. Management should consider master budgeting for the basics of having resources ready for production, avoiding stockout, steady flow of planned sales, economic order quantity, and volume fluctuations. Master budgeting goes toward determining true cash needs and would involve cash budget or statement of cash flows on a pro-forma basis. Management should also look beyond current operations and engage in capital budgeting, looking forward several years for machine replacements, alternative markets, and the like. CVP is very good in the very short run, but management needs to take a holistic appraisal of where the company stands and plan for the long run accordingly, hopefully with time value of money techniques.

**Grading Rubric for Accounting Essays & Discussion**

Student: I. M. Bright

Item: Assessment name/number Managerial/CVP

Date:           n/n/nn

(Note: sufficient length is required—default score = 0)      Evaluator:

CRITERION	Rating Scale:	0	1	2	3	4
<b>Critical Thinking</b>	<i>Content Performance</i> (usually tied to specific paragraphs in student work)					
I	Identification and recognition of key items and concepts (generally Bloom scale of application and lower)			2		
II	Throughput, argument development, recording selection (generally Bloom scale of analysis or synthesis)			2		
III	Decision-making, judgment, output (generally Bloom scale of evaluation)				3	
<b>Communication Elements</b>	<i>Delivery Performance</i> (usually tied to overall student response)					
IV	Writing rules—grammar, punctuation, sentence clarity (items that generally would surface on Spell Check, but also correct usage and parallelism)				3	
V	Organization coherence—paragraph development, business application, readability by those in the discipline (diction, language, precision, tone, appeal—effective and efficient professional presentation style)			2		
<b>TOTALS</b>	Combination of five criteria			6	6	
<b>GRAND TOTAL RAW SCORE = 12</b>						

IV.

Scale Converter:	Raw Score, Converted Score
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V.

VI.

A level work generally	20,100	19,95	18,93	17,90
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B level work generally	16,88	15,85	14,83	13,80
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C level work generally	12,78	11,77	10,75	9,73	8,71
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D level work generally	7,69	6,67	5,65	4,63	3,60
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F level work generally	2,40	1,20	0,0
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The following example is of a more detailed rubric design.

**Accounting Thinking and Written Communication Skills Rubric**

Student: \_\_\_\_\_ Evaluator: \_\_\_\_\_

Word Count: \_\_\_\_\_ Sufficient length is required Course: *Acct* Section: \_\_\_\_\_ Date: \_\_\_\_\_

Performance Element /Rating	Unsatisfactory (0)	Weak (1)	Marginal (2)	Good (3)	Outstanding (4)
<b>Content, Structure</b> ✓ Knowledge scope, depth ✓ Argument development ✓ Organization, coherence, and evaluation	<input type="checkbox"/> Fails to address the important requirements of the assignment in quantity and quality  <input type="checkbox"/> Displays little knowledge; makes factual errors; fails to develop conclusions  <input type="checkbox"/> Provides little substance and order to sequencing, unity, paragraph development, and supporting analysis	<input type="checkbox"/> _  <input type="checkbox"/> _  <input type="checkbox"/> _	<input type="checkbox"/> Fulfills some important content or displays peripheral knowledge  <input type="checkbox"/> Develops limited premises, and alternatives leading to conclusion  <input type="checkbox"/> Provides limited focus in building order and connection for relevance and comparative synthesis	<input type="checkbox"/> _  <input type="checkbox"/> _  <input type="checkbox"/> _	<input type="checkbox"/> Exceeds requirements and displays superior range in quantity and quality  <input type="checkbox"/> Demonstrates superior understanding In argument development  <input type="checkbox"/> Demonstrates strong, clear, consistent organization development and evaluation
<i>Element Total</i>	_____	_____	_____	_____	_____ <i>factor weight (fw)</i>
<i>Times rating =</i>	_____	_____	_____	_____	_____
<b>Holistic Delivery</b> ✓ Diction, Language, and tone	<input type="checkbox"/> Uses words inappropriate to context; negative emphasis; biased language; conveys condescending or rude tone	<input type="checkbox"/> _  <input type="checkbox"/> _	<input type="checkbox"/> Uses words generally appropriate to context and avoids biased language; generally conveys professional tone	<input type="checkbox"/> _  <input type="checkbox"/> _	<input type="checkbox"/> Selects appropriate words and language for context; builds goodwill; conveys confidence  <input type="checkbox"/> Consistently chooses relevant voice, person,number, tense, and verbs;

Performance Element /Rating	Unsatisfactory (0)	Weak (1)	Marginal (2)	Good (3)	Outstanding (4)
✓ Precision, voice, and appeal <input type="checkbox"/> Uses vague, awkward wording, passive voice, weak linking verbs, many unnecessary words or contractions, ineffective presentation style			<input type="checkbox"/> Generally chooses precise, concrete wording, active voice, strong verbs; avoids unnecessary words, contractions; uses effective presentation style		<input type="checkbox"/> uses efficient and effective words and presentation style
<i>Element Total</i>	_____	_____	_____	_____	_____ <i>factor weight (fw)</i>
<i>Times rating =</i>	_____	_____	_____	_____	_____
<b>Writing Rules</b>					
✓ Sentence clarity and parallelism  <input type="checkbox"/> Exhibits frequent fragments, run-ons, comma splices, and word omissions; errors in subject-verb agreement, pronoun and verb forms		<input type="checkbox"/> _	<input type="checkbox"/> Generally uses sentence structure for clarity with appropriate completeness, grammar, and patterns	<input type="checkbox"/> _	<input type="checkbox"/> Consistently uses sentence structure and patterns to support appropriate relationships among ideas
✓ Grammar comp, punctuation  <input type="checkbox"/> Exhibits errors #s, symbols, caps, hyphens, sp, italics, commas, apostrophe, & punctuation		<input type="checkbox"/> _	<input type="checkbox"/> Generally uses correct grammar components including punctuation	<input type="checkbox"/> _	<input type="checkbox"/> Consistently uses correct grammar to support argument content
<i>Element Total</i>	_____	_____	_____	_____	_____ <i>factor weight (fw)</i>
<i>Times rating =</i>	_____	_____	_____	_____	_____

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# APACS (Accounting Practitioner Academic Conversion System): Using Securitization to Solve an Emerging Business Education Funding Problem

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## ABSTRACT

The emerging shortage of Ph.D. qualified accounting professors has led to considerable discussion. While changes in AACSB faculty qualification has allowed more “professionally qualified” faculty, Ph.D. qualified faculty are still in short supply.

One relatively recent approach to dealing with this shortage is the introduction of various initiatives designed to encourage existing accounting practitioners to attain the Ph.D. and transition into academic careers. Many obstacles exist to such transitions, but the cost of the transition is a key concern.

While student loans are available to support accounting students, the easily estimated future income stream of an AACSB accredited accounting Ph.D. graduate makes the situation on which could provide the basis for a market based alternative funding program using a securitization format. Essentially, loans to fund this particular type of study would be of high quality and easily characterized in terms of default risk.

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 accounting practitioners in transition to academic careers who are engaged in earning the required Ph.D. in accounting.

## **THE PROBLEM: INTENSIVE DOCTORAL STUDY OPPORTUNITY COST FOR ACCOUNTING PRACTITIONERS**

The emerging shortage of Ph.D. qualified accounting faculty has led to several initiatives intended to encourage and assist certified accounting practitioners in their transition to academic careers. While awareness of the compensation levels for and nature of accounting faculty positions is not high among practitioners, the highest rated concern identified from surveys is the cost of the transition.

One alternative to the current situation would be to develop a system whereby promising candidates could transition from full time practice to a period of full-time graduate study. If a special form of funding were available to support appropriately selected candidates, then most likely, more candidates would move more rapidly through the Ph.D. study process.

The problem with this type of loan is that these loans would be relatively mispriced relative to other types of non-government sponsored student loans. 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 [2]. 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. [9].

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 requirements, 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 [9]. 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 [9]. 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 [5]. 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 [5].

More recently, startup company *Upstart* began operations in 2013 with a business model which sells rights to a specified percentage of an entrepreneur’s unknown future earnings stream over a specified period. The founders of *Upstart* currently focus on technology entrepreneurs but recognize the potential for such arrangements to work in other industries [3].

Rock star David Bowie famously securitized his future royalties earnings. However, securitization of intellectual property has not advanced as quickly as was originally anticipated [10]. 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 AND ACCOUNTING FACULTY**

Considerable data is available on expected salaries of certified accounting professionals and accounting Ph.D. in full-time academic positions. Data is also available which demonstrates the salary premium derived from successful completion of professional certification in the accounting field.

### **OUTLINE FOR THE CREATION OF APACS**

The authors propose the creation of a system whereby select accounting practitioners are offered funding for a period of intensive doctoral study as they prepare for full-time faculty positions in accounting. 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 professional doctoral study loans which then in turn could be pooled. Direct securitization of the accounting faculty members’ 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 (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 shortage of Ph.D. accounting faculty. Specifically, the possibility exists for a securitized loan program which would support certified accounting practitioners during their transition through focused Ph.D. programs. 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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## **ELUCIDATE PROCESS COSTING WITH STREAMLINED NUMBERS**

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### **A B S T R A C T**

Process Costing is one of the most detailed, interwoven topics in cost accounting. Students usually have prior exposure to job order costing in principles of accounting, but this is usually not the case with process costing. Suddenly, the very handy job-order cost sheets which easily determine the costs transferred from one department to another in job order costing are no longer available. In process costing, students find there is a detailed sequence of events involved with determining how much left the work-in-process department and how much is still in ending inventory. Students also see that there are both FIFO and weighted-average costing techniques that can be used. When teaching the process costing sequence of events, one procedure is to first go through the problem presented in the chapter (perhaps with a handout for students to use to help track the products through the process costing production process). After this, working an independent non-textbook problem will allow the sequence to be revisited to clarify the procedures and to see if questions are forthcoming from the students. The problem used for the re-visitation should have one goal: clarifying the steps involved in the process costing sequence. Numbers can often be far too cumbersome, which can serve to distract students rather than add to the learning process. Numbers for a problem designed to showcase a new topic should be unique to one item in the problem and easy to manage. This can help students stay focused on the concepts being studied in the problem. In this paper, a problem is presented which focuses on process costing and was well received by the students – and was found to be less confusing than the textbook presentation since the purposely designed and uniquely assigned numbers mapped a clearer pathway through the problem.

# **TERRITORIAL VS. WORLDWIDE TAX SYSTEMS – IMPLICATIONS FOR U. S. TAXPAYERS**

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## **ABSTRACT**

Tax reform is a topic that is could be described like the weather– Everybody talks about it, but nobody does anything about it. While tax reform may be desirable, when it comes down to specific proposals there is frequently a push-back as groups and individuals lobby to protect their self-interests. One area of tax reform that is of great importance is that of a territorial versus a worldwide taxation system. While this distinction may be lost on the average taxpayer, the implications of reform in this area have multiple implications. This paper discusses the two systems and three areas of tax law that have significant impact on U. S. taxpayers – the foreign tax credit, the foreign earned income credit/exclusion, and the reporting of foreign bank accounts.

## **Worldwide and Territorial Tax Systems**

The United States has a worldwide tax system. This simply means that a U. S. person will be taxed on his or her worldwide income, regardless of source. U. S. persons are defined as U. S. citizens or residents as well as domestic partnerships, corporations, estates, or trusts. Worldwide tax systems create compliance nightmares. The IRS has not developed an estimate of the international tax gap, but others estimate this amount to be between 40 and 123 billion dollars per year [10]. By its nature, the true amount cannot be known. Efforts such as the Foreign Account Tax Compliance Act (FATCA) are designed to discover foreign assets of U. S. citizens. In addition, the Bank Secrecy Act requires an annual report of foreign bank accounts. This report is made by filing Form TD 90-22.1 with the Department of Treasury, listing foreign bank accounts over which the taxpayer has authority. This is commonly known as FBAR (Report of Foreign Bank and Financial Accounts).

The U. S. system allows tax liabilities on foreign income to be deferred until it is “repatriated” or returned to the United States. This is seen as critical to stability of the U. S. international tax system as it provides a “near-level playing field with companies domiciled in nations with more favorable tax climates [3]. This has resulted, however, in an estimated 1.7 trillion dollars in earnings being held in foreign nations in order to avoid U. S. taxation on those earnings.

In contrast to a worldwide tax system, nations may adopt a territorial tax system. Under a territorial system, a country collects tax only on income earned within its borders. A common feature in such systems exempts dividends from foreign subsidiaries from the domestic tax base [3].

The United States is the only major industrialized nation with a worldwide tax system and a statutory income tax rate in excess of 30 percent [4]. In recent years there has been a movement away from worldwide systems to territorial systems. In 2000, worldwide systems represented 66 percent of

total GDP amount Organisation for Economic Co-operation and Development (OECD) nations. In 2012, that percentage dropped to 45 but is heavily weighted by the United States. Twenty-seven of the 34 OECD nations now employ some type of territoriality [3].

There are four observations that should be made regarding the current U. S. worldwide system. First, U. S. taxpayers are allowed a credit for taxes paid to foreign governments. However, this offers little relief, as the U. S. corporate rate so high compared to other nations and the individual rate is typically higher.

Second, worldwide taxation of corporate income accounts for a large share of tax compliance costs. Adoption of a territorial system would result in significant simplification and reduction of compliance costs. This would also be true on a lesser level for individual taxpayers.

Third, territorial taxation is based on the concept that governments should tax only the income earned within its borders. To those growing up with the U. S. worldwide system, this sounds somewhat heretical, but worldwide systems create trade barriers and are in opposition to free-market tax policies.

Fourth, if the U. S. moved to a territorial system, the competitiveness of U. S. companies would receive a significant boost and U. S. exports would surge.

Dittmer did a study of nations that have moved from a worldwide system to a territorial system since 2000. Among these nations were Japan, the United Kingdom, Canada, Germany, and The Netherlands. Japan and the UK are particularly relevant, as their worldwide system closely resembled the current U. S. system. There were a number of fears that the new system would create unemployment, a decline in wages, and a decrease in corporate tax revenues. None of these happened as unemployment declined, wages increased, and corporate tax revenues remained stable. In addition, these nations experienced fewer distortions in corporate behavior [3].

What is involved with a move toward a territorial tax system? Currently, U. S. laws utilize the “arms-length” method in allocating costs and revenues among its various corporate structures. The arms-length method operates under the condition that the parties to a transaction are independent and on an equal footing. [12]. This assumption is difficult to maintain in practice. On an international level, it requires multinational enterprises that have a permanent establishment within a country to calculate their profits as if their integrated operations were separate and distinct from each other. Every internal transfer of goods and services occurs under the assumption that transfers occur as if with an unrelated party at market prices. This allows income shifting to low-tax nations and expense shifting to high tax countries [11]. In addition, the arms-length approach relies on the income reported in a particular country. This ignores the realities that a company’s presence in a nation goes beyond reported income. It basically requires a company to price each internal transaction across countries.

### **FORMULARY APPORTIONMENT**

What is needed in transferring to a territorial tax system is a system of formulary apportionment (FA). This approach makes the tax liability of a taxpayer dependent upon its business activity in a country, rather than the income reported. Formulary apportionment allocates the profit earned, or loss incurred, by company to a particular tax jurisdiction through consideration of a number of factors.



Advocates of FA promote the simplicity, flexibility, stability, and competitiveness of such a system. In reality, such a system is somewhat in place in regard to taxation in the U. S. across state lines.

It is simple. A company knows how much it earned in each nation by multiplying its total profits by the share of its business activity in each nation. There is some debate on how business activity is measured, but it generally is a matter of the weights assigned to the various relevant activities.

It is flexible. It treats a complex multinational organization as a single economic entity for tax purposes. Economic substance rather than legal form takes precedence.

It enhances stability. As long as a company shows overall profitability, each nation is guaranteed a positive tax base unlike the current situation under which profitability can make wide swings from year to year. This reduces uncertainty for the enterprise as well as the tax authorities.

It promotes competitiveness. Each nation designs its tax structure to encourage companies to locate factories and employees in the nation. This is as opposed to focusing on just income in the nation. [11].

The factors to be incorporated into FA are a matter of debate, as well as the weighting of each factor. However, the European Union has drafted a formulary apportionment system for member nations. The formula is based upon four factors. One-third is based on property in the nation, one-third on sales, one-sixth on number of employees, and one-sixth on employee compensation. Adherents admit that this, or any FA formula, is not perfect. It is, however, seen as superior to the arms-length method. FA does close the tax gap through restrictions on income shifting. Problems arise with how to deal with intangible assets and in determining what members belong in the consolidated group. However, these issues are not unique to FA and should not be a deterrent to its adoption [11].

## **FIVE REASONS TO ADOPT A TERRITORIAL SYSTEM**

Any number of reasons has been given for the U. S. to move to a territorial system but five of them stand out as compelling [5].

1. As the United States is immersed in an increasingly dominant international environment it is imperative that the U. S. tax system be aligned with its global trading partners. Companies no longer need a U. S. presence in order to compete in the U. S. market, as trade and consumerism have become internationally mobile.
2. One of the basic principles of taxation is the benefit principle, which states that taxes should be based on the benefits received by entities using the goods financed with the tax. The worldwide tax system violates this principle by taxing profits earned in another tax jurisdiction. A territorial system is more closely aligned with the benefit principle.
3. Even though the United States is said to operate under a worldwide system, the truth is that it has a dual system. Foreign-owned companies are taxed territorially; that is, they pay tax in the United States based upon income that is “effectively connected” to the U. S. This dual system puts U. S. companies at a disadvantage in attempting to acquire foreign businesses or assets due to the higher after-tax returns that must be earned by a U. S. company as compared to a company operating under a territorial system.

4. The compliance cost of a worldwide system is extremely high. One study showed that over 40 billion dollars is spent annually by U. S. companies to comply with the U.S. tax code. At least 40 percent of this amount is due to the international provisions in the code. European firms under territorial systems do not report a disparity between complying with domestic and international rules [2].
5. The current worldwide system in the United States “traps” capital abroad. Since foreign earnings are not taxed until “repatriated” or brought back into the U. S., these earnings remain in various foreign nations to avoid paying U. S. tax on these profits. It has been estimate that over 1.7 trillion dollars have been kept out of the U. S. for this reason [13].

### **WORLDWIDE SYSTEMS AND THE INDIVIDUAL**

Although much of the discussion of a worldwide versus a territorial tax system has focused on companies, the U. S. worldwide system can have a significant impact on individuals. This is seen in three areas of our tax law:

1. The foreign tax credit, which utilizes Form 1116
2. The foreign earned income exclusion/credit using Form 2555
3. The reporting of foreign financial accounts under the Foreign Account Tax Compliance Act (FATCA) and the Report of Foreign Bank and Financial Accounts (FBAR).

### **FOREIGN TAX CREDIT**

Form 1116 is utilized to take a credit for foreign income taxes paid. It most frequently arises with the receipt of dividends and interest from foreign sources, although it may apply in other cases. Taxpayers may elect to claim the credit without filing Form 1116 if three conditions are met:

1. All foreign source gross income was “passive category income” which includes most interest and dividends.
2. All of the income and any foreign taxes paid were reported on a qualified payee statement such as a 1099 or Schedule K-1.
3. The total of creditable foreign taxes does not exceed \$300 (\$600 married filing joint) [8]

Even though this is a rather generous exclusion that excludes many taxpayers from filing Form 1116, it still results in additional time involved in the preparation of the return. The credit is a dollar-for-dollar credit but the income is still fully taxable in the United States and usually results in additional taxes being paid due to higher rates in the U. S. Form 1116 applies to individuals, estates, and trusts. Corporations must file Form 1118, which is an eight-page form with a higher level of complexity.

### **FOREIGN EARNED INCOME EXCLUSION**

United States citizens and green card holders are subject to tax on their worldwide income, regardless of source. Therefore, a citizen or resident working in a foreign country is subject to United States income tax on his or her earnings in that foreign country. This is a consequence of the U. S. worldwide taxation scheme. Frequently those earnings are also subject to tax in the host country where the money is earned. In order to lessen the burden of double taxation, U. S. income tax law provides for a Foreign Earned Income Credit or Exclusion. This allows qualifying taxpayers to avoid tax on up to

\$97,600 of foreign income in 2013. The amount of the exclusion is indexed for inflation and changes annually. In addition, the exclusion is per individual, so a married couple each can exclude up to the maximum amount each year. In addition, there is a foreign housing exclusion that is also available.

As mentioned, this may be utilized as an exclusion or as a credit. If the tax in the host country is higher than the U. S. rate, the credit would be most beneficial. Otherwise, the exclusion should be taken, as is most often the case. In addition, if the host country does not have an income tax or does not subject the earnings to its tax regime, the exclusion is still allowed.

There are three requirements to qualify for the credit. The taxpayer's tax home must be in a foreign country, the taxpayer must have foreign earned income, and the taxpayer must meet the bona fide residence or physical presence tests.

#### *Tax Home*

First, the tax home must be in a foreign country. The IRS defines a tax home as "the general area of your main place of business, employment, or post of duty, regardless of where you maintain your family home"[6]. A foreign country does not include the Antarctic or U. S. possessions such as American Samoa, Guam the U. S. Virgin Islands, or Puerto Rico.

#### *Foreign Earned Income*

Second, there must be foreign earned income. Foreign earned income is income in the form of wages, salaries, commissions, bonuses, professional fees, and tips. Self-employment income can also be foreign earned income. It does not include pensions, income received as a military or civilian employee of the U. S. government, income from services performed in international waters, or income for services in specified combat zones. In addition, dividends, interest, capital gains, gambling winnings, and alimony are not earned income.

The source of the earned income is the place where the individual performed the services for which compensation was received. These funds can come from a U.S. or a foreign organization. For example, assume that an employer is located in Orlando, FL and earnings are deposited into a taxpayer's bank account in a bank located in Memphis, TN. The income was earned while working in Ghana. This is foreign earned income.

The foreign earned income exclusion does not apply to social security, Medicare, or self-employment taxes. In addition, the taxpayer must file a return in order to take the exclusion even if there is no tax liability.

#### *Bona Fide Residence or Physical Presence*

The taxpayer must meet either the bona fide residence test or the physical presence test in order to qualify for the exclusion or credit. The bona fide residence test is met if the taxpayer is a bona fide resident of a foreign country for an uninterrupted period that includes an entire tax year. To be considered a bona fide resident, the taxpayer must have established a bona fide residence in the country. This is determined on a case-by-case basis, but generally the taxpayer must be able to prove that he/she is

living as a resident of a foreign country, paying any local income taxes and living as a citizen of the local economy. The intent is that the taxpayer plans to reside in that country indefinitely.

The physical presence test is met if the taxpayer is physically present in a foreign country or countries for 330 days during a period of 12 consecutive months. It does not require that the days be in one tax year. If the taxpayer is not physically present for the entire tax year, the amount of the exclusion will be pro-rated. For example, if a taxpayer arrived in a foreign country on August 2, 2012, he or she would meet the 330 day requirement on June 28, 2013, assuming they did not return to the U. S. for business during that time. For 2012, the taxpayer would have been physically present in a foreign country for 151 days. The exclusion amount would be  $151/365 \times \$95,100 = \$39,343$ . Since the 330-day test was not met until June 28, the taxpayer should file for an extension and file the return once the test is met. Alternatively, a timely filing can be made and an amended return filed when the test is met.

Once the test has been met, the taxpayer continues to be qualified until returning to the U. S. for more than 35 days in a 12-month period. To take the above example one step further, assume that the taxpayer remained in the foreign country all of 2013. He or she would qualify for the full amount of the exclusion. Further assume that, in 2014, the taxpayer returned to the U. S. for 30 days in January, then returned to the foreign country. The qualification continues as the taxpayer maintained a foreign tax home.

The rules do not require employment during the entire time, nor does it require working or remaining in the same country in order to qualify. For example, assume that the taxpayer's assignment ended and he or she has only been in a foreign country for 315 days. The taxpayer could remain in a foreign country for an additional 15 days and meet the physical presence test, but would not need to be employed during that time.

The only exception to the 330-day test is that if the taxpayer must leave the country because of war, civil unrest, or adverse conditions in that country. The IRS publishes an annual list of countries that qualify for the waiver. You should be able to prove that you would have met the time requirements if adverse conditions had not prevented your stay.

#### *Taking the Exclusion or Credit*

The exclusion or credit is taken by filing Form 2555 or 2555-EZ. If choosing the exclusion, the taxpayer cannot subsequently take the credit in another tax year unless he or she attaches a statement indicating that the choice of the exclusion is being revoked.

When excluding income under the foreign earned income exclusion, any remaining taxable income will be taxed at the rate it would have been subject to if the exclusion were not taken. For example, assume a filing status of married filing jointly with taxable income in 2013 of \$110,000 without regard to the exclusion. If the taxpayer qualifies for the full exclusion, that reduces taxable income to \$12,400. This amount of taxable income would normally be subject to a 10 per cent rate. However, lacking the exclusion, the taxpayer would be in the 25% bracket, so the \$12,400 would be taxed at 25%.

### *Withholding*

In many instances, the salary received by a taxpayer will allow the taxpayer to totally avoid withholding on his or her salary. If this is the case, the taxpayer can file a Form 673 with the employer. This form will instruct the employer to discontinue withholding for U. S. income tax from that employee. However, the IRS guidelines state that if the employer has reason to believe that the employee will not qualify for the exclusion, Form 673 may be disregarded.

There is one caution in regard to withholding. If the employee does not file a Form 673 but qualifies for the exclusion, there may be a situation in which the employee's withholding exceeds his or her adjusted gross income. When this occurs, the return cannot be submitted via e-file.

### *Foreign Housing Exclusion or Deduction*

In addition to the foreign earned income credit or exclusion, qualified individuals may take an exclusion or deduction for foreign housing costs. The amount of the deduction is determined as follows (using 2013 amounts):

\$97,600 x 30%	\$29,280
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Minus: 97,600 x 16%	15,616
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Maximum Housing Exclusion	\$13,664
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The \$97,600 is the maximum foreign earned income exclusion; the 30% of the exclusion amount is the statutory limitation or maximum. This maximum applies unless the taxpayer is in a location having a higher maximum exclusion. This list is found in the Instructions for Form 2555. Sixteen percent represents the base housing amount. This maximum exclusion would be subtracted from actual housing expenses to determine the amount that may be excluded.

Housing expenses include reasonable expenses incurred or paid in a foreign country for housing and include only the portion of the year in which the taxpayer qualifies for the foreign earned income exclusion. Housing expenses include employer-provided amounts either paid to the individual or paid by the employer to third parties.

The foreign housing exclusion is chosen by completing the appropriate sections of Form 2555. The foreign housing deduction is limited to those with self-employment income and may be deducted on line 36 of Form 1040.

### *Complexity*

Obviously, this is not an easy section of the Internal Revenue Code to navigate. Few individuals understand the intricacies of this law. Unfortunately, there are a significant number of tax preparers who do not understand it either. When a practitioner is known to be knowledgeable in this area of tax law, it is not uncommon to receive communication from U. S. taxpayers worldwide.

If the United States were to adopt a territorial tax system, all of the problems associated with the foreign earned income exclusion/credit would disappear and the tax code would take a step toward

simplicity. The income would simply not be taxable in the United States, regardless of how much the taxpayer earned or how long the taxpayer was physically present in a foreign country.

## **FOREIGN BANK ACCOUNTS**

Those having an interest in a foreign bank account may be subject to reporting requirements. There are two pieces of legislation that relate to these accounts. The Bank Secrecy Act requires that certain financial accounts based in foreign countries be reported to the Department of Treasury. This act has been in place for a number of years and is commonly known as FBAR (Report of Foreign Bank and Financial Accounts). The Foreign Account Tax Compliance Act (FATCA) was enacted in 2010 with the intent of identifying American account holders in foreign bank and requiring payment of taxes on income from these investments. These rules apply to individuals as well as business organizations.

## **FOREIGN BANK ACCOUNT REPORTING**

Under FBAR, anyone with a financial interest or signature authority over a foreign financial account may be required to file Form TD F 90-22.1 with the Department of Treasury. Note that this is not an income tax form and is not filed with the IRS. The due date for the return is June 30 of the year following the calendar year being reported. This is known as the Report of Foreign Bank and Financial Accounts and does not require the payment of taxes. It is merely informational with the intent of identifying offshore financial assets owned by U. S. taxpayers.

### *Financial Accounts*

A foreign financial account includes any savings or checking deposit in an account maintained with a foreign financial institution. This includes savings and checking accounts in addition to any account in which the account has an equity interest in the fund, such as a mutual fund. It does not include ownership of individual bonds, notes, or stock certificates held by the owner. A foreign country is defined for this purpose as all geographical areas outside the United States, the commonwealth of Puerto Rico, the commonwealth of the Northern Mariana Islands, and the territories and possessions of the United States.

### *Who Must File*

There are two basic filing requirements for those having a foreign financial account. First, this applies to "United States persons." A United States person includes a citizen or resident of the United States, a domestic partnership, a domestic corporation, and a domestic estate or trust. United States persons must also have "signature or other authority over an account." This means the authority to control the disposition of money by signing a check or similar document. Authority also exists if the person can exercise that power through direct communication with the financial institution.

The second requirement is that the account must be reported if the aggregate value of foreign financial accounts in which there is a financial interest exceeds \$10,000 at any time during the calendar year. This requirement has a couple of provisions that can be easily overlooked. First, the accounts are reportable if the value exceeds \$10,000 at any time during the year. Not the average balance for the year. For example, if \$12,000 were deposited into an account one morning, then withdrawn the following day, a reporting requirement would be triggered, as the value of the account exceed \$10,000. Secondly, the reporting requirement is for the aggregate value of all foreign financial accounts. Thus if there were two accounts, and the value of those combined accounts exceeded \$10,000 at any time, the reporting requirement is triggered.

## *Reporting Issues and Penalties*

As mentioned, the FBAR is not an IRS form and is sent to the Department of Treasury. The report is due June 30 and cannot be extended. In addition to the FBAR requirement, all foreign accounts should be reported to the IRS. For individuals filing a 1040, a response to Schedule B, Part III, lines 7a or b is required if the taxpayer is reporting over \$1,500 of taxable interest or ordinary dividends or had a foreign account. In addition, if there was a distribution from a foreign trust or the taxpayer was a transferor or grantor of such a trust, lines 7 a or b must be answered in a positive manner. Schedule B of the 1041, 1065, and 1120 have similar requirements. If required to check “yes” on any of these boxes, a failure to do so is interpreted as a willful failure to file if a TD F 90-22.1 is required. The Schedule B reporting is limited to the existence of the accounts. These accounts must be reported in detail on the TD F 90-22.1 if the form is required to be filed.

Although there is no tax associated with TD F 90-22.1, there are significant penalties for not filing the return. These penalties can be civil or criminal. A willful failure to file may carry a criminal penalty of up to \$250,000 and/or up to five years in prison. Each missing FBAR is a separate crime. A civil willful failure to file carries a penalty of up to \$100,000 or 50% of the highest balance in each unreported account for the year. If it can be demonstrated that the failure to file was not willful, the penalty would be much lower, frequently \$10,000.

There are three important points about the penalties.

1. Penalties are assessed per account, not per return.
2. Penalties apply for each year of each violation.
3. Penalties can apply to each person with a financial or signature authority over the account.

It is readily apparent that the penalties can escalate quickly and can substantially exceed the balance in the foreign accounts.

## **FOREIGN ACCOUNT TAX COMPLIANCE ACT**

The Foreign Account Tax Compliance Act (FATCA) was enacted in order to combat U. S. tax evasion by taxpayers holding investments in foreign accounts. This is somewhat controversial, as it raises privacy issues, especially for those having dual citizenship. Also, a number of European banks and financial institutions have been closing brokerage accounts for all U. S. customers due to perceived “onerous” U. S. regulations [1]. There are three components to the Act. The original effective date was January 1, 2014, but the IRS has delayed implementation. Institutions now have until January 1, 2017, to begin withholding U. S. tax from clients’ investment gains. However, procedures to meet FATCA reporting requirements must be in place by January 1, 2014.

The first section requires foreign financial institutions (FFI) to undertake certain identification and due diligence procedures in an effort to discover any U. S. account holders. U. S. account holders are defined as U. S. persons or foreign entities with substantial U. S. ownership. For any accounts that have been so identified, the FFI is to report annually to the IRS the balances, receipts, and withdrawals from these accounts. The IRS is empowered to require participating FFI’s to withhold and pay to the IRS 30 percent of any payments of U. S.-source income made to non-participating FFI’s, individual account holders who have not provided sufficient information to determine if they are a U. S. person, and foreign entity account holders failing to provide sufficient information about the identity of its substantial U. S. owners. [1]

The second section focuses on the individual accountholders themselves. It requires disclosure of foreign assets by filing Form 8938 with the annual 1040. Threshold amounts for filing the form depend on filing status and residency.

Filing Status	Living in the U. S.	Not Living in the U. S.
Single or Married filing separate	Balance of \$50,000 on last day of year or \$75,000 at any time during the year.	Balance of \$200,000 on last day of year or \$300,000 at any time during the year.
Married filing jointly	Balance of \$100,000 on last day of year or \$150,000 at any time during the year.	Balance of \$400,000 on last day of year or \$600,000 at any time during the year.

The determination of living or not living in the United States is made by applying the bona fide residence or physical presence test as applicable to the foreign earned income exclusion [7].

The third section of FATCA closes a tax loophole that investors had used to avoid paying taxes on dividends by converting them into non-taxable dividend equivalents.

It is the first section of FATCA is by far the most controversial, with significant push-back from foreign banking and government officials who are balking at requiring them to become “extensions of the IRS” and assuming a significant financial burden in attempting to comply. Few countries have entered into agreements to cooperate with the U. S. on FATCA. Discussions with other countries are under way. Some countries, such as China, have flatly refused stating that “China’s banking and tax laws and regulations do not allow Chinese financial institutions to comply.” In other countries, legal action has been initiated to stop FFIs from compliance [9].

One of the issues is that the U.S. is asking for information on American taxpayers, but is not offering some kind of reciprocity. Unfortunately, there does not appear to be much the U. S. has to offer here. Since most nations utilize a territorial tax system, reciprocity is not an important to most of these nations [9]. American Citizens Abroad (ACA) states that FATCA represents a legislative overreach on every foreign financial institution on earth by placing on them the obligation to examine whether and to what extent it must adhere to this law [1].

Of concern to many is the risk of foreign divestment of U. S. investments. The top 100 financial institutions worldwide have assets of approximately 78 trillion dollars. Two-thirds of this amount is controlled by non-U. S. financial institutions. Rather than comply with the U. S. law, some of these institutions have begun to avoid U. S. investments and closed accounts with U. S. taxpayers. It is likely that this is only the start of a much larger movement, as more institutions are faced with compliance issues [1]. Even though a nation may agree for its financial institutions to comply with FATCA, the institutions probably can not be compelled to deal with U. S. taxpayers.

The second section, requiring full disclosure of personal assets and bank account information on Form 8938 is of concern. As mentioned, this form is a part of the taxpayers’ annual income tax return. It is well-known that the Internal Revenue Service has issues in regard to tax-related identity theft. The complete taxpayer return will have the name, address, social security number (or other taxpayer ID number), and phone number in addition to detailed financial account information. This places U. S.



taxpayers at serious risk for identity theft. Americans living overseas are particularly at risk, as most of them would have a qualifying account in a foreign financial institution.

### SUMMARY

This paper has examined territorial and worldwide tax systems. The United States is one of the few nations that have a worldwide system, putting itself out of step with most other developed countries in the world. Preserving the use of the worldwide tax regime creates enforcement and other problems as commerce becomes more and more global in scope. Some of these issues primarily create added complexity to the tax code. While not minimizing the issue of tax complexity, this is not the most serious negative effect of a worldwide system. However, in seeking to reduce tax complexity, changing to a territorial system would be a significant first step.

FATCA is an attempt to reduce the international tax gap but is not an effective solution and is fraught with financial and economic risk. It also creates strained relationships with other nations and their financial institutions with the burdens the U. S. is attempting to impose on these institutions. A territorial tax system would eliminate the need for solutions such as FATCA.

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## **TEACHING COST ACCOUNTING: DEVELOPING A PROBLEM FOR TRANSITIONING FROM THE ABSORPTION TO THE DIRECT INCOME STATEMENT**

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### **A B S T R A C T**

The absorption (or traditional) method of costing products views both variable and fixed costs of production as costs that should be inventoried if a product is not sold. Accordingly, each unit produced is assigned its variable production costs, plus each unit must also “absorb” its fair share of fixed overhead into its product cost which becomes an asset until sold. The direct (or variable) method of costing products views only the variable production costs as costs that should be inventoried if the product is not sold. In most cost accounting courses, the absorption method is presented first as part of financial accounting with the income statement and the statement of the cost of goods manufactured and sold. This is usually followed by a chapter on internal, cost-volume-profit analysis with its focus on direct costing. Students seem to have less trouble with either absorption or direct costing when each is discussed independently. However, the reason absorption and direct costing are usually in sequential chapters is so students can initially learn them separately, but then juxtapose them and work with them together and identify the differences. The problem in this presentation is designed to augment the transition from the absorption to the direct method. It is designed to be worked by students after both methods have been covered and a couple of shorter problems on each method have been separately worked.

# **Relative Impact of the 2003 Tax Act on Average Returns: Firms That Pay Dividends versus Firms That Repurchase Shares?**

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## **Abstract**

*This study documents a dramatic prolonged increase in aggregate dividend distributions as well as share repurchases by publicly traded firms following the passage of the Jobs and Growth Tax Relief Reconciliation Act of 2003. This study also documents large persistent year to year increases in both dividend distributions and share repurchases of 40 percent and 30 percent respectively with a 100 percent increase in both types of distributions within four years of passage of the act.*

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## **Creating a Business Intelligence and Analytics Schedule of Courses**

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### **Abstract**

Every University a process for the creation of a new program. Part of that process included defining the courses required by the program. The goals of the process described in this paper include: defining a body of knowledge for Business Intelligence and Analytics, converting that body of knowledge into a set of courses and limiting the additional faculty support need to teach the new program, by using as many existing courses as possible.

Business Intelligence and Analytics (BIA) as a discipline is made up of several related activities: data mining, online analytical processing, querying and reporting, statistical and quantitative analysis, exploratory and predictive models, and fact-based management to drive decisions and actions. These activities are found the Management Science, MIS and Statistics.

### **PART I: DESCRIPTION OF MAJOR**

The proposed major in Business Intelligence and Analytics is a natural extension of the existing majors in the College of Business. Most of the resources needed for the major are already in place. Existing faculty have experience in this discipline. No other school in this state offers such a degree, and the development of the major would permit state residents to study Business Intelligence and Analytics without needing to leave the state and pay higher fees and tuition. Additionally, students from nearby states who desire a high paying job may decide to enroll in the major.

#### **A. Degree Objectives**

The objectives are to prepare individuals for careers in Business Intelligence and Analytics. They will:

1. Be conversant in the BIA terminology and language;
2. Understand the information systems, analytic techniques, and the development of business models they will need to drive decision-making;
3. Demonstrate critical thinking skills and independent decision making based on relevant theory and analysis of empirical facts;
4. Communicate successfully in writing and orally, at both the individual and large-group level; and

#### **B. Program Identification**

The following is the appropriate program identification as provided in the Classifications of Instructional Programs developed and published by the U.S. Department of Education Center for Educational Statistics:

**CIP Codes: 52.1301, 52.1302, 52.0207, 52.1402, 52.1299**

**Title:** Management Science, Business Statistics, Customer Service Management, Marketing Research and Management Information Systems and Services

**Definition:** (Note: The uniqueness of this program requires cross-referencing several general CIP Codes. If only one can be used the first, 52.1299, is best: Any instructional program in Management Information Systems and Services, Other.)

### C. **Degree Features**

The major in Business Intelligence and Analytics will be the only such program in the State provided by any public or private institution. The degree will consist of 120 undergraduate credit hours designed to be completed over a four year period. The catalog description of the major will read:

***Business Intelligence and Analytics Major*** - A minimum of 36 credit hours, to include: Yet to be selected statistics course, MIS 340, MIS 360 (new Introduction to BIA course), MGT 420, MIS 444, MIS 460 (new BIA II course), MIS 476 (new BIA project course) with a focus in ACC, ECN, FIN, MGT, MKT, or MIS. Each focus areas require 9 credit hours selected from the following courses. MKT three of the following MKT courses: MKT 231, MKT 437, MKT 442 or MKT 440.

MIS three of the following MIS courses: MIS 300, MIS 310, MIS 412, or MIS 465

FIN three of the following finance and/or economics courses: FIN 343, FIN 425, ECN 423 or FIN 431

The focus areas in ACC, MGT and ECN will be described as faculty in these areas select 3 or more courses.

Students will take MGT 460 as a capstone

Descriptions of the new courses are provided in Appendix A.

### **Admission and Performance Standards**

All students must meet the standard University admission requirements and those of the College of Business. All students must maintain their performance in accordance with the policies of the University and the College of Business.

### **Degree Requirements**

Appendix B contains the Four Year Curriculum Plan Template for the BBA – Business Intelligence and Analytics degree.

#### **D. Degree Outcomes**

The following outcome measures have been established for students seeking a major in Business Intelligence and Analytics:

1. Eighty percent or more of all students admitted will successfully complete the program within five years.
2. Within six months of successful completion of the major, 90% of graduates will be employed in the field of Business Intelligence and Analytics or related areas.

#### **E. Degree Delivery**

All coursework will be offered on campus.

### **PART II: DEGREE NEED AND JUSTIFICATION**

#### **A. Relationship to Institutional Goals/Objectives**

The addition of this major in Business Intelligence and Analytics would benefit the citizens of state and the surrounding region by providing additional educational options in the area of Business Intelligence and Analytics. The Mission Statements of both the University and the College of Business commit the institution to be a contributor to the region's overall economic development. State private and public employers seek managers with training and/or experience in big data. The major in Business Intelligence and Analytics will prepare graduates to better serve these needs.

#### **B Existing Degrees**

There are no other schools in the state that offer either a major or minor in Business Intelligence and Analytics. Students with an interest in this field must travel out of state to seek their education at greater expense. Currently, a student desiring a baccalaureate degree in Business Intelligence and Analytics will have to travel to Pennsylvania, Texas, Arkansas, Arizona or Colorado. Attending an out-of-state school would require a student to relocate and pay higher levels of tuition and fees. The addition of the major in Business Intelligence and Analytics would create a cost-effective alternative for all the state, and would be attractive to students from nearby states.

#### **C. Degree Planning and Development**

The College of Business is accredited by the AACSB and currently offers majors in Accounting, Economics, Finance, International Business, Management, Management Information Systems, Marketing, and Risk Management and

Insurance. The proposed major in Business Intelligence and Analytics complements the existing offerings and provides a new dimension to the offerings. The faculty of the College has the expertise to plan and develop the Business Intelligence and Analytics major so that it makes the best use of existing resources and courses.

#### **D. Clientele and Need**

The major in Business Intelligence and Analytics is designed to prepare students for career opportunities in business intelligence and business analytics. Business intelligence and analytics in a related field of big data analytics have become increasingly important over the past two decades.

#### **E. Employment Opportunities**

The US Bureau of Labor Statistics estimates that in 2010 in the United States there were 28,200 managers working in this area. The mean annual wages for these workers is \$100,660.

An IBM tech trends report identified business analytics as one of the four major technology trends in the 2010s. A McKinsey Global Institute report predicted by 2018 the United States will face a shortage of 140,000 to 190,000 people with deep analytical skills and a shortfall of 1.5 million data savvy managers with the ability to analyze big data in making effective decisions. (Manyika, 2011)

Writing for *Business Week*, Spencer E. Ante stated, “Evangelos Simoudis, managing director of the venture capital firm Trident Capital, said that 12 of the 50 companies in his firm’s portfolio are focused on the analytics market. . . . Simoudis believes the demand for these jobs will only grow thanks to several big trends. One is the sheer data explosion. When Simoudis was working in the software business in the 1980s, he said data warehouses use to handle two terabytes of data. Today, just one small online ad network is generating 100 terabytes of data, while social network Facebook is spewing out 1.5 petabytes of data a year, or 1,500 terabytes. All those status updates and party photos consume massive amounts of data.

The second trend is that decision making has become much more performance based. Intuition is out. Metrics are in, especially in a tough economy where every dollar counts. Lastly, there has been a democratization of data. The rise of the Web and dashboard technologies is giving more and more people the ability to access data. And they want it.” (Macmillan, 2009)

#### **F. Degree Impact**

The major in Business Intelligence and Analytics will augment the existing programs in the College of Business and provide students with additional

educational choices. These courses could also be appropriate as electives for other majors outside of the College of business, such as Mathematics and Integrated Science & Technology in the College of Science and Computer Science in the College of Information Technology and Engineering. The existence of the major should attract students to Marshall University by creating a viable area of study that is not available at many institutions in the United States.

**G. Cooperative Agreements**

There are no cooperative agreements in place at this time.

**H. Alternatives to Development of the Major**

There are no alternatives to the development of this major. There are no Business Intelligence and Analytics majors offered at West Virginia colleges or at colleges in any of the contiguous states. Students wishing to pursue this field of study must leave the area at considerable personal cost. Marshall University and West Virginia should capitalize on this opportunity and exert a positive influence on the economic development and environment of the state.



## **PART III: DEGREE IMPLEMENTATION AND PROJECTED RESOURCE REQUIREMENTS**

### **A. Degree Administration**

Program administration will be provided by the Head of the Division of Management, Marketing and MIS in the College of Business. The Head will organize, administer, review, develop, and assure program effectiveness through on-going program assessment. The Head will also coordinate activities with other colleges offering courses. The faculty of the division will be responsible for the development and delivery of the courses.

### **B. Degree Projections**

Initial enrollment is presently projected to grow to 20 students per class. Assuming a 10% drop rate in both the freshman and sophomore years, the total number of majors would grow to 74 students with 34 actively involved in major-specific courses at any time. This is a conservative estimate and does not include possible students from other colleges. The five year projection of enrollment is presented in Appendix C. Details of the projections are presented in Appendix D.

### **C. Faculty Instructional Requirements**

The major in Business Intelligence and Analytics consists of one specified lower level course, six specified upper level courses, and three upper level electives. Several of these must be taught by faculty specializing in Business Intelligence and Analytics. By adjusting the way current courses are being presented this major should not require any additional faculty resources. The addition of a dedicated computer lab with dedicated servers to support the storage and analysis of large data sets will be required in the future.

### **D. Library Resources and Instructional Materials**

Library resources currently offered at the University are sufficient. No new or additional library resources will be necessary at this time.

### **E. Support Service Requirements**

No additional support services are required.

### **F. Facilities Requirements**

None

**G. Operating Resource Requirements**

None.

**H. Source of Operating Resources**

Faculty, personnel, and facility resources are the responsibility of the university. Operational funds will be derived from tuition and fees.

**PART IV: OFFERING EXISTING PROGRAMS AT NEW LOCATIONS**

Not applicable.

**PART V: DEGREE EVALUATION**

**A. Evaluation Procedures**

Evaluation is a critical component to the success of any program. Marshall University has a systematic and on-going evaluation process. All university departments must submit an annual assessment and program evaluation through the Office of Program Review and Assessment. The College of Business also conducts a continuous review process known as Assurance of Learning (AOL). The AOL process monitors the material presented in the courses and the success of students in mastering this material. Feedback is given to each discipline concerning the success of their courses, and faculty members make the changes necessary to improve the quality of instruction.

Student feedback is sought through semester student evaluations and questionnaires given to new graduates. The evaluations each semester provide information concerning the perceptions of the students as they are in the educational process while the end-of-program questionnaire allows students to give detailed comments about the entire program and its effectiveness. These inputs from students are used to adjust the course material and the way it is presented.

**B. Accreditation Status**

The College of Business is accredited by the Association to Advance Collegiate Schools of Business International (AACSB). All programs within the college are subject to continuous and rigorous review to assure that they meet the highest standards and provide quality educational opportunities for the students. The major in Business Intelligence and Analytics will dovetail with the existing degree in Management, which has already passed AACSB review. The

experience of the college, division, and faculty will ensure that the major in Business Intelligence and Analytics will meet and surpass AACSB accreditation standards.

#### **PART VI: TERMINATION OF A PROGRAM**

All program termination procedures will be guided by Marshall University policies on program termination located in the undergraduate student handbook and Marshall University's Greenbook. Any decision to terminate this program would require that sufficient coursework be taught to complete the degree for all accepted students, or arrangements be made with another institution offering a like degree to accept all students enrolled.

#### **PART VII: GUIDELINES FOR COOPERATIVE DOCTORAL PROGRAMS**

Not applicable.

## APPENDIX A

### BBA – BUSINESS INTELLIGENCE AND ANALYTICS DESCRIPTION OF COURSES

#### **1 REQUIRED LOWER LEVEL COURSES (3 HOURS)**

**Statistics** **3 hrs**  
A yet to selected statistics course..

#### **6 REQUIRED UPPER LEVEL COURSES (18 HOURS)**

**MIS 360 Introduction to Business Intelligence and Analytics** **3 hrs**  
This is a new course under development and the course title, number designator and description have not been finalized.

**MIS 340 Introduction to Database Management Systems.** **3 hrs**  
Introduction to enterprise data administration emphasizing database environment and architecture, relational model and languages, database requirements, and modeling. Introduction to the use of a database management system.

**MGT 420 Operations Management.** **3 hrs**  
Management of operation systems including system design, implementation and control. Analysis of the system in the areas of product, process, material quality, and facilities management. Topics include breakeven analysis, inventory models, transportation models, network analysis. (PR: MGT 218, MTH 203)

**MIS 444 Advanced Database Management Systems** **3 hrs**  
Enterprise database administration; issues surrounding database implementation, security, ethics, distributed databases, and advanced language features using a database management system. (PR: MIS 340)

**MIS 460 Business Intelligence and Analytics II** **3 hrs**  
This is a new course under development and the course title, number designator and description have not been finalized.

**MIS 476 Business Intelligence and Analytics Project** **ask** **3 hrs**  
This is a new course under development and the course title, number designator and description have not been finalized.

#### **3 COURSE ELECTIVES FROM ONE AREA OF CONCENTRATION (9 HOURS)**

**Finance and Economics Concentration - choose three of the following courses:**

**FIN 343 Intermediate Financial Management** **3 hrs**

Application of financial principles to corporate business problems. Computer analysis will be utilized where appropriate. (PR: FIN 323)

**FIN 425 Portfolio Analysis and Management. 3 hrs.**

Analytical procedures for valuing various financial securities and techniques for the creation and maintenance of portfolios. (PR: FIN 370)

**ECN 423 Introduction to Econometrics. 3 hrs..**

Combines economic theory with real data to obtain quantitative results for purposes of explanation and prediction. The development of useful economic models applicable to present day world problems. (PR: ECN 250, ECN 253, MGT 218, MTH 203)

**FIN 431 Futures and Options 3 hrs**

This is a new course under development and the course title, number designator and description have not been finalized.

**MIS Concentration - choose three of the following courses:**

**MIS 300 Introduction to Business Programming. 3 hrs.**

Introduction to programming in a business context, emphasizing problem solving using basic programming logic and data structures, interface concepts, file and database access, and selection and use of development tools. (PR: MIS 290)

**MIS 310 Business System Analysis and Design. 3 hrs.**

The course covers business application systems development, behavioral considerations in the development process, feasibility assessment, requirement analysis, and communication skills. Emphasis on prototyping and fourth generation languages.

**MIS 412 Enterprise Systems. 3 hrs.**

A study of cross-functional and process-oriented information systems. Topics to include business process management, supply-chain, and relationship management systems. (PR: MIS 290 or permission of COB advising office)

**MIS 465 Business Decision Support Systems. 3 hrs.**

A study of decision support systems (DSS) in terms of building and providing end-user support for managerial decision making. Advanced topics will include computer interface design and artificial intelligence.

**Marketing Concentration - choose three of the following courses:**

**MKT 231 Principles of Selling. 3 hrs.**

Elements of professional personal selling from prospecting through follow-up designed for individuals preparing for a career in sales/marketing and those desiring skills to influence, persuade, or lead others.

**MKT 437 Consumer Behavior. 3 hrs.**

Acquaints the student with individual and group behavior as it pertains to consumer activity. Theories and findings in the behavioral sciences, as well as those set forth by marketing scholars, are examined so as to understand the behavioral patterns of consumers. Cultural, social, and psychological influences are considered, in addition to the traditional economic interpretations. The stress of the course is on incorporating these data into the managing of the marketing effort.

**MKT 440 Sales Management. 3 hrs.**

An exploration of the duties and activities of sales managers. Topics typically include planning and forecasting as well as organizing, staffing, training, compensating, motivating, and evaluating the sales force. (PR: MKT 340)

**MKT 442 Market Research. 3 hrs.**

Scope and importance of market and distribution research; product, package, brand analysis and social impact; consumer, industrial and institutional survey, quantitative and qualitative analysis of market data; situation analysis, sampling, tabulation and presentation methods. (PR: MKT 340, MGT

APPENDIX B

BBA – BUSINESS INTELLIGENCE AND ANALYTICS (BIA)  
FOUR YEAR CURRICULUM PLAN TEMPLATE

<b>Year One</b>			
<b>Fall Semester</b>		<b>Spring Semester</b>	
MIS200 Business Computer Applications	3 hours	ECN250 Principles of Microeconomics	3 hours
Composition: ENG101 Composition (or equivalent)	3 hours	Communication: CMM207 Bus & Prof Communication	3 hours
FYS100: FYS100 First Year Seminar	3 hours	CT Designated Course	3 hours
Social Science: PSY 201 Introduction to Psychology	3 hours	GEO101 Physical Geography	4 hours
Mathematics: MTH130 (3 hrs) or MTH127 (5 hrs)	3-5 hours	Humanities:	3 hours
<b>Hours:</b>	<b>15-17 hours</b>	<b>Hours:</b>	<b>16 hours</b>
<b>Year Two</b>			
<b>Fall Semester</b>		<b>Spring Semester</b>	
ACC215 Principles of Accounting	3 hours	ACC216 Principles of Accounting	3 hours
ECN253 Principles of Macroeconomics	3 hours	ENG204 Writing for the Workplace	3 hours
Composition: ENG201 (or equivalent, "C" or better)	3 hours	LE207 Legal Environment of Business	3 hours
Physical or Natural Science GLY 200/210L		MGT218 Management Statistics	3 hours
Physical Geology and Lab	4 hours	CT Designated Course	3 hours
CMM Studies Elective	3 hours		
<b>Hours:</b>	<b>16 hours</b>	<b>Hours:</b>	<b>15 hours</b>
<b>Year Three</b>			
<b>Fall Semester</b>		<b>Spring Semester</b>	
MGT 219 Business Stats II	3 hours	FIN323 Principles of Finance	3 hours
MGT320 Principles of Management	3 hours	MIS 340 Database Systems	3 hours
MIS290 Principles Management Information Systems	3 hours	<b>MIS 360 Introduction to BIA</b>	<b>3 hours</b>
MKT340 Principles of Marketing	3 hours	BIA Elective	3 hours
LE308 Commercial Law	3 hours	Fine Arts	3 hours
<b>Hours:</b>	<b>15 hours</b>	<b>Hours:</b>	<b>15 hours</b>
<b>Year Four</b>			
<b>Fall Semester</b>		<b>Spring Semester</b>	
MIS 444 Advanced Database Mgt Sys	3 hours	<b>MIS 476 BIA Project</b>	<b>3 hour</b>
LCOB International elective	3 hours	Writing Intensive : MGT460	3 hours
BIA Elective	3 hours	Strategic Management	3 hours
<b>MIS 460 BIA II</b>	<b>3 hours</b>	BIA Elective	3 hours
MGT420 Operations Management	3 hours	Free electives	4-6 hours
<b>Hours:</b>	<b>15 hours</b>	<b>Hours:</b>	<b>11-13 hours</b>
<b>Other Requirements:</b>			
Minimum Number of Hours to Graduate: 120			
Minimum GPA to Graduate: 2.0 Marshall, College, Major			
Other: The total number of free electives depends on the number of hours the student completes in mathematics and if the student double-counts any requirements.			

APPENDIX C

BBA – BUSINESS INTELLIGENCE AND ANALYTICS  
 FIVE-YEAR PROJECTION OF ENROLLMENT

	<b>First Year (2014)</b>	<b>Second Year (2015)</b>	<b>Third Year (2016)</b>	<b>Fourth Year (2017)</b>	<b>Fifth Year (2018)</b>
<b>Number of Students Served through Course Offerings of the Program:</b>					
<b>Headcount</b>	<u>40</u>	<u>40</u>	<u>48</u>	<u>61</u>	<u>66</u>
<b>FTE</b>	<u>40</u>	<u>40</u>	<u>64</u>	<u>95</u>	<u>105</u>
<b>Number of Student Credit Hours Generated by Courses within the Program (entire academic year):</b>					
	<u>120</u>	<u>120</u>	<u>192</u>	<u>285</u>	<u>315</u>
<b>Number of Majors:</b>					
<b>Headcount</b>	<u>10</u>	<u>24</u>	<u>37</u>	<u>55</u>	<u>64</u>
<b>FTE majors</b>	<u>10</u>	<u>24</u>	<u>37</u>	<u>55</u>	<u>64</u>
<b>Number of Student Credit Hours Generated by Majors in the Program (entire academic year):</b>					
	<u>300</u>	<u>720</u>	<u>1,110</u>	<u>1,650</u>	<u>1,920</u>
<b>Number of Degrees to be Granted (annual total):</b>					
	<u>0</u>	<u>0</u>	<u>0</u>	<u>8</u>	<u>13</u>



APPENDIX D

BBA – BUSINESS INTELLIGENCE AND ANALYTICS  
 FIVE-YEAR PROJECTION OF PROGRAM SIZE CALCULATIONS

**2014      2015      2016      2017      2018**

Headcount of BIA Majors					
Freshman	10	15	15	20	20
Sophomore		9	14	14	18
Junior			8	13	13
Senior				8	13

BIA majors in BIA Upper Level Courses					
Junior			8	13	13
Senior				8	13

BIA credit hours from BIA juniors			9	9	9
BIA credit hours from BIA seniors			6	6	6
Total			72	165	195

Total BIA hours (annual)	120	120	192	285	315
FTE (3 credit hours/course)	40	40	64	95	105

Headcount in BIA courses	40	40	48	61	66
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BIA majors	10	24	37	55	64
Credit hour per academic year	30	30	30	30	30
Total BIA major credit hours	300	720	1,110	1,650	1,920
Annualized FTE	10	24	37	55	64

APPENDIX E

BBA – BUSINESS INTELLIGENCE AND ANALYTICS  
 FIVE-YEAR PROJECTION OF OPERATING RESOURCE REQUIREMENTS

	<b>First Year (2014)</b>	<b>Second Year (2015)</b>	<b>Third Year (2016)</b>	<b>Fourth Year (2017)</b>	<b>Fifth Year (2018)</b>
<b>A. FTE POSITIONS</b>					
1. Administrators	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
2. Full-time Faculty	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
3. Adjunct Faculty	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
4. Graduate Assistants	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
5. Other Personnel:					
a. Clerical Workers	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
b. Professionals	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>

**Note: Include percentage of time of current personnel**

**B. OPERATING COSTS (Appropriated Funds Only)**

1. Personal Services:					
a. Administrators	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
b. Full-time Faculty	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
c. Adjunct Faculty	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
d. Graduate Assistants	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
e. Non-Academic Personnel:					
Clerical Workers	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Professionals	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Salaries	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>

APPENDIX E(cont)

BBA – BUSINESS INTELLIGENCE AND ANALYTICS  
 FIVE-YEAR PROJECTION OF TOTAL OPERATING RESOURCES REQUIREMENTS\*

	<b>First Year (2014)</b>	<b>Second Year (2015)</b>	<b>Third Year (2016)</b>	<b>Fourth Year (2017)</b>	<b>Fifth Year (2018)</b>
2. Current Expenses	_____	_____	_____	_____	_____
3. Repairs & Alterations	_____	_____	_____	_____	_____
4. Equipment:					
Educational Equip.	_____	_____	_____	_____	_____
Library Books	_____	_____	_____	_____	_____
5. Nonrecurring Expense	_____	_____	_____	_____	_____
Office furniture and computers.					
<b>Total Costs</b>	<u>    0    </u>	<u>    0    </u>	<u>    0    </u>	<u>    0    </u>	<u>    0    </u>

**C. SOURCES**

1. General Fund Appropriations	_____	_____	_____	_____	_____
(Appropriated Funds Only)					
_____ Reallocation		_____ New funds	(Check one)		
2. Federal Government	_____	_____	_____	_____	_____
(Non-appropriated Funds Only)					
3. Private and Other	_____	_____	_____	_____	_____
(specify)					
<b>Total All Sources</b>	_____	_____	_____	_____	_____

**NOTE: Total costs should be equal to total sources of funding**

\*Explain Your Method for Predicting the Numbers (Use additional sheet if necessary)

# **Fundamental Statistical Analysis for a Future with Big Data**

Session Leaders and Moderators

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## **ABSTRACT**

Session examines issues that the advent of Big Data present relative to introductory business statistics instruction. It is followed by an interactive discussion of what changes, if any, should be made in introductory business statistics instruction to prepare students for a world with big data. The discussion piece addresses whether the typical statistics course prepares business students with the skills they will need for a future where big data sets and decision making based on data will be more prevalent. The session will include a demonstration of capabilities for analyzing data in Excel 2013 focusing on recently introduced capabilities that are available through Excel and able to handle bigger data sets.

## **INTRODUCTION**

It is a well-known fact that the amount of data being collected and available for analysis is rapidly increasing. As a result the size of data sets is also increasing and there are new types of data available for analysis. Big Data is the name often used to refer to such data. However, big data, like many terms we use, does not have a universal definition of what constitutes big data. Emerson and Kane [4] define big data as the quantity of data and use of the percent of the computer's random access memory as a measure of big since the computer is what is being used to analyze the data. An Internet search for Big Data yields the April 28, 2013 definition by Wikipedia to be "a collection of data sets so large and complex that it becomes difficult to process using on-hand database management tools or traditional data processing applications." This definition focuses on size relative to processing capability and as such is not really germane to a foundational business statistics class other than to the selection of computational software that should be used in the class. One might note that using a handheld calculator is not providing any real value for analyzing big data. One part of this session will include an overview of analysis procedures available through Excel that are appropriate for a fundamental business statistics class and these will be presented later.

In contrast to the definitions of big data that focused on the size of data, Michael Horrigan [5] from the Bureau of Labor Statistics has a slightly different view and sees "Big Data as nonsampled data, characterized by the creation of databases from electronic sources whose primary purpose is something other than statistical inference." This definition focuses on the purpose of the data rather than the size of the data set and purpose of data analysis should be

germane to a foundational class in business statistics. Most business statistics textbooks and one would also infer that most business statistics courses focus on descriptive statistics that summarize the characteristics of the observed data and on inferential statistics that strive to reach conclusions about characteristics of a larger population or process that was the source for the observed data. According to Horrigan's definition of Big Data, standard inferential statistical instruction is not properly preparing students for the analysis of big data.

An IBM Institute for Business Value study of Chief Financial Officers [7] found that the CFOs felt that a significant gap existed between skills required for today's business environment and the skills currently available in the workforce. This, along with other similar pronouncements, indicates that our present educational process is deficient for the perceived future needs of businesses. The business statistics class is one that should have a clear focus on analysis of data. Historically this has included a set of analysis procedures/techniques listed in the course description with a primary focus on descriptive statistics, understanding probability distributions, confidence interval estimation and testing for the statistical significance of hypotheses. Testing of statistical hypotheses may match well with the analysis many faculty members are doing to get their research published but it does not match well with the analysis needed for big data using Horrigan's "nonsampled data" as the definition for big data.

Brown and Kass [2] in their critical look at statistics state, "Degrees in Statistics have emphasized a large suite of techniques, and introductory courses too often remain unappetizing. The net result is that at every level of study, gaining statistical expertise has required extensive coursework, much of which appears to be extraneous to the compelling scientific problems students are interested in solving." As their comment indicates, their orientation is on the physical and health sciences and neuroscience in particular, but we feel their comments are equally applicable to business in the sense that much of the coursework in a business statistics class may be considered as extraneous to the business problems our graduates will need to solve using big data. They continue saying, "Computer scientists have been especially influential in the past decade or so. ... As others leap daringly into the fray, attempting to tackle the most difficult problems, might statistics as we know it become obsolete?" Faculty members teaching business statistics are often heard expressing concern about the diminished role of statistics in the business curriculum at their school. Its role in the business curriculum should be well established if the business statistics class is providing students with skills they will need for a future that is forecast to be reliant on data-based decision making using big data.

Based on their findings Brown and Kass conclude, "We are worried. While we expect that in many institutions—perhaps most—there may exist specific courses and programs that are exemplary in certain aspects, in the aggregate, we are frustrated with the current state of affairs. The concerns that we have articulated here are not minor matters to be addressed by incremental improvement; rather, they represent deep deficiencies requiring immediate attention." They suggest two overarching principles for curricular revision:

1. A focus on statistical thinking and
2. Flexible cross-disciplinarity.

Specifically they say "the primary goal of statistical training at all levels should be to help students develop statistical thinking." But they point out "According to syllabi and lists of requirements, statistics courses and degree programs tend to emphasize mastery of technique." It

is easier to have a narrow focus and teach mastery of technique rather having a broader focus that includes learning technique as well as statistical thinking and cross-discipline applications.

Hal Varian [8] presented a brighter picture and is cited as saying that he “sees statisticians as part of the reconfiguring of the business industry’s future” and that “Information is easily accessible, and statisticians can help organizations analyze the information to improve productivity.” A place for statisticians to do this is to better prepare our business students for their future in our business statistics class. The cited statements from Brown and Kass expressed the short-comings of current statistical instruction while those from Varian focused on the potential for those properly trained in statistics to play an important role in the future of business.

A window of opportunity exists for an improvement to be made in business statistics instruction. This window has been opened through the deluge of data presented by big data and the potential strategic advantage that can be obtained by proper analysis being touted by Davenport and Harris [3] in their book *Competing on Analytics*. Even though Brown and Kass criticize an almost exclusive focus on techniques that does not mean we should stop teaching analysis techniques.

Today’s hot quantitative topic is analytics. Peter Bell [1] says the best way to explain analytics is to use the SAS 8-levels of analytics framework with “(1 = standard reports, 2 = Ad hoc reports, 3 = query drilldown, 4 = alerts) which are familiar to most, and this framework also highlights the big step from 5 (the statistical analysis of historic data) to 6 (forecasting) and 7 (predictive modeling).” The business statistics class should be introducing students to foundational procedures in levels 5, 6 & 7. He points out that their level 8 (optimization) is not the “pinnacle of analytics” from everyone’s perspective because “many firms have more difficulty with risk analysis and coping with uncertainty.” Learning the fundamentals of risk analysis and coping with uncertainty should be a primary learning objective of the business statistics class to truly prepare students for making decisions that are guided by knowledge obtained from big data.

An important aspect of big data is that almost all of what people refer to as Big Data are data gathered over time. The Wikipedia information about Big Data includes this statement, “Data sets grow in size in part because they are increasingly being gathered by ubiquitous information-sensing mobile devices, aerial sensory technologies (remote sensing), software logs, cameras, microphones, radio-frequency identification readers, and wireless sensor networks.” All of these data sources are obtaining data over time and not just taking measurements at regular intervals. The classic business statistics addresses inference for situations where the data are a sample from a fixed population. Most people teaching business statistics would agree that Horrigan’s “nonsampled data” definition for big data mean that the data are not a representative sample from a population. Some statistics classes address the situation that may exist when the sampling frame does not match the target population of interest and the implications of this mismatch. However, most introductory business statistics textbooks do not address how to deal with data gathered over time, except in a time series or forecasting chapter. The techniques in these chapters are for data gathered on a single variable of interest and at regular intervals. The introductory class should not attempt to cover everything but it should make students aware of important things to consider relative to using data for the SAS levels 5 (the statistical analysis of historic data), 6 (forecasting) and 7 (predictive modeling). Also the introductory class should provide some applicable data analysis skills using software.

### **APPROPRIATE SOFTWARE FOR THE BUSINESS STATISTICS CLASS**

Analysis of big data, however you define it, must be done with computational software. Which software is most appropriate for the introductory business statistics class? The answer certainly depends on the criteria used. We believe that the primary criterion is what would be best to prepare the students for their future and not what would be best to help me teach the things I want to teach in the course. They need to know tools that will allow them to analyze data when they get a business job. Cheryl McKinnon [5] states, “Big data gets all the hype today, but enterprises around the globe continue to be run by big spreadsheets.” She also cites a survey by Deloitte in 2009 reporting that 99.7% of businesses surveyed said that they used spreadsheets and 70 percent of respondents had ‘heavy’ reliance on spreadsheets to support critical portions of their businesses. She reaches these conclusions, “Spreadsheet data is enormous in size and impact” and as a result “do not skimp on analytic tools that can be used and understood by a typical business worker.”

The 2013 KDnuggets Software (14<sup>th</sup> annual) Poll had 1880 voters answering the question, “What Analytics, Big Data, Data mining, Data Science software you used in the past 12 months for a real project?” Excel finished third with 28% reporting that they had used it (29.8% had reported using it in the 2012 survey). The winner for 2013 was Rapid-I RapidMiner/RapidAnalytics free edition with 39.2% (26.7% had reported using it in the 2012 survey placing it behind Excel). The open source statistical software R was second with 37.4% (30.7% had reported using it in the 2012 survey placing it slightly above Excel). It should be noted that this “RapidMiner has been very successful in motivating their users, and got the most votes.”

In addition to the above support for Excel, Peter Bell [1] recommends the use of Excel. The bottom line is that Excel is our recommended software because a graduate hired by business is almost sure to have Excel available for use at the business and a large percentage of analysts doing analytics, big data, data mining, data science analysis use it. Plus Excel has added several new capabilities in Excel 2013 that increase its big data capabilities and the statistical packages JMP and SAS can be accessed as an add-in with a tab on Excel.

### **EXCEL CAPABILITIES FOR THE BUSINESS STATISTICS CLASS**

The session will end with a presentation of some Excel based analysis methods/techniques that we believe will prove to be of future value to students.

The overview of Excel topics will include:

- New Charting Capabilities
- Conditional Formatting
- Flashfill
- GeoFlow
- PowerPivot 2013
- PowerView
- Quick Analysis Tools Slicers
- Sparklines
- Standard Pivot Tables

## SUMMARY

The main focus of the session will be on what is being taught in the introductory business statistics class and what should be taught to prepare students for a future that will be more reliant on decision making using data. Big Data is a hot topic now and as a hot topic it presents an opportunity for the introductory business statistics to have a more important place in the business curriculum if the course is properly structured to provide real value to the students. If statistics faculty do not take advantage of this opportunity then faculty from other disciplines will fill the void and the value of the introductory business statistics class will decline. The reasons cited support the authors' conclusion that Excel should be the software of choice for the introductory statistics class so that the students are best equipped for their future. Hence the session also covers Excel capabilities and illustrates how the knowledge of using these effectively will be valuable for students in analyzing big spreadsheet data.

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## Critical Andragogy and Teaching the Principles of Macroeconomics Course: A Pilot Study

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“Critical pedagogy is a philosophy of education described first by Paulo Freire and developed by Henry Giroux educational movement, guided by passion and principle, to help students develop consciousness of freedom, recognize authoritarian tendencies, and connect knowledge to power and the ability to take constructive action.”<sup>i</sup>

Examples of critical pedagogy exist in the choices of curriculum (do we teach creationism or evolution?<sup>ii</sup> and in our choices in the classroom. (Personally I focus on how much time to focus on the classical macro-theory vs, Keynesian macro-theory.) We require certain courses, and, we require certain topics within each course. The Board of Regents of the University System of Georgia and AACSB dictate some of the choices we make.

Teaching adults is also wrought with the complications of teaching within a politically-informed framework, obviously in the choice of political science, history, and women’s studies, but most especially within the principles of economics courses, both macro and micro. I try to avoid confrontational politics within my courses, but of course neither course is apolitical. In microeconomics, the role of government in imperfect markets is stressed. The assumptions of perfect markets include

- Lots of buyers and sellers
- Complete, relevant information
- No product differentiation
- No ability to set prices
- No transactions or other costs

What can we do when these assumptions are not true? The question then becomes, “should the government do anything?”

Within the context of the principles of macroeconomics, the choice of teaching a Keynesian-based theory is an andragogical choice as well as a political choice. To me, teaching Keynes is grounded in the assumption that this is easier for most students, particularly those without a background in calculus, to grasp. Always, my focus is on what they can take away. In microeconomics, I want them to learn decision-making skills; in macro I want them to learn some of the tools of citizenship—what is the government doing? Is it right? Is it appropriate? Will it work? (This is also true of microeconomics.)

Since spring semester 2009, I have incorporated an Excel-based study of current macro-indicators. My goal is two-fold: To have my students understand the importance of macro data and its relation to a Keynesian-based theory, and also to see the underlying relationships among key macro indicators, particularly gross domestic product (GDP), unemployment rates, changes in the price index, and changes in the money supply.

My main purpose is to get students to see the relationships among key macro-indicators. In the early stages, led with the help Joyce Sandusky,<sup>iii</sup> the project worked. Students would collect current data from the Bureau of Economic Analysis, the Bureau of Labor Statistics, and the Federal Reserve. As the economy recovered, however, the relationships have become blurred. Students are collecting too much data, so information is obscured. In addition, many students have a poor understanding of Excel, and therefore, get very little out of the project.

I still think the exercise is valuable, but it needs to be reframed and a more serious analysis of actual student learning applied. Here is my plan to revise the exercise and to develop a quasi-experimental project that can extend over time.

First step: Get IRB approval for using student assessment for publication.

Second step: Collect pre- and post-test data on student accomplishment re understanding of the relationship of key macro-indicators for fall and spring semesters.

Third step: Reformulate the exercise based on student accomplishment during the fall and spring 2013 exercise. Put more emphasis on Excel skills.

Fourth step: Compare results.

Next step: Expand the study to include more countries and different kinds of economies.

Next step: Find a way to discover how the assignment has improved student "citizenship, if possible.

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<sup>i</sup> Giroux, H. (October 27, 2010) "Lessons From Paulo Freire", [Chronicle of Higher Education](#). Retrieved 5/20/13.

<sup>ii</sup> Pinholster, G. (February 19, 2006) "AAAS Denounces Anti-Evolution Laws as Hundreds of K-12 Teachers Convene for 'Front Line' Event", [AAAS News](#). Retrieved 9/31/13.

<sup>iii</sup> Joyce Sandusky works with faculty and students at CSU to learn critical technological skills.

## **An Application of Statistics: Using the “Moneyball” Story in a Basic Statistics Course**

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### **ABSTRACT**

The purpose of this paper is to provide a teaching guide to a set of supplementary materials for a beginning statistics course using the book “Moneyball” by Michael Lewis. It provides a great business context for using statistics to gain a better perspective of the world. The book helps to illustrate the importance of measurement, data collection, hypothesis testing, model building, application of the scientific method, and, most importantly, developing a conversation of questions, hypotheses, results of analyses, model building, that is pertinent to the management of a business in a very competitive environment.

### **INTRODUCTION**

A first course in statistics can be a challenge for the student and instructor. One of the instructors’ challenges is student lack of motivation or interest to learn about statistics that is, perhaps, related to the question of relevancy. However, a general knowledge of statistics, probability, and the scientific method, as they relate to decision making and policy making is a very real value-added product of a statistics course.

Unfortunately, many courses are designed to create the knowledge of basic statistics, their calculation and interpretation. Indeed, the difficulty is relating the basic and simple, elementary statistics to something that is relevant. As instructors, we struggle to find a context that makes the statistics meaningful. One classic article [1] is “The Median is not the Message” by Stephen Jay Gould. The article clearly, at least to these authors, uses the positively skewed distribution of lifespan after a cancer diagnosis to develop a conversation about using the distribution to explore variance and the reasons for the variance in the distribution. The statistics provide an objective basis to continue a conversation about life span and life after a diagnosis of cancer. Our careers as instructors of statistics are made easier by articles like these.

This paper explores another source of applied statistics that is interesting, relevant, and supported by widely available data [2]. The source is the book “Moneyball” by Michael Lewis [3]. This paper will explore and propose a guide to using “Moneyball” and the Major League Baseball data as supporting materials for a first course in statistics. There are other supporting materials that will also be noted in this paper.

### **“Moneyball”: The book**

“Moneyball” (MB) has several themes and stories. They include a brief biography of Billy Beane’s baseball career, a comparison of a traditional approach and a new data based approach to managing a professional baseball team, and stories of several professional baseball players whose careers were extended because of a new data based approach to professional baseball. However, the theme that is most useful to a beginning course in statistics encompasses the essence of our discipline as an extraordinary application to the evolution of an entertainment industry, professional baseball.

A major challenge of using MB in a beginning statistics course is that all students are not familiar with baseball. So the challenge is to define baseball in a larger context, which is the competitive environment of an organization, corporation, or company. And how an organization can remain competitive with limited resources. This burden falls on the instructor. The challenge is to use the book in the broader context while limiting baseball jargon to the very necessary references. The authors do not claim to know exactly how to face this challenge but have explored the challenge in the Spring Semester of 2013. So, in the context of organizations seeking to be successful with limited resources in a competitive environment, a class discussion is useful to establish the basis for using MB. The following is a proposed sequence of questions for a classroom discussion that can frame the context of the book.

- What defines organizational success? Making a profit.
- How do organizations make a profit? (Revenue-costs) > 0
- How is revenue generated? Customers' decision to purchase a product or service.
- How are costs determined? Player salaries.
- What attracts customers? Winning baseball teams
- How do baseball teams win games?

So how do baseball teams win games? What are the hypotheses? What is the science? As the baseball industry has evolved, the marketplace for talented baseball players has become very competitive. Players sign contracts worth millions of dollars. And the teams with the largest budgets to spend on players are able to buy the best talent.

So is it correct that an organization must simply hire the most expensive players to win the most games? Here is an opportunity to test a hypothesis, to start the scientific method, and to show the relevancy of knowing how to apply statistics. The proposed hypothesis is: The teams with the highest payroll win the most games. Using the Major League Baseball (MLB) data, students can do the analysis. All analyses in this paper are based on the 2011-2012 seasons.

Payroll (Millions \$)	WINS						Grand Total
	50-59	60-69	70-79	80-89	90-99	100-110	
35-52	1		2	1	1		5
52-69	1		4	3	3		11
69-86		3	4	1	5		13
86-103		3	2	4	1		10
103-120		2	1	3	3		9
120-137			2	1	1		4
137-154			1				1
154-171				1	1		2
171-188		1		1		1	3
188-205					2		2
<b>Grand Total</b>	<b>2</b>	<b>9</b>	<b>16</b>	<b>15</b>	<b>17</b>	<b>1</b>	<b>60</b>

So the process of discovery starts. Using elementary statistics, students can summarize the data and start a conversation about this industry. Specifically, do the statistics indicate that the organizations with the highest payroll are more likely to be successful, that is, win the most games? It is clear that the

hypothesis is incorrect. The null hypothesis is rejected and this result should stimulate further inquiry. So, what is the continuing conversation? How are the seventeen organizations with varying payrolls successful, that is how do they win more than ninety baseball games? How does an organization recruit, hire, and train employees that lead to success?

So now the fun begins. And this is really part of statistics, measurement. How does an organization measure employee potential and talent? And what measures of an employee are most directly related to organizational success? What employee actions are most highly correlated with winning games? How does an organization select employees?

Measuring employee talent in baseball has been, and probably continues to be a subjective assessment based on limited, biased, qualitative data. A scout or interviewer travels and observes potential employees. Paul DePodesta, a Harvard graduate and the current vice president of player development and scouting for the New York Mets, ... "was fascinated by irrationality, and the opportunities it created in human affairs for anyone who resisted it. ... the market for baseball players ... was far more interesting than anything Wall Street offered. There was, for starters, the tendency of everyone who actually played the game to generalize wildly from his personal experience. People always thought their own experience was typical when it wasn't. There was also a tendency to be overly influenced by a guy's most recent performance: what he did last was not necessarily what he would do next. Thirdly—but not lastly—there was the bias toward what people saw with their own eyes, or thought they had seen. The human mind plays tricks on itself when it relied exclusively on what it saw... There was a lot you couldn't see when you watched a baseball game" [3, p.18].

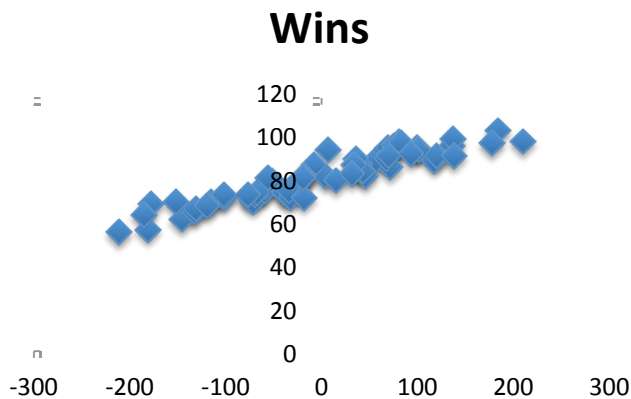
However, observers of baseball organizations have been recording employee performance data for some time. Some of the performance measures are hits, outs, homeruns, fielding errors and many more. Still the question is, what measures of performance are most closely associated with winning games.

Enter Bill James who authored the Baseball Almanac. Mr. James was not a statistician; he was a writer and his topic was the baseball industry. He was the science behind the industry. He wanted some one to prove their hypotheses, their hunches, and their guesses about baseball. Conjecture was his enemy. James' approach to baseball was that "... everything from on-field strategies to player evaluation was better conducted by scientific investigation—hypotheses tested by analysis of historical statistical baseball data—than by reference to the collective wisdom of old baseball men. By analyzing baseball statistics you could see through a lot of baseball nonsense. For instance, when baseball managers talked about scoring runs, they tended to focus on team batting average, but if you ran the analysis you could see that the number of runs a team scored bore little relation to that team's batting average" [3, pp 56-57]. Based on MLB data for the 2011-2012 seasons, the correlation coefficient is 0.767 or a  $R^2$  of 59%. Conversations about the industry needed to be based on premises substantiated by data and statistics. And the conversation was about how a baseball organization can be successful. Selecting players based on batting average was not the best measure of employee performance.

### **Managing for Success**

In the baseball industry, the number of wins defines success in a regular season. Therefore how do employees generate wins? Bill James was not a statistician, but he had data and experimented with performance statistics to develop interesting predictors of "number of wins". One premise that he tested is that if a team scored runs, and more runs than the opponent, the team would win games. Can

this premise be verified? Again, we can turn to the data. Plotting wins in a season against runs differential we get:



For this relationship, the correlation coefficient is 0.94, the coefficient of determination is 88%, and the equation is  $Wins = 80.93 + 0.1078(\text{runs scored} - \text{runs scored against})$ . So the statistics support and prove a point. Winning teams score runs, and they score more runs than their opponents. In addition, the results of the statistical analysis show that, on average, a team needs to score at least 84 more runs than their opposition over a season to win 90 or more games.

So the conversation continues. What employee actions generate runs? Further, how does an organization assemble a team to generate runs? What organizational policies and guidelines should be established to be successful?

Again enter Bill James, measurement, and the controversy of the “walk”. Traditionally, walks were considered a non-event. It was not counted or measured or considered a contribution to producing runs and being successful. Batting average does not account for walks. Mr. James experimented scientifically to arrive at a model that would evolve into decision-making policy. The model was:

$$\text{Runs Created} = (\text{hits} + \text{walks}) * \text{total bases} / (\text{at bats} + \text{walks}).$$

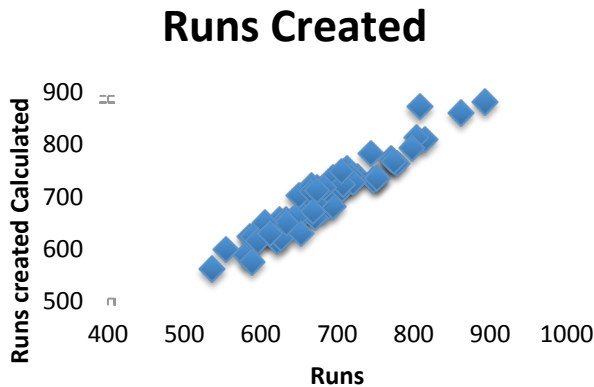
There was nothing elegant or principled in the way he went about solving the problem. He apparently did not know about regression analysis. He simply tried various equations or models until he found one that closely calculated a team’s season run totals. Crude as it was, the equation could fairly be described as a scientific hypothesis: a model that would predict the number of runs a team would score given its walks, singles, doubles, etc. He could test the model using data from past seasons and compare the results to the runs the team scored that season. If the actual number of runs scored by the 1975 Boston Red Sox differed dramatically from the predicted number, his model was clearly false. If they were identical, James was probably onto something. As it turned out, James was onto something. His model came far closer, year in and year out, to describing the run totals of every big league baseball team than anything the teams themselves had come up with.

That, in turn, implied that professional baseball people had a false view of their offenses. It implied, specifically, that they didn't place enough value on walks and extra base hits, which featured

prominently in the "Runs Created" model, and placed too much value on batting average and stolen bases, which James didn't even bother to include.

When applied to the data (MLB data for the 2011-2012 seasons), the correlation between Bill James formula and actual runs is 0.96. For the 2011 and 2012 data, the formula overestimates by about +10 runs on average. Clearly, the formula proposed a conversation about how to be successful in creating runs and therefore winning games.

□



“But once again, the details of James's equation didn't matter all that much. He was creating opportunities for scientists as much as doing science himself. Other, more technically skilled people would soon generate closer approximations of reality. What mattered was (a) it was a rational, testable hypothesis, and (b) James made it so clear and interesting that it provoked a lot of intelligent people to join the conversation.” [3,p. 78] "The fact that the formulas work with the accuracy that they do is a way of saying there are essentially stable relationships between batting average, home runs, walks, other offensive elements—and runs," wrote James

As a result of applied statistical analysis, the way that organizations competed changed. It became clear that offense in terms of getting on base with hits or walks, and collecting bases through extra base hits was the clear criterion for deciding on the characteristics of employees that would make a baseball team successful.

### Summary

The purpose of this paper is to provide a teaching guide to a set of supplementary materials for a beginning statistics course using the book “Moneyball” by Michael Lewis. It provides a great business context for using statistics to gain a better perspective of the world. The book helps to illustrate the importance of measurement, data collection, hypothesis testing, model building, application of the scientific method, and, most importantly, developing a conversation of questions, hypotheses, results of analyses, model building, that is pertinent to the management of a business in a very competitive environment.

We hope that this paper inspires statistics instructors to broaden their course objectives beyond the calculation and interpretation of statistics and show their students the real meaning and relevancy of statistics.

In addition to the book, “Moneyball” story has been made into a movie that is a good tool for generating student interest. For additional interest, to validate the realism of the movie, instructors can use the following true and false reference for the movie: [www.mercurynews.com/news/ci\\_18937797](http://www.mercurynews.com/news/ci_18937797). Instructors and students can access an interview with Billy Beane at: ["Moneyball": Tracking Down How Stats Win Games.](#) *Fresh Air from WHY?*. September 23, 2011 (originally broadcast on May 28, 2003). [audio: 31 min 53 sec]. Another excellent reference is an interview with Bill James: ["The Man Behind the 'Moneyball' Sabermetrics."](#) *Talk of the Nation*. September 26, 2011. [audio: 17 min 6 sec]. We believe that all these references and sources support the discussion and conversation to support the use of “Moneyball” in a beginning statistics course.

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# **INTEGRATING STUDY ABROAD INTO A BUSINESS CURRICULUM: A CASE STUDY**

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## **ABSTRACT**

Research suggests that study abroad has substantial benefits for students. Barriers to semester study abroad include financial issues, the possibility of not graduating on time, and difficulties in fitting study abroad courses into degree programs (Doyle et al., 2009). Universities can address these concerns by negotiating costs with international partner universities and by developing plans of study that integrate study abroad courses into degree programs (curriculum integration). This paper presents a process for curriculum integration.

## **INTRODUCTION**

In 2011, a regional comprehensive university in the southeastern United States initiated a Global Learning Initiative (GLI). The learning objectives for that program include “global knowledge, global attitudes, and global engagement”. The university has an International Center and a well-established study abroad program, with twenty partner universities. The GLI program includes a curriculum integration initiative, which is designed to give students in every undergraduate major an opportunity to study abroad for a semester and take courses that meet degree requirements, without delaying graduation. In each major, faculty were selected to identify at least two appropriate partner universities and prepare eight-semester plans of study that would meet those objectives. The plans of study will be used to help students make good decisions about study abroad, guide their course selections, and assist their advisors.

The College of Business at the university offers several degree programs, including a Bachelor of Science in Business Administration (BSBA), with twelve concentrations. This paper presents a process for developing the plans of study that were required for curriculum integration of the BSBA program.

## **REVIEW OF LITERATURE**

There is a large body of literature related to the benefits of study abroad. One of the most ambitious studies was the Georgia Learning Outcomes of Students Studying Abroad Research Initiative (GLOSSARI), a carefully-designed study of academic outcomes of study abroad in 35 institutions in the University of Georgia system. (Redden, 2010). Study abroad students were compared with a control group that matched the institution, semester in college, and class standing of students who had studied abroad. The study concluded that study abroad improved both graduation rates and cumulative GPA. On these measures, African American students benefited more from study abroad than other ethnic groups; students who entered college with the lowest SAT scores benefited more from study abroad than those with higher scores. The GLOSSARI study also found that study abroad increases students’ intercultural knowledge.

Other research has also substantiated the benefits of study abroad. Researchers at Michigan State University found small, but statistically significant, gains in personal growth, intercultural awareness, professional development, and academic performance (Ingraham & Peterson, 2004). In this study, the length of study abroad ranged from three weeks to one semester. The benefits of study abroad were positively correlated with the length of study. In a related study, Black and Duhon (2006) assessed the impact of a one-month study abroad program in London on cultural adaptability. Using a pretest-posttest methodology, Black and Duhon (2006) found statistically significant gains in flexibility and openness, perceptual acuity, emotional resilience, and personal autonomy. In a third study, Lee, Therriault, and Linderholm (2012) administered standard tests of creative thinking to three groups of students: students who had studied abroad, students who planned to study abroad, and students who had not studied abroad and did not plan to do that. Students who had studied abroad performed better on tasks that required creative thinking than the other two groups of students. The length of study abroad was not reported.

Doyle et al. (2009) summarized research on barriers to study abroad. According to these authors, students are concerned about financial issues, the possibility of not graduating on time, and difficulties in fitting study abroad courses into their degree programs. Sanchez, Fornerino, and Zhang (2006) also identified financial issues as a barrier to study abroad.

The GLI curriculum integration initiative responds to research findings in three ways. First, the initiative focuses on semester study abroad, which has a greater impact than short-term programs. Second, the university's study abroad programs are less expensive than most other semester study abroad options. Third, the initiative provides plans of study that show students how to fit study abroad into their degree programs, without delaying graduation.

## **CURRICULUM INTEGRATION IN A COLLEGE OF BUSINESS**

The author was assigned to develop plans of study for five BSBA concentrations: Health Care Management, Human Resources Management, International Business, Management, and Sustainable Business. For each concentration, there was an existing eight-semester plan of study for the home campus, showing the courses that a student would need to take in order to graduate. All plans of study followed the same basic format:

- Freshmen take general education courses and an Introduction to Business course.
- Sophomores continue with general education courses, which also taking foundation courses in economics, accounting, and statistics.
- Juniors and seniors take primarily core business courses and concentration courses.

Curriculum integration involved five steps:

1. Determine the most feasible times for students to study abroad.
2. Evaluate the universities with which we have exchange programs. Select two of these partner universities as the best places for our business students to study.
3. For those two universities, identify courses that could be taken there.
4. Develop templates for study abroad at each partner university.
5. For each concentration and each partner university, modify the existing plan of study to include a semester of study abroad at the partner university.

## **The Most Feasible Times to Study Abroad**

Faculty members were especially interested in institutions where our students would be able upper-level business classes, particularly core courses. Taking upper-level business courses abroad may give students insight into the impact of culture on business. Most core courses can be taken in the first semester of the junior year, allowing students to spread concentration courses over their last three semesters at the home university. Also, students are probably less likely to encounter prerequisite issues with core courses than with concentration courses. Finally, juniors are likely to be more mature than freshmen and sophomores. A review of plans of study for the home campus showed that students in the International Business and Sustainable Business concentrations would be able to study abroad in the first semester of the junior year, if suitable courses could be found at partner universities.

While studying abroad during the first semester of the junior year seemed to be ideal, an analysis of existing plans of study showed that students in some concentrations would need to go abroad before that time, so that graduation would not be delayed. Our Health Care Management concentration requires four semesters to complete. The first semester of the junior year includes a required course that is specific to the United States and is offered only in the fall; this precludes study abroad during the first semester of the junior year. Students in the Management and Human Resources Management concentrations need to take Principles of Management in the first semester of the junior year, to meet a prerequisite requirement in the second semester of the junior year. Those students would need to (1) study abroad before the junior year, or (2) study at a university that offers Principles of Management in the fall semester.

Our partner universities do not accept freshmen for study abroad, and some do not accept first-semester sophomores. Therefore, if a student cannot study abroad during the first semester of the junior year, the most feasible time to study abroad is the second semester of the sophomore year. This means that our Health Care Management students should schedule study abroad in the second semester of the sophomore year.

## **Selecting Partner Universities for Study Abroad**

The author's university has semester exchange programs with about twenty partner universities. The first step was to identify partner universities that have business degree programs and offered several undergraduate core courses in business that are compatible with our curriculum. There were four partner universities that met those requirements:

- Deakin University in Melbourne, Australia
- American University in Cairo, Egypt
- The Florida State University campus in Panama City, Panama
- Kingston University in London, United Kingdom

The American University in Cairo was eliminated from consideration because of political unrest in Egypt, which could create an unsafe situation for students. Each of the other three institutions had attracted business students in the past. There was anecdotal evidence that each had provided positive experiences for students. Deakin and Kingston have been among our most popular study abroad programs. The Florida State campus in Panama has attracted a much smaller number of students. For this reason, a decision was made to develop plans of study for Deakin and Kingston. If there was a concentration where neither Deakin nor Kingston was workable, Florida State in Panama would be a good choice.

## Course Selection

The next step was to review course offerings at Deakin and Kingston universities and select courses that are appropriate for transfer credit. Both partner universities provide course listings and course descriptions for inbound study abroad students on their Web sites. General Education courses were reviewed according to the home university's general education requirements. The following questions were used to review core business courses and foundation courses:

- Is the course substantially equivalent to the corresponding course in our program?
- If the study abroad course requires a prerequisite, will our students have taken the prerequisite before they study abroad?
- If the course is a prerequisite to a more advanced course in the BSBA program, will the study abroad course enable students to succeed in the advanced course?
- Is the course offered in the semester when our students would need to take it? For most general education courses, this was the spring semester. Core business courses were needed in the fall semester. With some adjustments in plans of study, Business Statistics II and Managerial Accounting could be taken in either semester.

Courses that met the requirements described above were referred to appropriate administrators for approval. Table 1 shows the approved courses. Except as noted, these courses are available in both the fall and spring semesters. Both Deakin and Kingston also offer elective courses that can be used to complete a schedule.

Table 1  
Approved Study Abroad Courses  
Semester Hours in Parentheses

	Deakin University	Kingston University
General Education Requirements	Global Perspectives (3) Humanities and Arts (3) Social Science (3)	Global Perspectives (4) Humanities and Arts (4) Natural Science (4) (spring)
Foundation	Managerial Accounting (3)	Business Statistics II (4) (fall)
Business Core	Management Information Systems (3) Principles of Management (3) Principles of Marketing (3)	Operations Management (4) (fall) Principles of Finance (3) (fall) Principles of Marketing (4) (fall)

In developing templates for study abroad, differences in course load and credit hours per course must be considered. At the author's university, the normal course load is 15-16 hours, and most courses earn three credits. Courses at Deakin University also earn three credits, but the normal course load for incoming study abroad students is 12 hours. A student can request permission to take 15 hours, but permission is not always granted. A student who is limited to 12 hours at Deakin will need either a summer course or an 18-hour semester later.

At Kingston, the standard course load is 15-16 hours, and most courses earn 4 credits. Since a student needs only four courses to earn 15-16 hours, a semester at Kingston will eliminate 3-4 general elective hours from the student's degree program.

Table 1 was used to develop templates for study abroad semesters at each of the two partner universities. The plans of study for Deakin and Kingston are based on those templates, which are shown in Table 2.

Table 2  
Study Abroad Templates

	Deakin University	Kingston University
Study abroad during the fall semester of the junior year	Management Information Systems (3) Principles of Management (3) Principles of Marketing (3) Elective (3)	Business Statistics II (4) Operations Management (4) Principles of Marketing (4) Principles of Finance (3) OR Global Perspectives (4)
Study abroad during the spring semester of the sophomore year	Managerial Accounting (3) Global Perspectives (3) Humanities and Arts (3) Social Science (3)	Global Perspectives (4) Humanities and Arts (4) Natural Science (4) Elective (4)

As stated earlier, our Management and Human Resources Management students need to take Principles of Management in the first semester of the junior year. The plans of study for those concentrations are based on study at Deakin University in the first semester of the junior year, or at Kingston University in the second semester of the sophomore year.

### Creating Plans of Study for Study Abroad

A four-step process was used to create plans of study.

1. Select the study abroad template for the desired university and semester from Table 2.
2. Start with the standard plan of study for the concentration. Remove courses that will not be taken abroad from the study abroad semester.
3. Move study abroad courses from their original semester to the study abroad semester.
4. Assign the courses that were removed to other semesters. Additional adjustments may be needed to balance the course load across semesters.

The process of creating a plan of study for the International Business concentration at Kingston will be used as an example. Table 3 compares the last five semesters of the standard plan of study and the plan of study for Kingston in the fall semester of the junior year.

The following changes were made in the original plan of study.

1. The courses to be taken at Kingston were inserted in Semester 5. One course was moved from Semester 4, and two were moved from Semester 6. Global Perspectives stayed in Semester 5.
2. A general education requirement in Natural Science was moved from Semester 6 to Semester 4.
3. Principles of Finance, Principles of Management, and Business Communication, which had been in Semester 5, were assigned to Semester 6.
4. An International Culture elective was from Semester 5 was assigned to Semester 7, replacing an elective. As expected, the number of general electives was reduced from three to two.

The new plan of study was complete.

Table 3  
 Creating a Plan of Study for Study Abroad  
 International Business Option at Kingston University

	Original Plan	Study Abroad Plan
Sophomore Year Spring Semester (Semester 4)	Managerial Accounting Macroeconomics Business Statistics II Critical Reading, Thinking, and Writing Foreign Language 102	Managerial Accounting Macroeconomics Critical Reading, Thinking, and Writing Natural Science (from Sem. 6) Foreign Language 102
Junior Year Fall Semester (Semester 5)	Principles of Finance Principles of Management Business Communication Global Perspectives International Culture Elective	Business Statistics II (from Sem. 4) Operations Management (from Sem. 6) Principles of Marketing (from Sem. 6) Global Perspectives
Junior Year Spring Semester (Semester 6)	Management Information Systems Sustainable Operations Principles of Marketing Natural Science Elective (300 level or above)	Management Information Systems Principles of Finance (from Sem. 5) Principles of Management (from Sem. 5) Business Communication (from Sem. 5) Elective (300 level or above)
Senior Year Fall Semester (Semester 7)	International Trade and Investment Global Marketing Business Law Technical Writing Elective	International Trade and Investment Global Marketing Business Law Technical Writing International Culture Elective (from Sem. 5)
Senior Year Spring Semester (Semester 8)	Business Policy International Finance International Management International Business Internship OR International Field Experience Elective	Business Policy International Finance International Management International Business Internship OR International Field Experience Elective

### SUMMARY

Research suggests that study abroad has substantial benefits for students. Study abroad at partner universities, where costs have been negotiated, is a cost-effective choice for students. Curriculum integration can make it easier for students to study abroad, without delaying graduation. Curriculum integration involves (1) identifying the most feasible times for students in each degree program and concentration to study abroad, (2) selecting appropriate partner universities for study abroad, and (3) developing plans for study abroad at those universities. A process for implementing curriculum integration in a College of Business has been described. The plans of study will be used to help students make good decisions about study abroad and course selections. It is hoped that the availability of these plans will encourage more students to consider study abroad. Since partner universities change their curricula from time to time, it will be important to monitor the curriculum at each partner university and update the plans of study when needed.

At the author's university, curriculum integration does not limit student choice. Business students will still be able to take advantage of other approved study abroad programs offered by the College of Business, the university, study abroad providers, and other universities.

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## The College Experience for Individuals with Intellectual Disabilities

### The THRIVE Program at the University of Central Missouri

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For most individuals with intellectual disabilities, that category of exceptionality once referred to as “mental retardation,” their years of formal education are concluded upon graduation from high school, or for some, when they reach age 21 and have not met all graduation requirements. And while transition from school to adult functioning is a requirement for all students with special needs according to the Individuals with Disabilities Education Act (IDEA), most of these young adults are relegated to a future of supported employment, sheltered workshops, or in some instances, a day-to-day life of mind-numbing sameness. Until recently, these young adults typically resided at home with their parents and were protected from society by families who had little choice in employment options, living arrangements or prospects for upward advancement. In some situations, where communities were large enough to provide options, group homes, work enclaves, and employment opportunities were made available so that these individuals could experience some semblance of being absorbed into the fabric of “normal society.”

Individuals with intellectual disabilities, while perhaps educationally and sociologically different in many respects from their typically-developing counterparts, are nonetheless not immune from the need to identify with their age peers, to experience intimacy, to feel acceptance, gain respect of others and knowledge of self-worth; things that are often denied them due to perceived notion that “these people” cannot achieve those ends. However, there is a growing movement nationally that these things can be accomplished if society simply gives these individuals a chance.

Attending post-secondary educational programs was nearly unheard of as recently as 20 years ago for this population. The obvious question was asked by those in academia and elsewhere: “What can a person with moderate intellectual disabilities possibly be expected to gain from such experiences as attending college?” Is it worth the time and financial costs of sending a person who can barely read and write to the hallowed halls of the university, and to what end for society? Seldom was the question asked: “Isn’t there something else in store for these people rather than a future where little is expected, little is offered, and little is achieved?”

Attending college or other post-secondary vocational programs greatly increases the likelihood of obtaining gainful employment, achieving independence, and generally experiencing success as an adult (Wagner, Newman, Cameto, Garza, & Levine, 2005). Individuals with



disabilities who obtain a post-secondary education--whether it be completing a technical training program, a community college's 2-year associate's degree, or a 4-year bachelor's degree -- enjoy increased vocational options and greater lifetime earnings ( Madaus, 2006; Stodden, 2005). Overall, according to Madaus (2006), college graduates can expect to have better health, greater self-confidence, increased career options, higher-level problem-solving skills, improved interpersonal relationships, and a greater level of open-mindedness as well as more involvement in politics, community affairs, recreation, and leadership activities.

And yet, due to increasingly stringent standards for admission to most colleges and universities, just passing the required entrance examinations (i.e. ACT or SAT) poses enormous obstacles for nearly all students with disabilities, particularly those with moderate intellectual impairments. And even if students with intellectual disabilities are admitted to a college or vocational training program, there remain the problems of academic support, social acceptance, living independently in an apartment or dormitory, navigating the physical campus, and so forth, which pose novel challenges to most in-coming students at a college campus. Many young adults with intellectual disabilities have never been away from their homes and parents for longer than a few days or weeks at summer camps or sporting events such as Special Olympics. As such, for many young adults and their parents, college has generally not been a viable post-secondary option to consider. However, there has been a growing movement, led by the organization known as *Think College*, that is making earning a college degree for individuals with intellectual disabilities a reality.

Think College is an initiative of the Institute for Community Inclusion (ICI) at the University of Massachusetts Boston, funded by federal grants focused on post-secondary education for people with intellectual disabilities. Numerous grants have been awarded through the *Think College Initiative* and the result is that hundreds of young adults with intellectual disabilities are going to college, completing degrees, and using those degrees in spite of the odds that have been stacked against them. One university in Missouri has established its own program of this type, and although not affiliated with the *Think College Initiative*, that program is growing and is rapidly gaining recognition as an innovative project designed to enhance the lives of people with intellectual disabilities who, just a few short years ago, would never have imagined that they could attend a university and have a college experience equal to what all people have if given the opportunity.

The THRIVE program at the University of Central Missouri was established in 2010, and is now in its third cohort of 12 students with intellectual disabilities (ID). THRIVE is an acronym for Transformation, Health, Responsibility, Independence, Vocation, Education and the students involved in this program learn to embody each of these traits as they learn, grow, and mature as

young adults. THRIVE students are carefully screened and selected by a panel of stakeholders including parents, university faculty members, community agency staff members, and university students who serve as mentors to the THRIVE students once they are selected and come to campus.

The purpose of this paper is to present timely information to the reader such that a similar program could be replicated on other university campuses. The THRIVE Program at UCM has been a resounding success. Several of the THRIVE Program graduates now reside in large metropolitan areas including New York and Washington, DC, and are gainfully employed and living independently. Mistakes have been made, but the program has learned from those mistakes and the program called THRIVE is, indeed, thriving.

### **THRIVE PROGRAM DESCRIPTION\***

THRIVE is a post-secondary program for students ages 18-25 years with intellectual and developmental disabilities. THRIVE students have the opportunity to earn a 2-year certificate of success while living on campus and participating in courses and activities offered at University of Central Missouri. If successful in noncredit classes, THRIVE students may be recommended to take coursework in a degree-seeking program or pursue a vocation depending on interests and academic abilities. Students enrolled in the THRIVE program will experience:

- Baseline assessment in reading, language arts, math, and communication;
- Core classes that emphasize life and social skills, independent living, academic skill development and enrichment, and workplace and community skills;
- Residence hall living on campus supported by THRIVE student mentors;
- Person-centered planning, counseling, and internships based on the student's individual strengths allowing opportunities that match the student's skills and interests;
- Full integration into residential, social, and community life;
- Experienced instructors, advisors, and counselors to support each student;
- Collaborative partnerships with educational agencies and community businesses.

### **CANDIDATE DESCRIPTION**

All candidates must have a strong desire to become an independent adult, possessing sufficient emotional stability and maturity to successfully participate in the program. The ideal candidate for the THRIVE Program will:

- be between 18 and 25 years of age at the time of admission;

- have been diagnosed with an intellectual or developmental disability consistent with eligibility for a free, appropriate public education;
- demonstrate basic skills in reading, writing, math, and communication;
- be able to administer any necessary medications independently;
- possess a desire and potential to benefit from a post-secondary educational experience, but be unlikely to meet the usual college admission criteria or to be successful in a traditional college degree program;
- be motivated to become an independent adult;
- possess sufficient emotional maturity and stability to participate in all aspects of a residential college-based program, with supports;
- demonstrate the ability to accept and follow rules and display respectful behavior;
- agree to attend and participate in classes and activities related to the THRIVE program.

All THRIVE students participate in the UCM Week of Welcome in August, beginning with Mule Haul on Sunday (move-in day) and including a formal Convocation on Monday, with faculty in academic regalia. This traditional series of events provide the student's first introduction to college and campus life. Throughout the week, many events and activities are offered to assist the student in learning his/her way around campus, making new friends, and getting a taste of campus activities. During the week, students will begin their ongoing interactions with typical college students, their new THRIVE classmates, and the THRIVE staff and mentors. A THRIVE-specific schedule is provided to all THRIVE students prior to move-in day.

### **PROGRAM PHILOSOPHY: SELF-DETERMINATION**

The THRIVE Program is based on the tenets of self-determination, as expressed in the six strands of the program's philosophy and curriculum:

- **Transformation** – Students are provided with opportunities to increase their skills, abilities, and self-confidence, thus, helping them to become independent individuals in the job market and in their personal lives.
- **Health** – Students are presented with information, support, and opportunities to make good health choices.
- **Responsibility** – Students have opportunities to develop personal responsibility by maintaining a college regimen, working on individual and team projects and assignments, participating in campus community activities and service learning.

- **Independence** – Student participation in THRIVE offers opportunities to develop self-confidence and stronger skills in decision-making, problem-solving, and independent living.
- **Vocation** – Students participate in activities and classes that will allow them to increase and improve vocational skills and abilities.
- **Education** – Students build on existing academic skills to facilitate success in THRIVE and university courses, and in application to employment and daily life.

## **THRIVE STAFF**

THRIVE students take courses with many different UCM faculty members, but their closest adult allies on campus are the THRIVE staff and mentors. The Coordinator of the THRIVE Program manages daily activities of the program and supervises the Peer Mentors. The Coordinator also manages outreach through public speaking and recruiting potential THRIVE students. The Case Manager and Graduate Counseling Intern work individually with each THRIVE student to develop a person-centered plan, select courses, and plan internship experiences. THRIVE Instructors teach the THRIVE seminars and courses each semester. Two additional UCM staff members have other full-time jobs on campus, and are assigned part-time to the THRIVE Program. They work primarily at an administrative level, making sure the program runs smoothly and keeping track of all the paperwork. Names and contact information for all THRIVE staff are provided at the parent meeting on Move In Day.

## **THRIVE PEER MENTORS**

THRIVE peer mentors are full-time students and part-time employees of the university who live in the residence halls with the THRIVE students. Mentors provide guidance and support after class hours and on weekends, balancing their THRIVE responsibilities with their own academic demands. These upper class level students receive training and support from the THRIVE staff and are seeking academic majors in special education, social work, psychology, or education. They are hired specifically for the THRIVE program and have expressed a strong desire to support students in their campus experiences. Mentors are the foundation of our support network outside of class time. When on duty, they schedule and supervise the study hall, organize social activities, and are available to provide evening and weekend support.

## **VOLUNTEERS**

Volunteers are UCM students, many of whom are majoring in education or other related fields of public service. Many faculty and staff also volunteer their time to work with THRIVE students. Volunteers may plan group activities in the residence halls, such as ice cream socials or game night, provide support in study hall, or go with students to campus activities as a buddy. Examples of past student/volunteer activities have included walking dogs on campus, playing one-on-one basketball, participating in physical activities at the UCM Student Activities Center, bowling, having meals together, or just hanging out and watching movies in the residence hall. Volunteers must complete an interview with THRIVE staff and pass a background check prior to working with students.

## **COURSEWORK**

Like most freshmen at UCM, all THRIVE students are required to participate in an orientation seminar (THRIVE Seminar I). All THRIVE students are initially enrolled as a group and have a common first semester course schedule designed to provide opportunities to:

- become oriented to the campus;
- gain organizational skills;
- participate in assessment of student skills and interests in academic (reading, language arts, math, communication) and vocational areas;
- experience integrated academic and social activities with THRIVE and typical peers.

The course descriptions at the end of this document outline the two-year sequence of THRIVE courses and internship experiences. These vary somewhat after the first semester, based on student ability and interest, and on course schedules and availability. A semester schedule is provided prior to the beginning of each term. A syllabus for each course is also provided by the instructor, explaining course objectives, assignments, and due dates. Syllabi are usually posted online in Blackboard; students and their families can access them to view or print.

## **THRIVE COURSE ASSIGNMENTS**

The following guidelines were created to assist our students in becoming responsible college students. These guidelines are followed in THRIVE courses to assist students in (a) understanding how college courses generally work, (b) requesting the help they need, and (c) completing their assignments on time. Instructors in regular UCM classes may have different expectations, which are explained in the course syllabus.

- All assignments are to be completed and submitted *at the beginning of class* on the due date. The instructor will specify *how* students are to submit the assignment—for example, on Blackboard, by email, or by handing in a paper. Most assignments must be typed.
- Students generally will receive support from the instructor and/or a mentor/volunteer prior to the due date of the assignment, but it is the student’s responsibility to ask for help if he/she does not understand the assignment or needs assistance completing it on time.
- All in-class work that is not turned in on time will become the responsibility of the student to complete as homework. It will be due at the beginning of the next class period.
- Points will be deducted for assignments that have been turned in after the due date.
- Assignments will not be accepted one week after the due date, and will be scored as zero.

Accommodations and modifications to regular course expectations will be arranged through the UCM Office of Accessibility.

### **PARTICIPATION IN OTHER UCM COURSES: NON-CREDIT**

Initially, all THRIVE students take courses on a non-credit basis. During each semester of the program, students are enrolled in THRIVE courses (attended only by their cohort) as well as in typical courses from the UCM catalog. The first semester, these integrated courses are selected for them, and they attend as a group. For example, during the first semester, groups of six students will be enrolled in an eight-week session of Bowling, followed by an eight-week session of Valuing Differences in groups of six (six THRIVE students with 15-20 typical UCM students per section). Also during the first semester, students work in Person Centered Planning to identify courses they might like to take as electives during subsequent semesters. These courses may be chosen to develop academic skills, or based on recreational or vocational interests. Although these courses are not taken for college credit, students are expected to attend regularly, participate fully, and complete assignments and tests to the best of their ability.

### **PARTICIPATION IN OTHER UCM COURSES: FOR CREDIT**

In addition, a goal of the THRIVE program is that highly-capable students may be offered the opportunity to receive credit in typical UCM courses, based upon the student’s interest, career goals, and ability. To be eligible for enrollment in typical UCM courses *for credit*, students must meet the following criteria during the first semester:

- Demonstrate success in THRIVE coursework. This is determined by the instructor, based on 80% or more of the possible points, good attendance, and a midterm grade of Progressing or Mastery.
- Demonstrate success in non-THRIVE (typical) courses. This is determined by the THRIVE staff, in consultation with UCM faculty, based on attendance, effort, and assignment completion that demonstrates they could achieve a grade of C in the class.
- Demonstrate overall accountability in working toward THRIVE program goals. This is determined by THRIVE staff, based on progress report data showing consistent 4s in all areas (see sample reports in Appendix B at the end of this paper).
- Academic skills and aspirations. Student expresses a desire to pursue a college degree; assessment results and coursework demonstrate the ability to function at the college level, with appropriate accommodations as needed.
- Behavior. Consistently follows rules and meets expectations of the program, with no major rule infractions or disruptive behaviors in class, the residence hall or in the community.

Students wishing to take classes for credit but not meeting these criteria by the end of the first semester may be re-evaluated at the midpoint of subsequent semesters.

## **CAREER GUIDANCE AND INTERNSHIPS**

Providing career guidance, internships, and vocational experiences is a critical part of the mission and curriculum of the THRIVE program. During the first semester, students explore their skills interests in Person Centered Planning, and identify internship preferences. In the second semester, students begin working on “soft skills” in the THRIVE Workplace and Community Skills class. They develop a resume and practice mock interviewing. During the third semester students participate in on-campus internships (Internship I); some may participate in community-based vocational experiences, based on skill level as well as the interests and goals outlined in their person-centered plan. Generally, students are introduced to the internship site gradually, beginning with 8-10 hours per week and increasing to 20 hours per week by midsemester. During the fourth semester, students will either complete Internship II in a second site on campus, or in the community. Internship is individualized, although students with similar interests may be placed in the same site. It is critical that students regard their internships as an important component of their college education and a required part of completing the THRIVE Program. Maintaining a high level of punctuality and attendance is mandatory for an internship to be successful.

## **ORAL COMMUNICATION AND COUNSELING**

Although coursework and internship are central components of the THRIVE Program, being able to communicate well with others and develop healthy social relationships also are critical to self-determination. Therefore, based on individual assessment results, all THRIVE students participate in activities designed to improve oral communication and interpersonal relations.

THRIVE students each receive a free hearing and oral communication screening through the Welch-Schmidt Communication Disorders Center on the UCM Campus. Along with other academic and social intake assessments, the communication evaluation allows us to assign THRIVE students—based on skills and needs—to individual and/or group activities designed to develop communication and self-advocacy skills. Some students may work on individual issues related to modulating voice tone and volume; others will work on building a functional vocabulary for workplace and community; many participate in pragmatic language groups focused on building interpersonal communication skills. The evaluations and sessions are conducted by graduate and upper-level undergraduate students studying Communication Disorders. They are supervised by a licensed speech-language pathologist.

THRIVE students also participate in individual counseling. Counseling is a professional relationship that empowers diverse individuals, families, and groups to accomplish mental health, wellness, education, and career goals. THRIVE students may address issues most all new college students encounter, such as transition from home to college, independent living, career exploration and learning to deal with roommate concerns. Counseling is provided by graduate interns in the Counselor Education Program Training Center under the supervision of a member of the Counselor Education Program faculty. All faculty are Licensed Professional Counselors with extensive experience working with a variety of populations. Counseling sessions are confidential, and information is only shared with THRIVE staff and parents with student permission, or when there is a safety concern.

## **ACCOMMODATIONS/MODIFICATIONS**

UCM has more than 12,000 students, and over 700 of them have self-reported a documented disability that affects their participation in classes. Each THRIVE student meets individually with the Office of Accessibility Services in the Student Union to review the accommodations and modifications they found helpful in high school and to determine what type of assistance may be needed at UCM. Common accommodations include: extra time to complete assignments or take tests, taking tests in the accessibility office, being paired with a nondisabled



student note-taker, and using audio textbooks. The Office of Accessibility Services will notify faculty of accommodations students will use, but it is the student's responsibility to self-advocate when necessary, and to follow through with picking up recorded materials and keeping appointments with tutors and proctors.

## **GRADING/REPORTING/RETENTION POLICY**

The THRIVE staff reviews each student's progress toward academic and social goals within the context of the THRIVE coursework. Weekly progress information is collected in a variety of ways, from student's weekly progress sheet (sample attached in Appendix B), from the residence hall sign-out sheet, from study hall attendance, and by regular email contact with non-THRIVE faculty members. Formal reviews occur at the middle and end of each semester, or in response to significant concerns with student achievement or behaviors. Midterm and end-of-semester progress summaries are emailed to the student with copies to parents within two weeks of the end of the grading period. The progress reports include information from THRIVE classes, non-THRIVE classes, weekly progress sheets, and from all program activities (Person-Centered Planning, language and counseling appointments, internship evaluations).

A student may be placed on probation or dismissed from the THRIVE program if the following guidelines are not followed:

- Student regularly attends, displays active participation in, and seems to benefit from coursework.
- Student participates in social activities on campus.
- Student follows the UCM Code of Conduct as published in the UCM student planner, follows housing rules, and follows program rules and expectations.
- Student displays behavior that is respectful to staff and other students (does not bully, harass, threaten, or in any way endanger self or others).
- Student displays an acceptable level of emotional and behavioral stability to allow for increasing independence in academic, vocational, and social activities.
- Student makes acceptable progress toward program goals and appears to benefit from program participation.

Students who are dismissed from the THRIVE program or who leave the program voluntarily without completing may reapply for consideration with the next cohort. Students who leave the program due to illness or family emergency may also reapply. Each situation is considered individually, based on the student's performance in the program and availability of a slot.

## **RESIDENCE HALL LIVING**

For the THRIVE program, residence hall living is a critical component. UCM Housing adapts to students' needs to ensure reasonable accommodations that might be necessary are handled effectively and in a timely manner. Living on campus is an integral part of the "complete" college experience. The student is part of a community where he/she can grow and experience life independently, yet have support needed to excel in THRIVE and on campus.

Student mentors live on the hall, share suites with the THRIVE students, and provide additional support to ensure that a beneficial level of social integration and success is experienced by each student. THRIVE students are assigned to a double room with a roommate. Students are expected to share in the cleaning and restocking of their bathrooms (e.g. toilet paper). As in all residence halls, THRIVE students live in a co-ed hall with roommates/suitemates of the same gender.

THRIVE students must abide by the rules established for freshmen residence halls. THRIVE students must sign in and out when leaving the halls at night and on weekends, and abide by the THRIVE curfew unless they are attending University events or with their parents. Students are expected to be on the floor in the residence hall by 10 p.m. Sunday – Thursday and by 11 p.m. on Friday and Saturday. We expect THRIVE students to respect—at all times—the needs of all students for quiet time to study and sleep.

## **RELEASE AND EXCHANGE OF INFORMATION**

When young people reach 18 years of age, they have the rights and privileges of adults. The University of Central Missouri is legally prohibited from releasing the information contained in the student's educational files to anyone except the student, in accordance with the Family Educational Rights and Privacy Act (FERPA). University Health Center and Counseling Center are prohibited from releasing information regarding students' medical and counseling information, in accordance with the Health Information Privacy & Protection Act (HIPPA).

There are three ways in which confidential student information is released to persons other than the student:

1. In order for individuals other than the student to have access to student educational files such as financial aid information and student accounts, the student must complete the Authorization for Release of Information and return the form to the THRIVE office where it will be shared with the Office of Student Affairs. *THRIVE Students are required to sign this form as part of the admission*

*process*. This form does not apply to medical or psychological records in accordance with HIPPA regulations.

2. Students must contact the University Health Center or the University Counseling Center to obtain the necessary form for HIPPA release of medical or psychological information from their programs. UCMI provides an informed consent for THRIVE Counseling.
3. Some parents have legal guardianship of their adult age students. A copy of this legal document on file with THRIVE satisfies the above approval. The guardianship information is also shared with the Office of Student Affairs.

All students must complete the FERPA form which allows the THRIVE staff to share information with other faculty or staff, as well as with parents. This permission is given with the understanding that only information necessary for the purposes of accommodation and academic progress will be communicated on a need to know basis. THRIVE students or their guardians must also sign a Risk and Release form before the school year begins. The required forms are made available by the THRIVE Office after students have been admitted.

### **SUMMARY**

The THRIVE Program at the University of Central Missouri continues to provide young adults with special needs an invaluable experience that would have been unheard of only a few short years ago. Now in its third cohort, THRIVE is providing an opportunity for these “special scholars” to graduate with an AA degree, join the workforce, live independently, and become valued members of their communities. THRIVE is, indeed thriving and hopes to do so for many years to come.

\*The bulk of the remainder of the paper was taken largely from informational publications about the UCM THRIVE Program including the *University of Central Missouri THRIVE Handbook: Empowering students with intellectual and developmental disabilities to be independent, participating members of their communities*. The author acknowledges the contributions of Drs. Barbara Mayfield and Joyce Downing, co-directors of the UCM THRIVE Program for the use of those documents.

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## APPENDIX A:

### TYPICAL TWO-YEAR THRIVE COURSE SEQUENCE

#### Semester 1

**THRIVE Seminar I: Freshman Seminar** – Introduction to college life: expectations, campus orientation, campus activities; Independent living skills: managing time, staying organized, setting goals; Lifelong learning: introductory learning and study skills (5)

**Person-Centered Planning** – Identifying strengths, needs, and aspirations; setting individual learning, social, vocational, and independent living goals; developing a person-centered plan for THRIVE and beyond; completing individual and group activities based on person-centered plans (1)

**Independence and Daily Living Skills** – A series of weekly topical seminars featuring presentations by faculty representing student areas of interest as well as those related to self-determination goals. Topics will include: exercise, nutrition and wellness; personal hygiene, health, and sexuality; personal safety; workplace skills; and exploring careers (2)

**Academic Skills** – Assessing present level of performance in academic skill areas (reading, language arts, math, and communication); scheduling individualized prescriptive activities and assignments to be completed by the student. NOTE: *Some activities will involve face-to-face individual or group interaction; others will be completed online.* (Individualized, NC)

**Beginning Bowling\*** – Fundamentals and participation in bowling (1)

**Recreation/Fitness Course\*** – Varies, based on interest and course availability (3)

**Valuing Differences: Discovering Common Ground\*** – Explores personal, experiential, and interactive issues relating to race, gender, class, and culture including ways that culturally diverse populations enrich society through differences and similarities (1)

**Technology Literacy\*** – Basic computer skills needed for college including Microsoft Office; internet for research, communication, and social networking; introduction to Blackboard software; overview of assistive technology; individual technology skills assessment. (2)

## **Semester 2**

**THRIVE Seminar II: Learning Strategies** – examines a variety of study skills that can prepare students for college- level learning and studying. Among the strategies presented are taking notes, reading textbooks, processing information, managing time, setting goals, taking tests, and understanding learning styles. (3)

**Workplace and Community Skills** – Students will learn about the process of career development and planning, which includes self-assessment, job search strategies, awareness of workplace issues, and decision-making. This course will also guide and assist a student’s exploration into their current self-concept, their abilities and strengths, their framework for accomplishment, and self-evaluation. It will explore the concepts and practices of self-determination and person centered planning as tools to help individuals recognize or identify their aspirations (goals) and the supports needed to attain these goals. Students will develop skills that, along with education, can lead to achieving personal goals and career success. (3)

**Person-Centered Planning** – Continues from Semester I (1)

**Academic Skills** – Continues from Semester I (NC)

**Personal Math** – Utilizes fundamental math in its application to everyday tasks such as check writing, record keeping, making change, purchasing, and measuring. (2)

**Recreation/Fitness Course\*** – Varies, based on interest and course availability (3)

**Additional non-credit course(s)\*** – In Person-Centered Planning, each THRIVE student will be assisted in choosing a course from the UCM catalog that matches his/her interests or career path. Generally these will be freshman or sophomore level courses with no prerequisites. Selection will also be affected by the student's performance in the previous semester courses. (Varies, typically 3)

### **Semester 3**

**THRIVE Seminar III: Transition Planning I** – Examines the skills necessary to move from the classroom to employment and independent living. Topics include communication, making a good impression, punctuality, accountability, responsibility, self-advocacy, and workplace relationships. Specific situations/expectations that are presented in the student's internship will be discussed. (3)

**Person-Centered Planning** – Continues from Semester I (1)

**Academic Skills** – Continues from Semester I (NC)

**Recreation/Fitness Course** – Varies, based on interest and course availability (3)

**Internship I** – Based on student interest and skills, an appropriate internship site on the UCM campus will be selected and negotiated with the relevant department or program. Prior to placement (generally during the first two weeks of the semester) students will meet individually and as a group with the THRIVE case manager to update their resume, discuss job expectations, and practice mock interviews. After successfully interviewing for the internship position (usually in week three), students will negotiate their individual schedule with the site supervisor. Generally, we recommend students start with a schedule of 8-10 hours per week, increasing their load and responsibility to 20 hours per week by the middle of the semester. (5)

**Additional non-credit course(s)\*** – In Person-Centered Planning, each THRIVE student will be assisted in choosing a course from the UCM catalog that matches his/her interests or career path. Generally, these will be freshman or sophomore level courses with no prerequisites. Selection will also be affected by the student's performance in the previous semester courses. (Varies, typically 3)

## Semester 4

**THRIVE Seminar IV: Transition Planning II** – A continuation of the Transition Planning I course. Topics covered in the course will include employer and employee expectations, desired basic employment skills, business and job etiquette, and the responsibilities of independent living. Specific situations/expectations of the internships will be discussed. (3)

**Person-Centered Planning** – Continues from Semester I (1)

**Academic Skills** – Continues from Semester I (NC)

**Recreation/Fitness Course** – Varies, based on interest and course availability (3)

**Internship II** – Based on student interest and skills, an appropriate internship site will be selected at UCM or in the community. Specifics of the internship will be negotiated with the relevant department or program by THRIVE staff. Prior to placement (generally during the first two weeks of the semester) students will meet individually and as a group with the THRIVE case manager to update their resume, discuss job expectations, and practice mock interviews. After successfully interviewing for the internship position (usually in week three), students will negotiate their individual schedule with the site supervisor. Number of hours is expected to be no more than 20 hours per week. (5)

**Additional non-credit course(s)\*** – In Person-Centered Planning, each THRIVE student will be assisted in choosing a course from the UCM catalog that matches his/her interests or career path. Generally these will be freshman or sophomore level courses with no prerequisites. Selection will also be affected by the student's performance in the previous semester courses. (Varies, typically 3)

*THRIVE students will take their examinations in the Office of Accessibility Services, and will need to make arrangements to do so in advance. Students will return home on the last day of classes prior to finals week, unless they are taking a course for credit or have a performance-based final (e.g., passing CPR demonstration, giving oral presentation).*



Course Alignment with ARC Self-Determination Scale Skill Areas

ARC 1a Independence – Milieu

1b Workplace and Community Skills, Seminar IV

1c-Milieu, Seminar I

1d-Seminar I, Valuing Differences, Milieu

1e-Seminars, Workplace and Community Skills

1f-Independence and Daily Living Skills, Personal Math, Milieu

2a-Workplace and Community Skills, Transition Planning I and II

2b-Transition Planning I and II

3-Independence and Daily Living Skills, Person-Centered Planning

4-Independence and Daily Living Skills, Person-Centered Planning

THRIVE BLACK TEAM Spring 2012

WEEKLY PROGRESS REPORT

	Accountability					Participation					Empathy					Cooperation					Self Care				
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THURSDAY	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
• Learning Strategies																									
• Work/Comm Skills																									
• Personal Math																									
• Residential Life																									
• PLATO																									

FRIDAY	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
• PE																									
• Learning Strategies																									
• Residential Life																									
• PLATO																									

SATURDAY	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
• Residential Life																									
• PLATO																									

SUNDAY	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
• Residential Life																									
• PLATO																									

MONDAY	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
• PE																									
• Learning Strategies																									
• Residential Life																									
• PLATO																									

TUESDAY	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
• Learning Strategies																									
• Work/Comm Skills																									
• Personal Math																									
• Residential Life																									
• PLATO																									

WEDNESDAY	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
• PE																									
• Learning Strategies																									
• Residential Life																									
• PLATO																									

TO DEPOSIT

<b>Weekly TOTAL</b>																														
<i>by Category</i>	/104					/76					/76					/76					/76					/\$4.08				

OTHER CLASSES	ATTENDANCE	ASSIGNMENTS/PARTICIPATION
• PCP/Counseling		
•		
•		
•		

## THRIVE PROGRAM EXPECTATIONS

- **First and foremost - be a successful student**
  - Be prepared for class
  - Be punctual; attend every class and appointment
  - Complete every assignment on time, and to the best of your ability
  - Attend study hall when you are assigned
  - Carry your weekly progress report and work on your own goals
  
- **Respect every individual**
  - No bullying
  - No gossiping
  - Mind your own business (MYOB)
  
- **Respect other people's space and privacy**
  - Be considerate of your roommate and suitemate when inviting visitors to your room
  - Always knock or look for signs indicating IN/OUT, Busy/Studying etc. before entering anyone's room
  - Only enter a room if the resident is present and gives permission for you to enter
  - Quiet Hours are from 9:00 P.M. until 10:00 A.M. Sunday - Thursday, midnight - 10:00 A.M. Friday and Saturday. "Quiet hours" means that you are out of the hallway, and that music and conversation from your room can't be heard three rooms away.
  
- **Keep yourself and others safe**
  - Absolutely no alcohol, drugs or weapons on the THRIVE floor
  - Always lock your door and keep your key with you
  - Sign in and sign out each time you leave the building during the evening or weekend
  - Observe the THRIVE curfew - Be back on the THRIVE floor by 10:00 pm Sunday-Thursday and 11:00 pm Friday-Saturday unless signed out appropriately. You may be on another floor of Ellis if attending an official event, but should still sign out.
  
- **Demonstrate respect for yourself**
  - Keep track of your own belongings. (No borrowing/lending of money, cell phones, or other items)
  - If you are sick, stay in your room. Use good hygiene. WHACK the FLU!
  
- **Respect the Mentors – They are students too**
  - Contact the mentor in case of any emergency or questions
  - Look at the 'Mentor on Duty' sign
  - Only call/text the mentor or CA who is on duty

- **Make sure your guests are aware of the THRIVE expectations;** visitors who do not follow the rules may be asked to leave the floor

**Consequences for failure to follow expectations:**

- 1st – Verbal warning
- 2nd – Write up. Staff and Mentors are notified; parents may be notified at staff discretion
- 3rd – Hearing with panel of Staff and Mentors; parents will be notified

# PLANNING FOR RETIREMENT

## A Workshop

James A. Pope, Duale Hochschule Baden-Württemberg, vaticandrj@yahoo.com

Have you begun planning for retirement? No matter where you are in your career, you should already be thinking about retiring. If you are close to retirement, you should be thinking very hard about it. This workshop is for all faculty members, especially those who are faculty approaching retirement time soon.

The workshop leader is Jim Pope, a faculty member who retired three years ago from the University of Toledo after 40 years in academia. He will share his perspectives and experiences and lead a discussion on the issues.

The topics covered in the discussion include:

- Finances
  - How to prepare for retirement
  - What are the implications of your choices?
  - How do things change once you retire?
  
- Personal Life
  - What do you do with your time?
  - How does family life change?
  - What are the SWOTs?
  - What about your health?
  
- Professional Life
  - Will you keep teaching?
  - Will you keep doing research?
  - Will you still go to professional meetings?
  - Reflecting back upon your career.

Although everyone has a unique situation and will have different answers to these questions and points, retirement is much more easy and enjoyable if you have thought about them ahead of time.

## **THE LABOR FORCE PARTICIPATION RATE:**

### **AN EXAMINATION OF THE DETERMINANTS OF ITS RECENT PRECIPITOUS DECLINE**

Patrick J. Litzinger, Ph.D., Robert Morris University, USA

John H. Dunn, Jr., MBA, Robert Morris University, USA

#### **ABSTRACT**

The Labor Force Participation Rate (LFPR) is defined as those Americans in the labor force, i.e. above the age of sixteen, below retirement age, who are either actively employed or actively seeking employment. From 1950 until 1998 it rose from 59.2% to 67.2%. Given the near doubling of the U.S. population, its impact on our economy was enormous. However, since 1998 the LFPR has declined steadily to 63.3%. Parallel to this decline, we have seen a polarization of both wealth and income in the U.S. Many economists have examined both trends – the decline of LFPR and inequality – and have put forth a variety of determinants. These include technology and globalization – a decline or “hollowing out” of the middle class, if you will. Also included are the demographics of an ageing society, and the increased racial and gender participation, but also a workforce that has become only marginally prepared by today’s educational institutions. Another class of determinants is the welfare “safety net” at both the Federal and state levels, including extended unemployment benefits, disability payments and other subsidies. The authors examine each class of determinants, including whether their aspects are cyclical, structural or even part of an ominous trend for our economy.

Keywords: Labor Force Participation Rate, Hollowing Out, Unemployment Rates, Unemployment Benefits, Disability Rolls

#### **INTRODUCTION**

From 1950 until 1998 the Labor Force Participation Rate (LFPR) in the United States rose from 59.2% to 67.2%. The LFPR is defined as those in the labor force, above the age of sixteen, below retirement age, who are either actively employed or actively seeking employment. That change reflects a strong and steady growth trend in labor force participation in the United States. That growth coincides with a number of structural changes in the U. S. economy and society. Since 1998, however, the LFPR has declined steadily. In addition, there appears to be a polarization of wealth and income in the United States accompanying the decline in LFPR.

Measurements of the LFPR for the United States during the period 1950 through 2012 are given in Table 1. There are a number of reasons advanced for the decline in the rate since 1998. Those reasons include technological change and globalization, an ageing society, a workforce that is only marginally prepared for today’s jobs, and the welfare “safety net” set up at both the Federal and state levels in the United States. Each of these proposed reasons for the decline need to be examined in order to even address some understanding of the change. Policy proposals cannot be considered until some minimal understanding of the situation is achieved.

One concern for the situation facing the U. S. economy today is that the decline of the LFPR since 1998 is primarily the result of losses of individuals in the labor force who would traditionally be called members of the middle class. This concern focuses on the decline or “hollowing out” of middle class workers. Of particular concern in this view is the possible reversal of a long-standing feature of growth, or improvement, in social well-being in the country. As Thomas Edsall (2012) describes the concern:

“The issue of the disappearing middle is not new, but credible economists have added a more threatening twist to the argument: the possibility that a well-functioning, efficient modern market economy, driven by exponential growth in the rate of technological innovation, can simultaneously produce economic growth and eliminate millions of middle-class jobs.”

It is a concern which has significant meaning to individual members of the labor force as well as policy makers.

The aging of the “baby boom” generation in the United States is now causing large numbers of people at traditional retirement age. This phenomenon will continue for a number of years. It would appear though that the nature of the 2008-2009 recession is exacerbating this problem. Larger numbers of the “baby boom” generation may be “retiring” than would be the case had this particularly severe global recession not occurred. Individuals in the 50’s and early 60’s age brackets may be continuing what began as unemployment during the recession. Faced with not finding employment comparable to that which they had prior to the recession, more people in those age brackets may be moving into “retirement” without ever returning to work.

While labor force participants in the senior groups of the traditional workforce may be starting earlier than anticipated retirement, there is arguably a problem with sufficiently prepared numbers of individuals in the younger age groups of the labor force. Proponents of this concern ask the question: “Are younger members of the labor force adequately trained for the jobs in the technological society of this century?” That question suggests a number of issues. There is the concern as to whether, or not, educational institutions are offering appropriate courses of job preparations for younger people. There is the concern of how the economy and society are to match individuals with jobs given a different workforce and new technological requirements for those workers.

Another concern associated with the recession of 2008-2009 and the slow recovery in employment after the recession is the welfare “safety net” found at the Federal and state government levels in the United States. Those who voice this concern wonder if the relatively recent decline in the U. S. LFPR is the result of choices made by people left unemployed for cyclical or structural reasons. The “safety net” is designed to support those who cannot work for any of a number of reasons. Programs designed to help workers through periods of temporary unemployment, or to support limited numbers of people through situations requiring permanent exit from the labor force, may allow people to remain unemployed longer than would be the case in absence of the “safety net”. Such a concern is perhaps the most difficult of the potential causes of the decline in the LFPR to evaluate.

Key to understanding the decline in the LFPR is to separate the cyclical causes from the structural. To that end, it is necessary to examine the causes of the unemployment of Great Recession determining if there are any structural forces that are operant. The analysis of several economists seems to conclude that all of the reasons for unemployment were cyclical in nature. Next, economists that have examined LFPR conclude that it appears that those same cyclical causes account for about half of the decline in the LFPR. Our objective then is to examine the possible structural causes of the decline, e.g. technological change, demographics, and welfare, and attempt to weigh those forces and see how they contribute to the trend.

## **LABOR FORCE PARTICIPATION RATE IN THE UNITED STATES**

The Labor Force Participation Rate (“LFPR”) historically has seen three phases since World War Two: “Phase one occurred from 1948 to the mid-1960s and was characterized by a roughly stable participation

rate. Phase two occurred from the mid-1960s to 2000 and was characterized by steadily *rising* labor force participation. Phase three began at the turn of the century and is characterized by *declining* labor force participation. These distinctive phases in the participation rate resulted from demographic, cultural, and institutional changes (Van Zandweghe) (*italics ours*). The Bureau of Labor Statistics provides the following tables and graphs of those time periods:

The 1948 to the mid-1960s phase is included in an overview of the whole post war period:

**Labor Force Statistics from the Current Population Survey  
1948-2013**

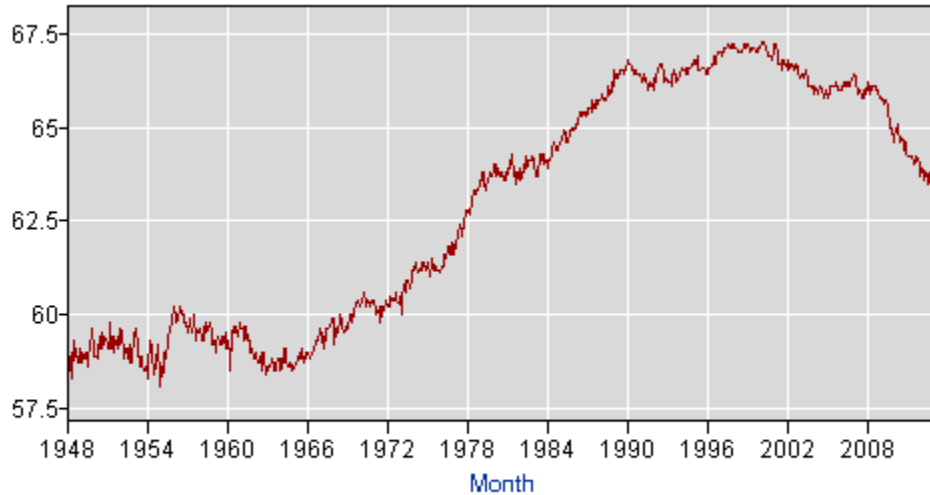
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1948	58.6	58.9	58.5	59.0	58.3	59.2	59.3	58.9	58.9	58.7	58.7	59.1
1949	58.7	59.0	58.9	58.8	59.0	58.6	58.9	59.2	59.1	59.6	59.4	59.2
1950	58.9	58.9	58.8	59.2	59.1	59.4	59.1	59.5	59.2	59.4	59.3	59.2
1951	59.1	59.1	59.8	59.1	59.4	59.0	59.4	59.2	59.1	59.4	59.2	59.6
1952	59.5	59.5	58.9	58.8	59.1	59.1	58.9	58.7	59.2	58.7	59.1	59.2
1953	59.5	59.5	59.6	59.1	58.6	58.9	58.9	58.6	58.5	58.5	58.6	58.3
1954	58.6	59.3	59.1	59.2	58.9	58.5	58.4	58.7	59.2	58.8	58.6	58.1
1955	58.6	58.4	58.5	59.0	58.8	58.8	59.3	59.7	59.7	59.8	59.9	60.2
1956	60.2	59.9	59.8	59.9	60.2	60.1	60.1	60.0	60.0	59.8	59.8	59.8
1957	59.5	59.9	59.8	59.5	59.5	59.8	60.0	59.3	59.6	59.5	59.5	59.6
1958	59.3	59.3	59.3	59.6	59.8	59.5	59.6	59.8	59.7	59.6	59.2	59.2
1959	59.3	59.0	59.3	59.4	59.2	59.2	59.4	59.2	59.3	59.4	59.1	59.5
1960	59.1	59.1	58.5	59.5	59.5	59.7	59.5	59.5	59.7	59.4	59.8	59.7
1961	59.6	59.6	59.7	59.3	59.4	59.7	59.3	59.3	59.0	59.1	59.1	58.8
1962	58.8	59.0	58.9	58.7	58.9	58.8	58.5	59.0	59.0	58.7	58.5	58.4
1963	58.6	58.6	58.6	58.8	58.8	58.5	58.7	58.5	58.7	58.8	58.8	58.5
1964	58.6	58.8	58.7	59.1	59.1	58.7	58.6	58.6	58.7	58.6	58.5	58.6
1965	58.6	58.7	58.7	58.8	59.0	58.8	59.1	58.9	58.7	58.9	58.8	59.0
1966	59.0	58.8	58.8	59.0	59.0	59.1	59.1	59.3	59.3	59.3	59.6	59.5
1967	59.5	59.3	59.1	59.4	59.3	59.6	59.6	59.7	59.7	59.9	59.8	59.9
1968	59.2	59.6	59.6	59.5	59.9	60.0	59.8	59.6	59.5	59.5	59.6	59.7
1969	59.6	60.0	59.9	60.0	59.8	60.1	60.1	60.3	60.3	60.4	60.2	60.2
1970	60.4	60.4	60.6	60.6	60.3	60.2	60.4	60.3	60.2	60.4	60.4	60.4
1971	60.4	60.1	60.0	60.1	60.2	59.8	60.1	60.2	60.1	60.1	60.4	60.4
1972	60.2	60.2	60.5	60.4	60.4	60.4	60.4	60.6	60.4	60.3	60.3	60.5
1973	60.0	60.5	60.8	60.8	60.6	60.9	60.9	60.7	60.8	60.9	61.2	61.2
1974	61.3	61.4	61.3	61.1	61.2	61.2	61.4	61.2	61.4	61.3	61.3	61.2
1975	61.4	61.0	61.2	61.3	61.5	61.2	61.3	61.3	61.2	61.2	61.1	61.1
1976	61.3	61.3	61.3	61.6	61.5	61.5	61.8	61.8	61.6	61.6	61.9	61.8



Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1977	61.6	61.9	62.0	62.1	62.2	62.4	62.1	62.3	62.3	62.4	62.8	62.7
1978	62.8	62.7	62.8	63.0	63.1	63.3	63.2	63.2	63.3	63.3	63.5	63.6
1979	63.6	63.8	63.8	63.5	63.3	63.5	63.6	63.6	63.8	63.7	63.7	63.9
1980	64.0	64.0	63.7	63.8	63.9	63.7	63.8	63.7	63.6	63.7	63.8	63.6
1981	63.9	63.9	64.1	64.2	64.3	63.7	63.8	63.8	63.5	63.8	63.9	63.6
1982	63.7	63.8	63.8	63.9	64.2	63.9	64.0	64.1	64.1	64.1	64.2	64.1
1983	63.9	63.8	63.7	63.8	63.7	64.3	64.1	64.3	64.3	64.0	64.1	64.1
1984	63.9	64.1	64.1	64.3	64.5	64.6	64.6	64.4	64.4	64.4	64.5	64.6
1985	64.7	64.7	64.9	64.9	64.8	64.6	64.7	64.6	64.9	65.0	64.9	65.0
1986	64.9	65.0	65.1	65.1	65.2	65.4	65.4	65.3	65.4	65.4	65.4	65.3
1987	65.4	65.5	65.5	65.4	65.7	65.5	65.6	65.7	65.5	65.7	65.7	65.7
1988	65.8	65.9	65.7	65.8	65.7	65.8	65.9	66.1	65.9	66.0	66.2	66.1
1989	66.5	66.3	66.3	66.4	66.3	66.5	66.5	66.5	66.4	66.5	66.6	66.5
1990	66.8	66.7	66.7	66.6	66.6	66.4	66.5	66.5	66.4	66.4	66.4	66.4
1991	66.2	66.2	66.3	66.4	66.2	66.2	66.1	66.0	66.2	66.1	66.1	66.0
1992	66.3	66.2	66.4	66.5	66.6	66.7	66.7	66.6	66.5	66.2	66.3	66.3
1993	66.2	66.2	66.2	66.1	66.4	66.5	66.4	66.4	66.2	66.3	66.3	66.4
1994	66.6	66.6	66.5	66.5	66.6	66.4	66.4	66.6	66.6	66.7	66.7	66.7
1995	66.8	66.8	66.7	66.9	66.5	66.5	66.6	66.6	66.6	66.6	66.5	66.4
1996	66.4	66.6	66.6	66.7	66.7	66.7	66.9	66.7	66.9	67.0	67.0	67.0
1997	67.0	66.9	67.1	67.1	67.1	67.1	67.2	67.2	67.1	67.1	67.2	67.2
1998	67.1	67.1	67.1	67.0	67.0	67.0	67.0	67.0	67.2	67.2	67.1	67.2
1999	67.2	67.2	67.0	67.1	67.1	67.1	67.1	67.0	67.0	67.0	67.1	67.1
2000	67.3	67.3	67.3	67.3	67.1	67.1	66.9	66.9	66.9	66.8	66.9	67.0
2001	67.2	67.1	67.2	66.9	66.7	66.7	66.8	66.5	66.8	66.7	66.7	66.7
2002	66.5	66.8	66.6	66.7	66.7	66.6	66.5	66.6	66.7	66.6	66.4	66.3
2003	66.4	66.4	66.3	66.4	66.4	66.5	66.2	66.1	66.1	66.1	66.1	65.9
2004	66.1	66.0	66.0	65.9	66.0	66.1	66.1	66.0	65.8	65.9	66.0	65.9
2005	65.8	65.9	65.9	66.1	66.1	66.1	66.1	66.2	66.1	66.1	66.0	66.0
2006	66.0	66.1	66.2	66.1	66.1	66.2	66.1	66.2	66.1	66.2	66.3	66.4
2007	66.4	66.3	66.2	65.9	66.0	66.0	66.0	65.8	66.0	65.8	66.0	66.0
2008	66.2	66.0	66.1	65.9	66.1	66.1	66.1	66.1	66.0	66.0	65.9	65.8
2009	65.7	65.8	65.6	65.7	65.7	65.7	65.5	65.4	65.1	65.0	65.0	64.6
2010	64.8	64.9	64.9	65.1	64.9	64.6	64.6	64.7	64.6	64.4	64.6	64.3
2011	64.2	64.2	64.2	64.2	64.2	64.0	64.0	64.1	64.2	64.1	64.1	64.0
2012	63.7	63.9	63.8	63.6	63.8	63.8	63.7	63.5	63.6	63.8	63.6	63.6
2013	63.6	63.5	63.3	63.3	63.4	63.5	63.4					

**Labor Force Statistics from the Current Population Survey  
1948-2013**

**Series Id:** LNS11300000  
 Seasonally Adjusted  
**Series title:** (Seas) Labor Force Participation Rate  
**Labor force status:** Civilian labor force participation rate  
**Type of data:** Percent or rate  
**Age:** 16 years and over



The 1965 to 2013 period:

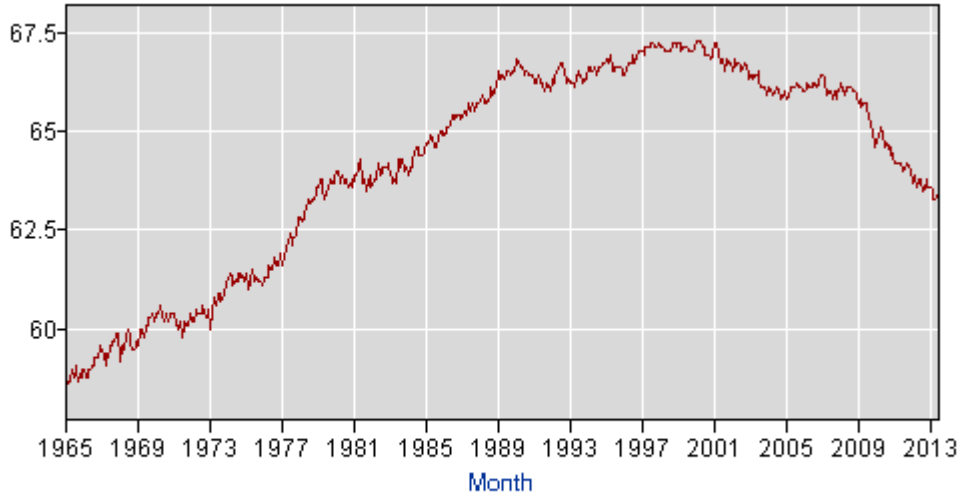
**Labor Force Statistics from the Current Population Survey  
1965-2013**

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1965	58.6	58.7	58.7	58.8	59.0	58.8	59.1	58.9	58.7	58.9	58.8	59.0
1966	59.0	58.8	58.8	59.0	59.0	59.1	59.1	59.3	59.3	59.3	59.6	59.5
1967	59.5	59.3	59.1	59.4	59.3	59.6	59.6	59.7	59.7	59.9	59.8	59.9
1968	59.2	59.6	59.6	59.5	59.9	60.0	59.8	59.6	59.5	59.5	59.6	59.7
1969	59.6	60.0	59.9	60.0	59.8	60.1	60.1	60.3	60.3	60.4	60.2	60.2
1970	60.4	60.4	60.6	60.6	60.3	60.2	60.4	60.3	60.2	60.4	60.4	60.4
1971	60.4	60.1	60.0	60.1	60.2	59.8	60.1	60.2	60.1	60.1	60.4	60.4
1972	60.2	60.2	60.5	60.4	60.4	60.4	60.4	60.6	60.4	60.3	60.3	60.5
1973	60.0	60.5	60.8	60.8	60.6	60.9	60.9	60.7	60.8	60.9	61.2	61.2
1974	61.3	61.4	61.3	61.1	61.2	61.2	61.4	61.2	61.4	61.3	61.3	61.2
1975	61.4	61.0	61.2	61.3	61.5	61.2	61.3	61.3	61.2	61.2	61.1	61.1
1976	61.3	61.3	61.3	61.6	61.5	61.5	61.8	61.8	61.6	61.6	61.9	61.8
1977	61.6	61.9	62.0	62.1	62.2	62.4	62.1	62.3	62.3	62.4	62.8	62.7

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1978	62.8	62.7	62.8	63.0	63.1	63.3	63.2	63.2	63.3	63.3	63.5	63.6
1979	63.6	63.8	63.8	63.5	63.3	63.5	63.6	63.6	63.8	63.7	63.7	63.9
1980	64.0	64.0	63.7	63.8	63.9	63.7	63.8	63.7	63.6	63.7	63.8	63.6
1981	63.9	63.9	64.1	64.2	64.3	63.7	63.8	63.8	63.5	63.8	63.9	63.6
1982	63.7	63.8	63.8	63.9	64.2	63.9	64.0	64.1	64.1	64.1	64.2	64.1
1983	63.9	63.8	63.7	63.8	63.7	64.3	64.1	64.3	64.3	64.0	64.1	64.1
1984	63.9	64.1	64.1	64.3	64.5	64.6	64.6	64.4	64.4	64.4	64.5	64.6
1985	64.7	64.7	64.9	64.9	64.8	64.6	64.7	64.6	64.9	65.0	64.9	65.0
1986	64.9	65.0	65.1	65.1	65.2	65.4	65.4	65.3	65.4	65.4	65.4	65.3
1987	65.4	65.5	65.5	65.4	65.7	65.5	65.6	65.7	65.5	65.7	65.7	65.7
1988	65.8	65.9	65.7	65.8	65.7	65.8	65.9	66.1	65.9	66.0	66.2	66.1
1989	66.5	66.3	66.3	66.4	66.3	66.5	66.5	66.5	66.4	66.5	66.6	66.5
1990	66.8	66.7	66.7	66.6	66.6	66.4	66.5	66.5	66.4	66.4	66.4	66.4
1991	66.2	66.2	66.3	66.4	66.2	66.2	66.1	66.0	66.2	66.1	66.1	66.0
1992	66.3	66.2	66.4	66.5	66.6	66.7	66.7	66.6	66.5	66.2	66.3	66.3
1993	66.2	66.2	66.2	66.1	66.4	66.5	66.4	66.4	66.2	66.3	66.3	66.4
1994	66.6	66.6	66.5	66.5	66.6	66.4	66.4	66.6	66.6	66.7	66.7	66.7
1995	66.8	66.8	66.7	66.9	66.5	66.5	66.6	66.6	66.6	66.6	66.5	66.4
1996	66.4	66.6	66.6	66.7	66.7	66.7	66.9	66.7	66.9	67.0	67.0	67.0
1997	67.0	66.9	67.1	67.1	67.1	67.1	67.2	67.2	67.1	67.1	67.2	67.2
1998	67.1	67.1	67.1	67.0	67.0	67.0	67.0	67.0	67.2	67.2	67.1	67.2
1999	67.2	67.2	67.0	67.1	67.1	67.1	67.1	67.0	67.0	67.0	67.1	67.1
2000	67.3	67.3	67.3	67.3	67.1	67.1	66.9	66.9	66.9	66.8	66.9	67.0
2001	67.2	67.1	67.2	66.9	66.7	66.7	66.8	66.5	66.8	66.7	66.7	66.7
2002	66.5	66.8	66.6	66.7	66.7	66.6	66.5	66.6	66.7	66.6	66.4	66.3
2003	66.4	66.4	66.3	66.4	66.4	66.5	66.2	66.1	66.1	66.1	66.1	65.9
2004	66.1	66.0	66.0	65.9	66.0	66.1	66.1	66.0	65.8	65.9	66.0	65.9
2005	65.8	65.9	65.9	66.1	66.1	66.1	66.1	66.2	66.1	66.1	66.0	66.0
2006	66.0	66.1	66.2	66.1	66.1	66.2	66.1	66.2	66.1	66.2	66.3	66.4
2007	66.4	66.3	66.2	65.9	66.0	66.0	66.0	65.8	66.0	65.8	66.0	66.0
2008	66.2	66.0	66.1	65.9	66.1	66.1	66.1	66.1	66.0	66.0	65.9	65.8
2009	65.7	65.8	65.6	65.7	65.7	65.7	65.5	65.4	65.1	65.0	65.0	64.6
2010	64.8	64.9	64.9	65.1	64.9	64.6	64.6	64.7	64.6	64.4	64.6	64.3
2011	64.2	64.2	64.2	64.2	64.2	64.0	64.0	64.1	64.2	64.1	64.1	64.0
2012	63.7	63.9	63.8	63.6	63.8	63.8	63.7	63.5	63.6	63.8	63.6	63.6
2013	63.6	63.5	63.3	63.3	63.4	63.5	63.4					

**Labor Force Statistics from the Current Population Survey  
1965-2013**

**Series Id:** LNS11300000  
 Seasonally Adjusted  
**Series title:** (Seas) Labor Force Participation Rate  
**Labor force status:** Civilian labor force participation rate  
**Type of data:** Percent or rate  
**Age:** 16 years and over



For the period 2000-2013:

**Labor Force Statistics from the Current Population Survey  
2000-2013**

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2000	67.3	67.3	67.3	67.3	67.1	67.1	66.9	66.9	66.9	66.8	66.9	67.0
2001	67.2	67.1	67.2	66.9	66.7	66.7	66.8	66.5	66.8	66.7	66.7	66.7
2002	66.5	66.8	66.6	66.7	66.7	66.6	66.5	66.6	66.7	66.6	66.4	66.3
2003	66.4	66.4	66.3	66.4	66.4	66.5	66.2	66.1	66.1	66.1	66.1	65.9
2004	66.1	66.0	66.0	65.9	66.0	66.1	66.1	66.0	65.8	65.9	66.0	65.9
2005	65.8	65.9	65.9	66.1	66.1	66.1	66.1	66.2	66.1	66.1	66.0	66.0
2006	66.0	66.1	66.2	66.1	66.1	66.2	66.1	66.2	66.1	66.2	66.3	66.4
2007	66.4	66.3	66.2	65.9	66.0	66.0	66.0	65.8	66.0	65.8	66.0	66.0
2008	66.2	66.0	66.1	65.9	66.1	66.1	66.1	66.1	66.0	66.0	65.9	65.8
2009	65.7	65.8	65.6	65.7	65.7	65.7	65.5	65.4	65.1	65.0	65.0	64.6
2010	64.8	64.9	64.9	65.1	64.9	64.6	64.6	64.7	64.6	64.4	64.6	64.3
2011	64.2	64.2	64.2	64.2	64.2	64.0	64.0	64.1	64.2	64.1	64.1	64.0

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2012	63.7	63.9	63.8	63.6	63.8	63.8	63.7	63.5	63.6	63.8	63.6	63.6
2013	63.6	63.5	63.3	63.3	63.4	63.5	63.4					

**Labor Force Statistics from the Current Population Survey  
2000-2013**

**Series Id:** LNS11300000  
 Seasonally Adjusted  
**Series title:** (Seas) Labor Force Participation Rate  
**Labor force status:** Civilian labor force participation rate  
**Type of data:** Percent or rate  
**Age:** 16 years and over



By inspection, then, you can see that the decline is severe: from 67.3 to 63.3 and it continues. And as we examine the Unemployment picture, one can see that as the LFPR declines, so does the unemployment denominator, giving an artificial numerical decline in the stated Unemployment rate. (Current Population Survey) Below, we will examine the Unemployment Rate and its various causes, especially to determine that which is cyclical and that which is structural. That analysis, will allow us to return to the LFPR and to better examine both its cyclical and structural aspects.

**THE GREAT RECESSION AND ITS CAUSES**

The Bureau of Labor Statistics provides monthly labor statistics for those people over 16 years of age. There are six measures of unemployment, but we focus on four:

**U3:** This is the official unemployment rate, which is the proportion of the civilian labor force that is unemployed but actively seeking employment.

**U4:** This is the official unemployment rate that is adjusted for discouraged workers. In other words, discouraged workers are treated just like other workers who are officially classified as unemployed, being included in both the ranks of the unemployed and the labor force. It is technically specified as the

proportion of the civilian labor force (plus discouraged workers) that is either unemployed but actively seeking employment or discouraged workers. The addition of discouraged workers generally adds a few tenths of a percentage point to the official unemployment rate.

**U5:** This augments U4 by including marginally-attached workers to the unemployment rate calculation. Marginally attached workers are potential workers who have given up seeking employment for various reasons. One of these reasons is that the workers believe such effort would be futile, which places them in the discouraged worker category. Those who have other reasons for not seeking employment are placed in the broader marginally-attached workers category. The addition of marginally-attached workers adds a few more tenths of a percentage point to the official unemployment rate.

**U6:** This augments U5 by including part-time workers to the unemployment rate calculation. The addition of part-time workers adds a full 2-3 percentage points to the official unemployment rate. This measure of unemployment is perhaps the most comprehensive measure of labor resource unemployment available. (Portal Seven)

As you can see, U3 is the reported measure, while U6 includes discouraged workers, those who have given up seeking employment, and part time workers. Clearly the economy affects all categories, but tracking the U6 allows us to see if an economic recovery, as measured by U3 is actually occurring, or simply statistically improving by people leaving the labor force, thereby reducing the denominator. Examining U3 and U6 for the period:

### Unemployment Rate – U3

2000 - 2013

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
<b>2000</b>	4.0	4.1	4.0	3.8	4.0	4.0	4.0	4.1	3.9	3.9	3.9	3.9	<b>2000</b>
<b>2001</b>	4.2	4.2	4.3	4.4	4.3	4.5	4.6	4.9	5.0	5.3	5.5	5.7	<b>2001</b>
<b>2002</b>	5.7	5.7	5.7	5.9	5.8	5.8	5.8	5.7	5.7	5.7	5.9	6.0	<b>2002</b>
<b>2003</b>	5.8	5.9	5.9	6.0	6.1	6.3	6.2	6.1	6.1	6.0	5.8	5.7	<b>2003</b>
<b>2004</b>	5.7	5.6	5.8	5.6	5.6	5.6	5.5	5.4	5.4	5.5	5.4	5.4	<b>2004</b>
<b>2005</b>	5.3	5.4	5.2	5.2	5.1	5.0	5.0	4.9	5.0	5.0	5.0	4.9	<b>2005</b>
<b>2006</b>	4.7	4.8	4.7	4.7	4.6	4.6	4.7	4.7	4.5	4.4	4.5	4.4	<b>2006</b>
<b>2007</b>	4.6	4.5	4.4	4.5	4.4	4.6	4.7	4.6	4.7	4.7	4.7	5.0	<b>2007</b>
<b>2008</b>	5.0	4.9	5.1	5.0	5.4	5.6	5.8	6.1	6.1	6.5	6.8	7.3	<b>2008</b>
<b>2009</b>	7.8	8.3	8.7	9.0	9.4	9.5	9.5	9.6	9.8	10.0	9.9	9.9	<b>2009</b>
<b>2010</b>	9.8	9.8	9.9	9.9	9.6	9.4	9.5	9.5	9.5	9.5	9.8	9.3	<b>2010</b>
<b>2011</b>	9.1	9.0	8.9	9.0	9.0	9.1	9.0	9.0	9.0	8.9	8.6	8.5	<b>2011</b>
<b>2012</b>	8.3	8.3	8.2	8.1	8.2	8.2	8.2	8.1	7.8	7.9	7.8	7.8	<b>2012</b>
<b>2013</b>	7.9	7.7	7.6										

**Unemployment Rate-U3  
2000-2013**



**Unemployment Rate - U6  
2000 – 2013**

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
<b>2000</b>	7.1	7.2	7.1	6.9	7.1	7.0	7.0	7.1	7.0	6.8	7.1	6.9	<b>2000</b>
<b>2001</b>	7.3	7.4	7.3	7.4	7.5	7.9	7.8	8.1	8.7	9.3	9.4	9.6	<b>2001</b>
<b>2002</b>	9.5	9.5	9.4	9.7	9.5	9.5	9.6	9.6	9.6	9.6	9.7	9.8	<b>2002</b>
<b>2003</b>	10.0	10.2	10.0	10.2	10.1	10.3	10.3	10.1	10.4	10.2	10.0	9.8	<b>2003</b>
<b>2004</b>	9.9	9.7	10.0	9.6	9.6	9.5	9.5	9.4	9.4	9.7	9.4	9.2	<b>2004</b>
<b>2005</b>	9.3	9.3	9.1	8.9	8.9	9.0	8.8	8.9	9.0	8.7	8.7	8.6	<b>2005</b>
<b>2006</b>	8.4	8.4	8.2	8.1	8.2	8.4	8.5	8.4	8.0	8.2	8.1	7.9	<b>2006</b>
<b>2007</b>	8.4	8.2	8.0	8.2	8.2	8.3	8.4	8.4	8.4	8.4	8.4	8.8	<b>2007</b>
<b>2008</b>	9.2	9.0	9.1	9.2	9.7	10.1	10.5	10.8	11.0	11.8	12.6	13.6	<b>2008</b>
<b>2009</b>	14.2	15.1	15.7	15.9	16.4	16.5	16.5	16.7	16.7	17.1	17.1	17.1	<b>2009</b>
<b>2010</b>	16.7	17.0	17.0	17.1	16.6	16.5	16.5	16.5	16.8	16.7	16.9	16.6	<b>2010</b>
<b>2011</b>	16.2	16.0	15.8	16.0	15.8	16.1	16.0	16.1	16.3	16.0	15.5	15.2	<b>2011</b>
<b>2012</b>	15.1	15.0	14.5	14.5	14.8	14.8	14.9	14.7	14.7	14.5	14.4	14.4	<b>2012</b>
<b>2013</b>	14.4	14.3	13.8	13.9	13.8	14.3	14.0						

## Unemployment Rate - U6 2000 - 2013



Notice that in the beginning of 2000, The U3 was 4.0%, and the U6 was 7.1%, or a differential of 3.1%. At the peak of the Great Recession, U3 was 10%, but U6 had risen to 17.1%, or a differential of 7.1%! As of June of this year, U3 had dropped to 7.6%, but U6 had only declined to 14.3%; again only a slight improvement in the differential to 6.7%. Clearly, this is partly reflected in the LFPR numbers for the same time:

Jan. 2000	67.2%
Oct. 2009	65.1%
Jun. 2013	63.3%

But notice: instead of an improvement in the LFPR percentages, the declining trend continues.

One would assume that if a person loses his job in a recession, and as the economy improves the person is rehired, the employment problem to be cyclical. On a macro basis, if the person is *not* rehired, then either the cyclical causes are still extant and masked by the transition from U3 to U6, or there are some significant structural conditions as well. But whether the causes are cyclical or a trend, the widening gap between U3 and U6 needs an explanation.

Probably the best study of the Great Recession, and whether its causes were cyclical or structural, was done by Edward Lazear and James Spletzer in September of 2012, [The United States Labor Market: Status Quo or A New Normal?](#). First, they define a structural shift: “as one that is permanent (or at least long lasting)...For example, a permanent change in the amount or nature of mismatch... would be viewed as structural. The industrial composition of the economy may have changed permanently. This change might mean that the skill requirements of the jobs that are available today do not match the skill sets of the workers who are searching for jobs because they trained for an economic structure that has become obsolete. Monetary policy is not likely to be of much assistance in remedying these kinds of structural changes.” (Lazear and Spletzer)

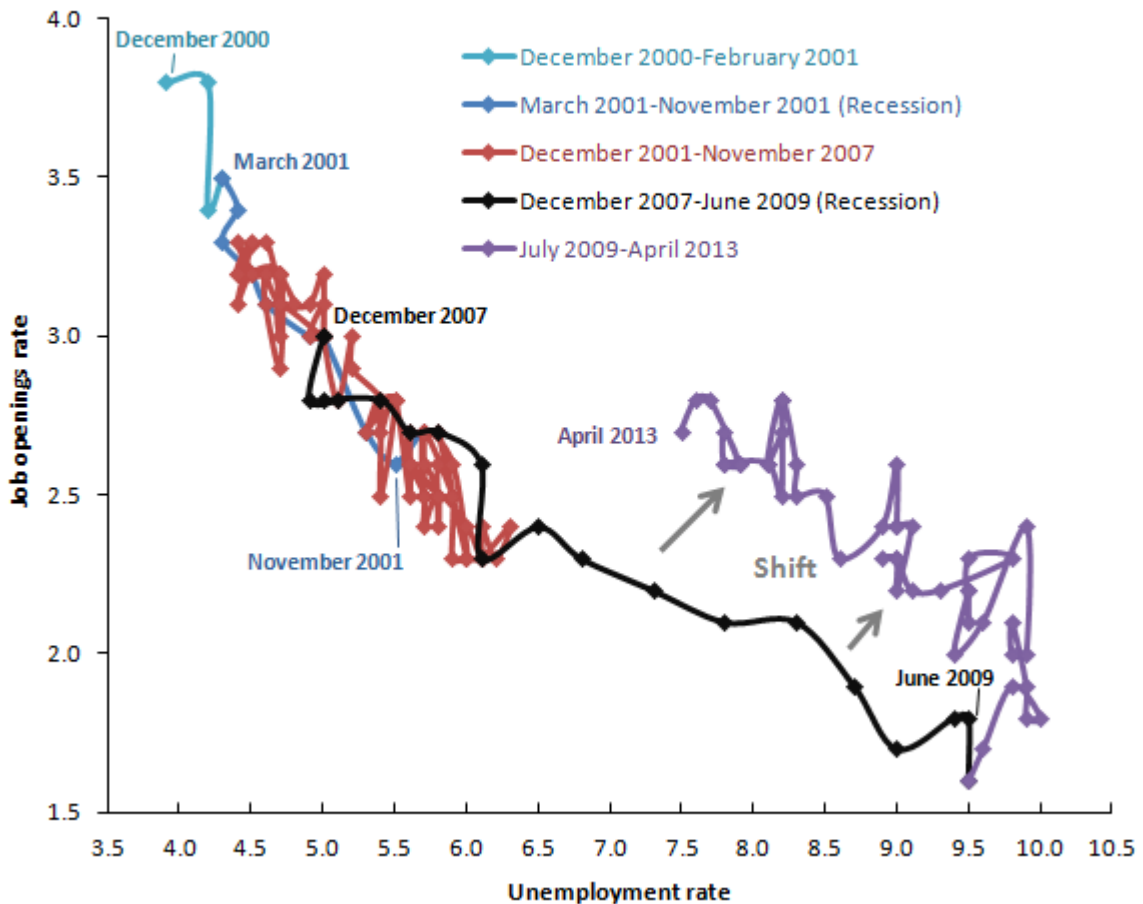


There are two reasons why they feel that the job losses of the Great Recession were not structural: “First, the unemployment rate was 4.4% in the spring of 2007 and rose to 10.0% by October of 2009. Thus, in a little over two years, unemployment went up by over 5 ½ percentage points. Most structural changes do not occur so rapidly. Second, the authors see the unemployment as industry specific. Industries like manufacturing, leisure & hospitality, construction, and wholesale & retail have higher unemployment than vacancies in good times as well as recessions. In short these industries led the recession in unemployment, but came back as the recession ended.

The same is true for education, gender, age. Unemployment in all groups went up dramatically, and then fell similarly. There are overall trends in employment, however. The trend has been for a higher number of college graduates to be hired than those who lack a high school degree. Manufacturing has faced a long term downward trend and education and health services have seen the opposite occur. In the recession both men and women suffered unemployment, although the long term trend had been a greater female participation in the labor force. As the authors conclude: “There are trends in the labor market, some of which began many decades ago. But the trends cannot explain the sharp increase in unemployment that occurred between 2007 and 2009”. For them also: “the evidence points to primarily cyclic factors.” (Lazear and Spletzer)

Lazear and Speltzer leave the door open for possible structural changes as they observe the historical changes in the Beveridge Curve. The curve is a “graphical representation between the unemployment rate and the jobs opening rate.” (U.S. Bureau of Labor Statistics, 2013b) The following chart shows the Beveridge curve during five separate time periods since

**The Beveridge Curve (job openings vs. unemployment rate),  
seasonally adjusted, December 2000–April 2013**



2000. Source: U.S. Bureau of Labor Statistics.

As Lazear and Spletzer point out: “Movements along the Beveridge curve are interpreted as cyclical in labor demand, whereas shifts in the Beveridge curve up and to the right are typically interpreted as structural shifts in unemployment, reflecting a reduced efficiency in matching workers to jobs. The apparent outward shift in the Beveridge curve and the resulting increase in unemployment may be consistent with a structural change that occurred after June 2009, but it is equally consistent with the counter-clockwise dynamics observed in previous recessions and recoveries.” They add “Whether this apparent outward shift in the Beveridge curve is a permanent change cannot be known until unemployment returns to normal levels.”(Lazear and Spletzer)

A publication of the U.S. Bureau of Labor Statistics, Job Openings and Labor Turnover Survey (“JOLTS”) states that “The outward shift in the Beveridge curve may be due to a greater mismatch between available jobs and the unemployed in terms of skills and location, or that employers are delaying hiring due to economic uncertainty.” (U. S. Bureau of Labor Statistics, 2013a) The fact that Gross Private Domestic Investment, as a percentage of the Gross Domestic Product, is now at the *lowest point since 1945*, may be part of this structural decline. (Bureau of Economic Analysis) If so, we will next examine that decline along with other non-cyclical forces that can account for the recent decline in Labor Force Participation.

## THE DECLINE IN THE LABOR FORCE PARTICIPATION RATE: ITS CAUSES

In the first quarter of 2012, researchers at the Kansas City Federal Reserve Bank (Van Zandweghe) and the Chicago Fed (Aronson, et al.), studied the decline in the LFPR. The former states: "...the long term trend factors account for about half of the labor force participation from 2007 to 2011, with cyclical factors accounting for the other half. The latter: "The authors conclude that just under half of the post 1999 decline in the U.S. labor force participation rate ...can be explained by long running demographic patterns, such as the retirement of baby boomers." (Aronson, et al.).

Van Zandweghe uses statistical correlation to assess the impact of the business cycle: "Over a long time horizon, labor force participation has been only weakly related to the business cycle. But this long time horizon can disguise more recent movements. In fact, since 2007, the LFPR has moved more strongly with the state of the economy... From 1948 to 2011, the unemployment rate and changes in the LFPR were uncorrelated. But since the start of the recent recession in 2007, this correlation has changed to -0.13. That is, in recent years, a higher unemployment rate has been associated with declines in labor force participation." (Van Zandweghe) His work found a steeper negative correlation at the state level. Those cyclical forces were outlined above in the section on unemployment.

The key aspects of the non-cyclical or structural decline are demographic, gender, education, and the social safety net of various welfare programs. Technology/automation/globalization has also been mentioned, but we find the literature on the subject generated more heat than light.

The composition of the population by age is affected primarily by the fact that the segment of the population, ages 25-54 has been declining, from 58.9% in 2000, to 54.8% in 2011. In fact, Aaronson concludes that this demographic shift accounts for two thirds of this decline, and gender and education account for one third. (Aronson, et al.) Ironically, the participation rate for people 55 and older increased through the mid-nineties and has held steady since 2007. (Hartley and Zenker)

"The female share of the labor force was increasing in the 1970s, 1980s, and 1990s, and has been steady at 46.5% during the 2000s and early 2010s." (Lazear and Spletzer) The labor force participation rate of women has held steady (excluding the cyclical forces), whereas "the LFPR of men has been falling steadily for 60 years.(Hartley) This decline is attributed to increased access to Social Security benefits and the declining real wages of low-skilled workers..." (Van Zandweghe)

"The labor force share of college graduates has risen dramatically since 1992, whereas the labor force share of high school graduates has fallen steadily." (Lazear and Spletzer) The higher level of education, the lower the unemployment. In fact the lower the age group, the higher the amount of unemployment. One would expect that since younger workers lack both years of formal education and job experience. One clear trend in post high school education may alter this: both for profit vocational schools and community colleges are moving away from the Associate degree and towards the Certificate. Both make great use of industry input, and the shorter training period (coupled with lower cost) allows a worker to move up in skill levels, e.g. to a welder, with commensurate increase in wages.

Many economists believe that the variety of welfare benefits have made "work less valuable". Lazear quotes University of Chicago's economist, Casey B. Mulligan that "the stimulus legislation, which lengthened the insured unemployment period, increased food stamp subsidies, and initiated programs related to health and mortgage assistance the required low income status." essentially provided little incentive to leave the unemployment roles. This is not to attribute something untoward towards the recipients of economic assistance, but rather to the very structure of welfare programs which reduce or

eliminate assistance as work is found, leaving the recipient worse off. We know from basic behavioral psychology that people will do whatever the reinforcement schedule dictates. People are rational, not malevolent.

The best empirical analysis was written by Gary Alexander, the former Secretary of Public Welfare of the Commonwealth of Pennsylvania. He writes: “ For example, a welfare recipient with two children earning a gross income of \$29,000 would receive the sum of \$57,327 in net income and welfare-assistance benefits, if you count the value of the housing –choice voucher, food stamps, daycare subsidies, and medical assistance. The same household would have to earn a gross income of \$69,000, with a net income of \$57,045 to enjoy a comparable standard of living. In other words, if the welfare recipient were earning a gross income of \$29,000, the household would turn down an opportunity to earn a gross income of \$30,000 because the benefits begin to fall off, making that household financially worse off.” (Alexander)

Richard Vedder of the Ohio University’s Department of Economics, wrote in the Wall Street Journal, ...”the Food Stamps program’s beneficiaries rose from 17.1 million in 2000, to 26.3 million in 2007, to 47.5 million in October of 2012. Pell Grants have mushroomed from 3.9 million students in 2000 to 9.7 million in 2011.” (Vedder). The issue here is not the necessity of governmental aid for education, but one that is blind to future resultant employment. Extending unemployment benefits beyond the traditional 26 weeks, at best delays looking for employment; at worst, reinforces staying at home.

Perhaps the most ominous welfare program seemingly “designed” to exclude labor force participation is the U.S. Social Security Disability Insurance Program or SSDI. David Autor’s seminal paper on SDDI, demonstrates two unfortunate aspects of the program: First, the addition to the disability rolls correlates not with the declining health of America’s population, but directly with unemployment statistics: “Previous research has established that workers are most likely to apply for SDDI benefits following a job loss, a fact underscored by the pronounced positive correlation between the national unemployment rate and the SDDI application rate... Between 1989 and 2009 the share of adults receiving SDDI benefits doubled from 2.3 to 4.6 percent of Americans ages 25-64.” This was due to Congress’ liberalization of admission criteria to include mental health. Autor concludes: “The SDDI program is growing in size and cost in substantial part because it is supporting a rising rate of dependency and a *declining rate of labor force participation* among working age adults.”(italics ours). The second, the SDDI trust fund will be exhausted between 2015 and 2018. (Autor)

In all the studies of the Decline in the LFPR, there is no mention of technology as a cause of any structural change in our economy. Erik Brynjolfsson and Andrew McAfee wrote the Race Against The Machine, subtitled “How the Digital Revolution is Accelerating Innovation, Driving Productivity, and Irreversibly Transforming Employment and the Economy”. The authors make the same observations about the economy that the previous economists have made, but see the causes as largely structural in general, and caused by automation and the digital revolution in particular. They lament that “a 2010 report published by the Federal Reserve Bank of Richmond, titled ‘The Rise in Long-Term Unemployment: Potential Causes and Implications,’ does not contain the words *computer, hardware, software, or technology* in its text.” (italics, theirs). Their problem is that they assume that the unemployment and the decline in labor force participation is related to technology, but give no empirical evidence to back up their postulates. They say that “The median worker is losing the race against the machine” (Brynjolfsson and McAfee), but no economists seem to share their view. The problem of Race Against The Machine is that the authors merely recount the recent economic problems and the aspects of the digital revolution, and then attribute causality, without any statistical correlations. Temporal contiguity is not causality.

Globalization and off-shoring have cost significant job losses, but it is beyond the scope of this paper to discuss it. Companies that manufacture off shore for that host country (GE comes to mind) are probably not causing significant unemployment. Rather it is using off shore suppliers that costs jobs, a fact consonant with the various manufactures lobbying organizations. Suffice it to say that with labor being such a small percentage of the selling price of most goods (except soft goods like textiles, apparel etc.), one can make a strong case that U.S. purchasers see their savings coming from regulation avoidance and its costs than the labor costs differential. (Dunn)

For example, two economists indirectly take issue with Brynjolfsson and McAfee's "Hollowing Out" of the middle class due to technology. David Autor and David Dorn discuss the job creation in the service sector from the advances in technology, and middle level skill jobs will be created. (Autor and Dorn) Finally, Kenneth Rogoff writes: "The next generation of technological advances could also promote greater income equality by leveling the playing field in education... Surely, higher education will eventually be hit by the same kind of sweeping wave of technology that has flattened the automobile and media industries, among others. If the commoditization of education eventually extends to at least lower level college courses, the impact on income inequality could be profound." Rogoff places his faith in market forces as opposed to government intervention.

## CONCLUSION

We have examined the causes of both unemployment and the decline of the Labor Force Participation Rate. One can conclude that the forces causing the decline are largely cyclical. Those factors that are of a structural nature are largely demographic, and are exacerbated by the "unintended consequences" of inadequately conceived welfare legislation. Finally if anything technology is more likely to be part of the solution than part of the problem of an underemployed.

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# **Dynamic Rebalancing Based Hedging of Exchange Rate Risk Using Currency ETFs**

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## **ABSTRACT**

The emergence of currency exchange traded funds (ETFs) has provided an alternative vehicle for both speculation and hedging in the currency markets. Because currency ETFs trade like equities and have no relevant expiration data, they represent an intriguing alternative for managing certain types of foreign exchange risk.

This paper reviews the particular advantages and disadvantages to currency ETFs as hedging instruments. Next, a discussion is provided of the potential divergence from initial intended ETF hedging results based on the particular characteristics of certain currency ETFs. The technique of dynamic rebalancing is introduced. A test of ETF hedging using the technique is then outlined for a dataset of historical currency ETF prices and exchange rates. Finally, recommendations are made concerning how market participants might assess the utility of currency ETFs in their specific foreign currency risk hedging application based on the expected results.

## **OVERVIEW**

The trade press has presented various practitioner oriented articles concerning the usefulness of currency ETFs in hedging foreign currency risk. However, such discussions typically do not approach the topic systematically. Generally, such treatments fail to recognize the similarities and differences between ETF based hedges and other hedging techniques using futures contracts, options contracts, or money market transactions. Most notably, many of the practitioner oriented articles discount the use of currency ETFs in hedging applications because of the necessity of tying up capital during the hedge. This criticism lacks merit since other well established techniques for dealing with foreign exchange risk also tie up capital during the hedging period. In the following sections this paper reviews the issues which arise in using currency ETFs in managing foreign exchange risk. Transaction details specific to currency ETFs are then discussed. Examples are given contrasting various hedging techniques, with special emphasis on how currency ETF investment objectives can impact the effectiveness of a hedge.

## **MANAGEMENT ISSUE**

The basic issue at hand is the management of foreign currency risk for those market participants who face only very small or occasional foreign currency exposures and those who face extremely long-term foreign currency exposures. For such market participants, existing liquid market derivative securities simply do not match the transaction scale or maturity. Table One summarizes this situation for the dominant U.S. market derivatives for the euro. In this case, the smallest notional principal amount involves 10,000 euros. A smaller size transaction would force the market participant to, in effect; take on a residual exposure of opposite nature to the initial exposure.

While services for small scale market participants do exist among the retail foreign exchange dealers, these arrangements have a reputation of being of a disadvantageous cost structure with account details

which may create more difficulties for the potential hedger (full margin calls, etc.). Also, the smaller FX dealer based derivative contracts or minor electronic exchanges suffer from illiquidity which may negatively impact pricing.

**Table One: Example Derivative Contract Sizes**

PHLX:	
Euro Options	10,000 euros
CME:	
Euro Futures*	125,000 euros
E-mini Futures	62,5000 euros
E-micro Futures	12,5000 euros

\*CME Options are limited to larger contracts.

With respect to maturity, the available exchange traded contracts tend to have relatively short maturities when compared to certain long-term foreign exchange exposures. Some OTC derivatives do have longer maturities, but these would be expected to have low liquidity.

## CURRENCY ETFS

In recent years numerous currency ETFs (CETFs) have been introduced. These include ETFs which cover most of the major currencies and an increasing number of second tier currencies. Variations include both long and short position ETFs, and more recently, double and triple long and short varieties. Table Two presents a sample listing of available CETFs as presented on the *Artremis.com* website. For the majority of these CETFs, there is no relevant maturity.

**Table Two: Examples of Currency ETFs \***

Symbol Name	Fund Family	Currency
FXE CurrencyShares Euro Trust	Rydex	Euro
EU WisdomTree Dreyfus Euro	WisdomTree	Euro
ERO iPath EUR/USD Exchange Rate ETN	iPath	Euro/U.S. dollar exchange rate
ULE Ultra Euro ProShares	ProShares	2x EUR/USD daily price change
EUO UltraShort Euro ProShares	ProShares	2x inverse EUR/USD daily change
URR Market Vectors Double Long Euro	Market Vectors	2x long euro
DRR Market Vectors Double Short Euro	Market Vectors	2x short euro
UUP PowerShares DB US Dollar Index Bullish	PowerShares	US Dollar
UDN PowerShares DB US Dollar Index Bearish	PowerShares	short US Dollar
FXY CurrencyShares Japanese Yen Trust	Rydex	Japanese Yen
JYF WisdomTree Dreyfus Japanese Yen	WisdomTree	Japanese Yen
JYN iPath JPY/USD Exchange Rate ETN	iPath	Japanese Yen/U.S. dollar exchange rate
YCL Ultra Yen ProShares	ProShares	2x JPY/USD daily price change
YCS UltraShort Yen	ProShares	2x short , JPY/USD daily change
FXC CurrencyShares Canadian Dollar Trust	Rydex	Canadian Dollar

\* Source: Artimis.com



CETF managers strive to match the change of the target currency in the specified proportion on a day-to-day basis. Essentially, the CETF substitutes for a long or short position in the target currency. Because the CETFs are traded on a share basis, an investor can take any conceivable position depending on the number of shares purchased. Based on varying notional amounts, most attempt to capture the daily percentage change of the target currency. While most applications of both speculation and hedging in foreign currencies can be accomplished with outright currency trades and traditional derivatives, the ease of trading CETFs is attractive to the new or occasionally foreign currency impacted investor. Also, there is no set denomination per share of such CETFs. Some CETFs are quoted in multiples of the underlying currency, while others are based on an arbitrary notional principal. Recent per share values range from \$15.87 to \$132.72 for the CETFs presented in Table One.

The minimum number of shares which an individual investor could trade depends on the individual brokerage housing the account. This conceivably could be as few as one share, and should not be confused with the inter-institutional “creation units” of much larger magnitude [1]). Commissions on CETF trades are also subject to wide variation, with typical commissions at discount brokerages below \$10 per trade. Some brokerages also offer commission-free trading on select ETFs. The basic CETFs involve foreign currency denominated bank accounts. The inverse or leveraged CETFs also use derivatives to attempt to meet their objectives. [11]

### **CETF INVESTMENT OBJECTIVES AND RESULTING RETURN DYNAMICS**

CETFs are available in both long and short varieties, and in leveraged long and short varieties. Naturally, the capability to easily take either short or long positions using these financial instruments would be of interest to those engaged in hedging applications. The potential utility of using CETFs in hedging foreign exchange risk would appear at first glance be highest for those who only occasionally face foreign exchange risk or those who face foreign exchange risk in magnitudes smaller than the sizes of the existing exchange traded currency derivatives. While foreign currency dealers have in recent years introduced smaller trading lots, the trading startup learning curve for trading forward currency contracts probably serves as a deterrent for the market participants in question.

However, existing CETFs operate under investment objectives which are defined relative to the daily returns on the underlying currency. The nature of the fund’s investment objective is crucially important to the potential use of CETFs in constructing hedging portfolios. The essence of any hedging approach is to create an offsetting position which is negatively correlated to the position originally at risk. However, this inverse relationship must be defined relative to the entire holding period. It is here that the CETF investment objective is crucial. While the typical CETF does a good job of tracking the daily changes in the reference currency, the effect is to create a compound return which can differ significantly from a continuous holding period return [4]. Thus, constructing hedge portfolios using CETFs can be problematic.

Given the existing CETFs one day return defined investment objective, the value of the CETF is driven by its own value change during the previous trading day. This differs significantly from other hedging instruments such as futures and forward contracts in which the value of the contract is always defined relative to the current value of the underlying. The overall effect is that CETF based hedges will drift away from the “perfect hedge” over time while derivatives based hedges will not deviate from the perfect hedge state during the contract period.

The drift effect is more pronounced for larger daily changes in the price of the underlying currency, and for longer periods of time [2]. For lower volatility markets and for shorter periods of time, the drift effect is negligible. However, for longer periods of time or high volatility markets, the effect can be substantial.

Thus, to ensure a CETF based hedge remains effective, ongoing rebalancing of the CETF position is required. This rebalancing, though theoretically relatively easy to accomplish due to the CETF trading format, significantly offsets the apparent appeal of CETFs as a hedging instrument for the occasional or small scale foreign currency market participant. In addition, the ongoing effort and expense of the rebalancing program would impact the overall effectiveness of the hedge.

### **REAL WORLD RELEVANCE OF CETF HEDGE DIVERGENCE**

From the literature it is clear that the divergence of a CETF based foreign currency hedge arises from the shape of the underlying position value functions [2]. Because the CETF has a return dependent on its own past return, its relationship to the underlying currency can be curvilinear [13]. Meanwhile, the futures contract value remains in a linear relationship to the underlying currency since its value is always  $X-S$ , which is the contract price minus the spot price on the value date.

The issue of CETF hedge divergence is thus dependent on the size of the daily returns in the underlying currency and the length of time over which the hedge position is held. In examples in the literature, the absolute magnitude of the daily return (i.e. change in price) of the underlying currency has been set as high as 5%. Clearly this is an unusually high level of change being only matched occasionally for any currency in the historical record. As a benchmark, from its high of around \$1.45/€1.00 in June 2011, to its level in June 2012 of \$1.25/€1.00, the euro experienced only an aggregate percentage return (price change) of negative 13.79%. This one year change implies daily average price changes of .04% over the period. If this period is seen as a relatively volatile period against the backdrop of the ongoing Eurozone financial crisis, the example volatilities from certain published hypothetical cases are clearly extraordinarily large.

For smaller daily returns (volatility) in the currency whose value is to be hedged, the divergence of the CETF based currency hedge can be negligible. However, high volatility environments are the essential motivation to most hedgers.

### **DYNAMIC REBALANCING AS A CETF HEDGING STRATEGY**

The discussion above has outlined the potential problem of divergence of CETF based hedges of foreign currency cash flows. The literature shows that the divergence can be extreme under certain daily return scenarios involving exceptional levels of volatility or exceptional levels of daily returns. However, under assumptions more in keeping with the historical record, it is likely that the divergence of the CETF based hedge from the benchmark futures based hedge is rather small.

It has been noted in the literature that the divergence of an ETF hedge can be eliminated by periodic rebalancing of the hedge [7]. In essence, this requires selling or purchasing the “excess” or “deficit” amount in the ETF resulting from the divergent returns on the ETF relative to the underlying asset. This would significantly reduce the suitability of hedging currency risk by less sophisticated market participants, since such rebalancing would require a complex and disciplined maintenance.

However, for reasonably sophisticated market participants, a rebalancing strategy could prove viable. The approach would provide an alternative to other available hedging techniques. One potential advantage of such a CETF hedging strategy would be the potential to keep a hedge position in place for an unlimited amount of time. It may well be that the relative efficiency of this type of CETF hedge would compare favorably to the longer term derivative contracts with respect to total cost.

What is needed is an empirical test of the hedging strategy. Since historical price data for CETFs is now available, it is possible to assess the technique for multiple currencies and for multiple historical market

periods and sub-periods. Such an investigation should be designed to include sub-periods of high volatility so as to provide meaningful evidence concerning the real-world likelihood of the theoretically possible extreme divergence discussed above.

## SUMMARY

While the basic construct seems robust, justification for use of CETFs for foreign exchange risk hedging depends on some operational details. First, while the CETF management objectives are clearly stated (ex. track double the inverse of the change in the underlying currency), the effectiveness of the CETF managers should be tested. For example, a double long CETF should correlate highly to 200% of the underlying currency's value change. If not, the utility of using double or triple long or short CETFs to reduce the amount of capital that is tied up is diminished.

Second, while many widely used currency risk hedging techniques (money market hedges, back-to-back loans) also do tie up capital during the duration of the hedge, the proper opportunity cost treatment for funds tied up in CETF based hedging must be more completely developed. Surely, those who dismiss CETF based hedging due to this factor overstate the severity of the issue. Nonetheless, a systematic incorporation of capital availability and costs must be established.

Finally, due to the return dynamics of CETFs, it is clear that a CETF hedge would require monitoring and potentially rebalancing to ensure the hedge objectives were met. However, this dynamic rebalancing approach must be assessed relative to the potential adjustments necessary for other types of hedges (ex. rolling between futures contracts) for longer hedging periods. That is, through ongoing rebalancing, a CETF hedge could be held open indefinitely. While studies of the effectiveness of such rebalancing approaches have been conducted for index and commodity ETFs, the author is unaware of similar studies specifically addressing CETFs [6].

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# **National Banking Sector Linkages: Did the Global Financial Meltdown Strengthen or Weaken the Linkages?**

Abstract:

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*This paper uses a vector auto-regression moving average (VARMA) as well as Granger-causality Wald test to examine the linkages among the major banking sectors in the international markets. My findings show that the US national banking sector has directional influence over the eight other major national banking sectors including: France, Germany, Switzerland, UK, Australia, Hong Kong, Japan, and Canada. Furthermore, the influence that the US national banking sector exerts on the other major banking sectors appears to diminish after the financial meltdown occurred on September 15, 2008.*

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**Jumping Over the Border, Why Not?**

**Examining the Advantages and Disadvantages of International Acquisitions**

**Compared to Domestic Acquisitions**

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## **Abstract**

This paper revolves around the exploration of the unique advantages acquired through international acquisition. International acquisition in this research includes mergers, acquisitions, and joint ventures. Market extensions and conglomerate mergers are strategic steps for companies to expand their markets and investment. Buying other companies, with the appropriate considerations being given to corporate structure, may be the easiest step for a company to grow. However, acquisitions can result in an expensive disaster if they are not done correctly. This is due to many factors; among these are the irreconcilable differences between the two corporate cultures of the parent and the subsidiary company. The decision to acquire, therefore, can be tricky and needs to be carefully considered.

The dilemma of whether or not to buy a company leads to another question: what if the subsidiary is outside of the U.S.? Would it add another layer of difficulty on to the acquisition question? Or would it open more doors and give the parent company unforeseeable competitive advantages? Many transitioning economies in the Southeast Asia region, such as Vietnam or Singapore, are stepping in the path of developed economic powers, such as the U.S. While these countries gravitate towards a capitalistic, industrialized society, they often lack technology advances due to insufficient funding for research infrastructure. The world is getting smaller than ever due to the exponential growth of the Internet and social media. These two factors alone increase the demand for U.S. products and services. International expansion may be worth all the trouble for some companies.

This research is done by compiling peer-reviewed sources on the topic of international acquisitions.



## **Jumping Over the Border, Why Not?**

### **Examining the Advantages and Disadvantages of International Acquisitions Compared to Domestic Acquisitions**

International acquisition, in this particular research, is defined as the act of partnering with, or acquiring a company that is located outside of the parent company's national borders. This act implies the implementation of integrated management and knowledge transfer between the involved companies. The term acquisition in this paper includes mergers, joint venture, and acquisitions. Even though the topic of acquisition is not new, buying a company entails many uncertainties and risks, both predictable and unforeseeable, such as corporate synergy. Regardless of acquisition types, having a difference between corporate cultures can render the acquisition a very expensive and even detrimental mistake. In the case of AOL and Time Warner Cable, the employees, company officials included, were struggling to integrate because the working styles and company visions of AOL and Time Warner Cable created an irreconcilable difference. An AOL official confessed: "Being a part of a giant corporation, a conglomerate, was not particularly appealing to me. We would just be part of a big corporation that controlled half the media in the world" (Klein, 2004). From the Time Warner Cable's side, things were not any better. When asked about the "honeymoon period" of the AOL/TWC marriage, a TWC executive said: "If there was a honeymoon period, it was about as short as summertime in Minnesota" (Klein, 2004). For the companies' executives, the acquisition initially made perfect sense as the combination of cable and Internet would surely give birth to an entertainment giant: "AOL Time Warner,

as the new company would be named, would use its vast array of media assets – from movies to magazines to music to the Internet – to create a new way to promote its own products and services, cut costs, and generate new forms of revenue” (Klein, 2004). Unfortunately, an acquisition’s success requires much more than just market research and an agreeable acquisition price. Over time, TWC realized their decision to acquire AOL would turn out to be a painful and expensive, business write-off.

What needs to be noted in this case is that AOL and TWC are both American corporations. They operate in the same market and culture, offer related services, and serve relatively the same category of customers. Yet, they could not work together to build an empire as TWC had imagined. Then why would anyone, after studying this case, even consider taking it a step further and integrating with a company that does not speak the same language, has roots in a completely different culture, and is located thousands of miles away? The answer is: it depends.

#### **Literature Review:**

Researchers in the topic of international acquisition mostly concentrate on finding a universal formula to a “happily ever after” merger. While none of them has found a single secret to world domination, they all agree that a successful acquisition is a combination of right moves, namely adequate market research, prior experience, strategic fit, cultural fit, and integration process (Duncan & Mtar, 2006; Meschi, 2004 , Colombo et al., 2007). However, before analyzing these factors, one should take a step back to the question above: why would anyone consider working with an unknown company outside the borders while there are domestic companies who offer the same service? This question is often neglected or only briefly

mentioned in the literature. International acquisition is an interesting concept that entails many distinct differences, compared to domestic acquisition, such as management philosophies, cultural differences, innovations, work ethics, and opportunities to expand (Errunza & Senbet, 1981; Caves, 1971, Zhan et al., 2008; Bresman et al., 1999). The purpose of this research is to explore the advantages and disadvantages of international acquisitions, compared to domestic acquisitions. Because each and every country possesses unique historic, economic, political and social differences, it is impossible to draw a general conclusion about all international acquisitions. Due to the scope of this paper, the main focus is to identify the unique advantages of international acquisition and particularly to encourage cross-border international joint ventures of North American companies in developing economies in Asia.

**Hypothesis 1: International Acquisition is positively perceived by financial analysts.**

Although globalization has received increased attention in the last ten years, and the explosion of social media began only several years ago, companies have long looked beyond their borders: “U.S. acquisitions of foreign firms increased in value from \$1.5 billion in 1979, to more than \$14 billion in 1989. These acquisitions have been rationalized as necessary strategic investments that allow American firms to position themselves in the global environment of the 1990s” (Markides and Ittner, 1994). According to United Nations Conference on Trade and Development (UNCTAD) statistics, collected in 1998: “During 1991-1997, 94% of the regulations regarding FDI (foreign direct investment) were relaxed to promote FDI in both

developed and developing countries” (Lahiri et al., 2003). Two years later in 2000, UNCTAD announced: “The value of all M&As (cross-border and domestic) as a share of world GDP has risen from 0.3% in 1980 to 8% in 1999” (Kayalica et al., 2009). Witnessing first-hand the boom in international acquisitions at the earliest stage, Markides and Ittner took part in the confusing, contradictory research about the effects that international acquisitions have on shareholders, with a study of 276 U.S. international acquisitions between 1975 and 1988 to determine the values they bring to companies. With stock price being the main measurement, Markides and Ittner found: “on average, foreign acquisitions create shareholder value for acquiring firms, a result that is consistent with the proposition that international acquisitions are associated with net benefits” (Markides and Ittner, 1994), compared to domestic acquisitions. Six years later, Loree, Chen and Guisinger (2000) published a similar conclusion about international acquisition: “ According to our findings, analysts are likely to raise their earnings estimates in response to the announcement of an international acquisition, all other things being equal, for companies that have demonstrated previous experience in performing this type of strategy” (Loree et al., 2000). Over the course of six years from 1994 to 2000, financial analysts modified their opinion about international acquisitions from merely “much better news than domestic acquisitions” (Markides and Ittner, 1994) to “analysts react to the acquisition characteristics in ways that are somewhat more complex than we imagined” (Loree et al., 2000). In Loree’s research, analysts are cautious in evaluating international acquisitions because history has provided an adequate amount of failed acquisitions for them to be careful when delivering their

opinions. The factors that tend to sway stock analysts towards a positive evaluation include: international acquisition experience, country experience, relatedness of the acquisition's business, experience with general acquisition and diversification versus focus (Loree et al., 2000). In addition, another study by researchers at University of Central Florida takes it further to include geographical, economic and political settings as influencing factors: "We find that the market reaction is more favorable when U.S. firms establish joint ventures in Asian countries, less favorable when the joint venture is established in lower risk developing countries, and less favorable when the joint venture is a manufacturing operation" (Borde et al., 1997).

There is no doubt that investors and stockholders' decisions are somewhat influenced by financial analysts (Loree et al., 2000; Borde et al., 1997). As these independent studies show, a company that is "international seasoned" with certain conditions, such as having experience in working in a global setting, preferably Asia, look better under the analysts' radars. According to a managerial study by Bresman, Birkinshaw and Nobel, this is because of the unique opportunities than can only be experienced by taking a leap across national borders (Bresman et al., 1999).

### **Hypothesis 2: International Acquisition creates unique synergies and competitive advantages**

From an external point of view, international acquisition can have a positive impact on its participants in the stock market. The base for analysts' optimistic evaluations stems from internally proven success. Not every international acquisition is guaranteed to succeed, as in the case with domestic acquisitions. However, success that is derived from an international setting has such unique

characteristics that it can create critical competitive advantages to the involved parties. Among potential positive effects, supporters of international acquisition tend to emphasize several advantages: reduction of variability of acquirer's earnings, international diversification, economies of scale, international market share, immediate expansion, critical mass, reverse knowledge transfer, and a favorable competitive environment (Borde et al., 1998; Yu et al., 1992; Duncan et al., 2006).

Examining the cross-border acquisition of Ryder Transportation (US) by FirstGroup, the UK's largest player in the public transportation industry, Duncan and Mtar (2006) reach several conclusions regarding the benefits derived from the successful example. First, the acquisition gave FirstGroup a valuable and powerful market entry to the U.S.: "By acquiring the second largest player in the US school bus industry and positioning itself in a market with significant growth potential, FirstGroup has enhanced its market power, which in turn enables it to compete more effectively in the increasingly global public transport industry" (Duncan & Mtar, 2006). For the US's side (acquiree), FirstGroup has brought "extremely beneficial" management skills to the acquired firm, especially when "the US market is now evolving along a similar path as the UK". Moreover, Ryder (the US acquiree), transferred to its parent a surprised competitive advantage: "the reverse transfer of know-how has resulted in the creation of new business opportunities for FirstGroup and enhanced its core business" (Duncan & Mtar, 2006). Specifically, FirstGroup implemented the signature US yellow school bus system, which was unprecedented in the UK, giving the parent company a tremendous competitive advantage in the

public transportation industry in its home country. It should be noted that not every international experience is the same and a blind international partnership can be as disastrous as a domestic one. Every country and region possesses its own culture and working habits, giving the parent an array of opportunities for the company to identify, and turn into assets. In the case of FirstGroup and Ryder, both of the companies are located in developed economies where they possess similar values and cultures, due to a shared history and frequent international relations. While this particular circumstance certainly helps them connect and learn from each other, it leads to a question of whether or not entering a developing economy can be considered a viable option.

Contrary to popular belief, Kayalica et al. (2009), Waheed et al. (1995) and Borde et al. (1998) argue that investing in risky, restrictive, developing countries generates more advantages to those who can get past entry barriers, due to limited competition. Taking advantage of the local government of the target country is one of the unique attributes of international acquisition since “National governments can encourage or discourage foreign investors in a discriminatory manner by choosing the policy tools that do not have a direct effect on international trades” (Kayalica et al., 2009). Because of this observation, researchers have focused on analyzing, testing and mapping a possible pattern to predict how a government would act in order to dilute the possibility of oligopoly. In particular, Kayalica et al. (2009) found that “[in] the absence of any policy towards domestic firms, the optimal lump-sum profit subsidy to foreign firms is negative. A domestic merger will increase the number of foreign firms if the optimal subsidy is exogenously given”

(Kayalica et al., 2009). In another study, Lahiri (2003) discovered that “ in the presence of lobbying, an increase in the number of domestic firms or an increase in the degree of corruption decreases the discriminatory subsidy towards FDI” (Lahiri, 2003). These are some of the conclusions in the topic of foreign direct investment in relation with target governments. They both show that a country’s political infrastructure and economic setting (developing versus developed) can pose either a threat or opportunity for foreign investment. This is confirmed by several separate studies, including Pierre-Xavier Meschi (2004) in France, Dikova et al. (2010) and Duncan et al. (2006) in the U.S. These authors even list knowledge about the target country as one of the success determinants.

**Hypothesis 3: Breaking the doors into a transitioning economy, such as Vietnam, through joint ventures is needed and rewarding**

The reason for the conclusion of “ventures in Asia generate more favorable wealth effects” (Borde et al., 1998) is not the relative strength of the U.S. dollar, venture partner, or the financial strength of the parent company (Borde et al., 1998). Surprisingly, it is because most Asian countries, such as China, India, and Vietnam, are transitioning economies. Generally, most studies have found that developing, especially transitioning economies highly favor international acquisition. As defined by Zhan et al. (2009), “transition[ing] economies are moving from closed-market, command structures to open, capitalistic systems.” These economies typically transition from government-controlled activities to free-market competition, and are in need of “technological, managerial, and marketing capabilities to meet the growing competition” (W.Zhan et al., 2009). Teaming up



with international companies from developed economies through international acquisition, especially international joint ventures, is one of the most effective ways to compete in transitioning economies (Zhan et al. 2008; Child, 2001; Shipley et al., 1996). This confirms one of the hypotheses of this paper: international joint venture is the easier, more frequently chosen way to enter a transitioning economy, such as Vietnam: “The IJVs’ acquisition of such knowledge should enable them to perform better than domestic firms in the increasingly market-oriented systems” (Tsang et al. 2004).

### **Conclusion, Suggestions, and Limitations:**

Business leaders have long known that acquisition is more than “one plus one equals two.” It is capable of delivering much more than what individual companies can achieve alone. Choosing the right partner and managing the post-acquisition process are challenging but crucial to the success of an acquisition. This is why researchers on this topic have long looked into determinants of acquisition success. As the world is getting smaller because of technology advancement, language barriers and cultural clashes remain an unavoidable burden in international business. Nonetheless, international acquisitions, mergers and joint ventures included, is a strategic move because of the undeniable advantages it can bring. These advantages include, but are not limited to, positive review from stock analysts, reduction of variability of earnings, gain on international diversification, economies of scale, international market share, immediate expansion, critical mass, reverse knowledge transfer, and a favorable competing environment (Borde et al., 1998; Yu et al., 1992; Duncan et al., 2006). The topic of how to achieve success

through acquisition is applicable and similar to both domestic and international cases (Duncan & Mtar, 2006). The ultimate decision to stay within the borders or jumping over them is a tricky, but possibly rewarding one. Like most business decisions, doing business overseas has its own risks and rewards. Although not discussed in detail in this research, it is suggested that adequate research prior to acquisition and focused post-acquisition management are two of the most important determinants of success for international acquisition. Limitations of this research include lack of real-world cases and updated references.

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# STRATEGIC COLLABORATIONS AND HIGH PERFORMANCE ORGANIZATION SYNERGY

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## ABSTRACT

This study conceptually explores the integration of strategic collaborations into an extended structure for high performance organizations (HPOs). Extant knowledge on HPOs implicitly incorporates outsourcing, strategic alliances and partnership management through a fundamental focus on core competencies. This work proposes that synergistic HPO outcomes can be obtained with the unambiguous assimilation of empirically proven strategic collaboration techniques. Resource orchestration combined with the structure and boundary spanning internal dynamics of the HPO are presented as moderators of the paradoxes and organizational complexity imposed by strategic collaborations, which in reciprocal relationships, are posited as antecedents to improved HPO performance. Propositions are presented, and a conceptual model is offered in support of the mutual compatibility of HPOs and strategic collaborations.

## INTRODUCTION AND BACKGROUND TO THE PROBLEM

The high performance organization (HPO) developed as a contemporary strategic concept in direct response to Peters and Waterman's (1982) seminal work, *In Search of Excellence*. Scholars and practitioners generally identify HPOs as emphasizing a select few strategic components that collectively allow organizations to excel in the more competitive global business climate of the late twentieth and early twenty-first centuries. Schermerhorn, Hunt, Osborn, and Uhl-Bien (2009) construct HPOs from five interrelated components; total quality management (TQM), employee participation, self-directed work teams (SDWTs), integrated production technology (IPT), and organizational learning. Intellectual capital is identified as the foundation for HPOs by these scholars. HPOs value people above all other assets. An HPO definition is offered by de Waal (2007):

A High Performance Organization is an organization that achieves financial results that are better than those of its peer group over a longer period of time, by being able to adapt well to changes and react to these quickly, by managing for the long term, by setting up an integrated and aligned management structure, by continuously improving its core capabilities and by truly treating the employees as its main asset. (p.4)

The five-component model of an HPO follows as Figure 1.

**Figure 1: High Performance Organization Components**



Adapted from Schermerhorn, Hunt, Osborn, and Uhl-Bien, 2009.

The performance of HPOs has been empirically documented to be superior to traditional organizations. Macy (2001) cited a thirty-year study of 1100 companies which concluded that HPOs exhibited annual profit growth 3 to 7 percent faster than traditional organizations, and 30 to 50 percent stronger over three to five year periods. A meta-analysis of extant HPO research undertaken by de Wall (2008) included 280 publications. For HPOs, return on equity, return on assets, and return on investment were respectively 17%, 7% and 20% higher than traditional organizations. Long-term strategic collaborations with external organizations were cited as a significant contributor to this differential performance (de Wall, 2008).

Global markets, multinational companies, lean manufacturing, cost efficiency and technological advance have all contributed to the need of long-term strategic collaborations and inter-organizational alliances to facilitate firms' operational expediency (Hitt, 2011; Luvison and Bendixen, 2010a; and Windrum, Reinstaller, and Bull, 2009). Dynamic, highly competitive environments create considerable uncertainty for participant firms (Gilbert, 2011 and Sirmon, Hitt, Ireland, 2011). Maintaining a competitive advantage in such a vigorous business environment necessitates strategic flexibility (Adner and Helfat, 2003). "Thus, firms either build an internal innovative capability and/or obtain such innovations externally through collaborative relationships" (Sirmon et al., p. 1399).

Prominent collaborative relationships include supply chain management (Chopra and Sodhi, 2004; Li, Ragu-Nathan, Ragu-Nathan, and Rao, 2006; Tan, Kannan, Handfield, and Ghosh, 1999), strategic alliances (Grant and Baden-Fuller, 2004; Kale and Singh, 2009; and Luvison, 2009), and outsourcing (Harland, Knight, Lamming, and Walker, 2005; Jiang, Frazier, and Prater, 2006 and Tadelis, 2007).

Mentzer, DeWitt, Keebler, Min, Nix, Smith, and Zacharia (2001) define supply chain management (SCM) as:

The systematic, strategic coordination of the traditional business functions and tactics across these businesses functions within a particular organization and across businesses within the supply chain for the purposes of improving

the long-term performance of the individual organizations and the supply chain as a whole. (p.18)

“Organizations began to realize that it is not enough to improve efficiencies within an organization, but their whole supply chain has to be made competitive” (Li et al., 2006,p.107).A multi-dimensional SCM framework has been proposed and empirically tested. This framework consists of five dimensions; strategic supplier partnership, customer relationship, level of information sharing, quality of information sharing, and postponement. This SCM framework has been proven to positively impact competitive advantage and organizational performance (Li et al.). Furthermore, the determination of customer requirements and management’s commitment to evaluating performance throughout the supply chain were shown to be significant antecedents to organizational performance (Hitt, 2011; Tan et al., 1999).

While an empirically proven SCM framework affords an organization the potential for increased performance, there is also the potential for increased complexity and risk which may paradoxically impede execution and performance (Chopra andSodhi, 2004; LuvisonandBendixen, 2010a).Supplychain risks include forecasting errors, disruptions and delays whichpotentially increase organizational complexity. “Managing supply-chain risks is difficult because individual risks are often interconnected. As a result, actions that mitigate one risk can end up exacerbating another” (Chopra andSodhi, 2004, p. 54).

Luvison and Bendixen (2010a) posit that as risk of organizational complexity increases firms may need stronger relationship-building mechanisms within the SCM function. Spekman, Spear, and Kamauff (2002) observed that behavioral elements such as trust, company culture, communication and commitment lead to greater adaptive learning, less organizational complexity and therefore a positive influence on SCM performance.

Strategic allianceshave grown in popularity as contemporary organizations seek to establish and maintain competitive advantage (Dyer, Kale,and Singh, 2001; Kale and Singh, 2009). A strategic alliance is a purposive relationship between two or more independent firms that involves the exchange, sharing, or co-development of resources or capabilities to achieve mutual relevant benefits (Gulati, 1995).While strategic alliances do create value for firms, and can be a source of competitive advantage (Dyer et al. 2001; Kale, Dyer,and Singh, 2002; Luvison, 2009) they pose significant failure risk (Dyer, et al.). Bamford, Gomes-Casseres, and Robinson (2004) observed failure rates of between 30% and 70%. Lunnan and Haugland (2008) found alliance termination rates in excess of 50%. Therefore, strategic alliances present a paradox for firms. Kale and Singh (2009) state; “On the one hand, companies face significant obstacles in ensuring sufficient success with alliances. On the other hand, they need to form a greater number of alliances than before, and must increasingly rely on them as a means of enhancing their competitiveness and growth.” (p. 45). Firms with stronger alliance management capability achieved stronger alliance performance (Dyer et al., 2001; Kale and Singh, 2009; Kale et al., 2002).

Outsourcing is a favored form of strategic collaboration and has become extensive and global in scope, incorporating a wide range of operational and strategic activities (Tadelis, 2007).“Outsourcing can be defined as turning over all or part of an organizational activity to an outside vendor” (Barthelemy, 2003). Mohr, Sengupta, and Slater (2011) define outsourcing as:

An arrangement in which one company (the client) hires another company (the service provider) to perform a particular function on its behalf. It involves the transfer of the management and/or day-to-day execution of an entire business function to an external service provider.



The incentives for outsourcing include cost reduction (Harland et al., 2005), access to advanced expertise or technology (Harland et al.), ability to focus on core competencies (Luvison and Bendixen, 2010; Windrum, Reinstaller, and Bull, 2009) and strategic flexibility (Mohr et al., 2011). Potential outsourcing shortfalls include supplier overdependence (Adler, 2003), information leakage (Hoecht and Trott, 2006), hidden costs (Bathelmy 2003), and loss of competitive advantage (Adler, 2003; Luvison and Bendixen, 2010) and loss of qualified employees (Bedeian and Armenakis, 1998).

Compounding the tradeoffs from the aforementioned outsourcing advantages and disadvantages are inherent outsourcing paradoxes. Windrum, et al., (2009) identify a productivity paradox; “In the short-run, outsourcing firms are able to reduce costs. In the long-run, firms that engage in outsourcing suffer lower productivity growth than firms that do not engage in outsourcing” (p. 198). This long-run productivity decline is modeled to be a result of myopic management’s focus on short-run declines in costs, the resultant motive to increase total outsourcing, which in turn leads to a decline in long-run innovative capability. Porter (1996) substantiates this long-run productivity decline:

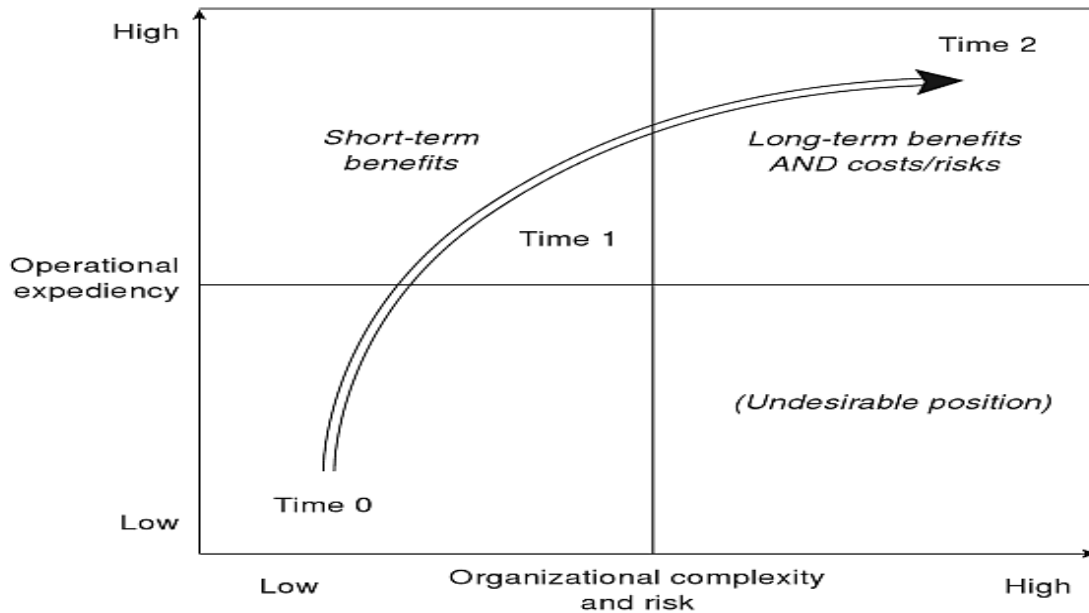
The more benchmarking companies do, the more they look alike. The more that rivals outsource activities to efficient third parties, often the same ones, the more generic those activities become. As rivals imitate one another’s improvements in quality, cycle times, or supplier partnerships, strategies converge and competition becomes a series of races down identical paths that no one can win. (p. 64)

Luvison and Bendixen (2010a) place this innovative capability risk within the context of a positive relationship between operational efficiency and organizational complexity. Luvison and Bendixen (2010b) state:

A vertically integrated firm (Time 0) can improve its operational expediency in the short term by outsourcing (Time 1). However, as it continues to progressively outsource increasingly key – and even core – functionality, additional benefits will be joined by new levels of complexity (Time 2). (p. 28)  
Please refer to Figure 2 which follows.

**Figure 2: The Relationship of Organizational Expediency to Complexity and Risk**

Adapted from Luvison and Bendixen, 2010a.



Luvison and Bendixen(2010a) identify three paradoxes aggregated within Figure 2:

1. Operational Expediency versus Strategic Complexity - Functions moved outside the firm paradoxically create the need for new innovative functions to maintain competitive advantage.
2. Operational Expediency versus Management Complexity - While outsourcing provides expediency through a reduced infrastructure, there remains the requirement for management to support the functional area outsourced with a new infrastructure consisting of new skills, attitudes and behaviors.
3. Operational Expediency versus Learning Complexity –As firms outsource functions, support activities remain, which are predominately people-based and behavioral, consisting of relationship-building mechanisms.

In the face of greater people and behavioral need, firms reducing their structure through outsourcing must endure the risk of losing the most talented employees through voluntary turnover (Bedeian and Armenakis, 1998). Contrary to conventional outsourcing logic, there will be a need for greater organizational effort, skill and coordination as more internal functions are outsourced. Complacent strategy formation, by naïve management may lead an otherwise competitive organization down a furtive course of value destruction. Bossidy and Charan (2002) emphasize the concurrent need for people skills, operational efficiency and strategic competency for execution of strategic goals.

In summation, decisions on participation in strategic collaborations should not be quickly seduced by short-term gain potential. Collaborations require new skills and complexities which are potentially very costly and time consuming. The purpose of this work is to construct a theoretical framework on the

manner in which firms may integrate collaborative endeavors into the strategic management process while achieving greater short-term expediency at lower levels of long-term complexity and risk.

This paper is organized as follows. First, the prevailing theories; transaction cost economics (TCE) and the resource based view (RBV), are conceptually extended into resource orchestration theory. Then, operationalizing research orchestration theory as a foundation, a new theoretical model of the high performance organization is developed. Critical paradoxes and organizational complexities of the strategic collaboration process are examined. The boundary spanning capabilities of the HPO, in conjunction with organizational learning theory are explored to develop propositions regarding the effectiveness of the new HPO model. Study implications and recommendations for future research close this work.

## THEORETICAL FRAMEWORKS AND PROPOSITIONS

Strategic collaborations have two theoretical underpinnings; the theory of transaction cost economics (Williamson, 2008, 1991), and the resource based view (Barney, 2001, 1991). Transaction cost economics (TCE) focuses on short-term efficiency, and promotes lucient guidelines to deploy outsourcing decisions (Crook, Combs, Ketchen, andAguinis, 2013; LuvisonandBendixen, 2010b). Harland, et al., (2005) explain TCE as exploring the boundaries of the firm with the most cost effective option. The resource base view (RBV) addresses long-term strategic sustainability through matching core competencies to environmental conditions (Crook, Ketchen, Combs, and Todd, 2008).The RBV posits that possession of rare and valuable resources drive value creation (Holcomb andHitt, 2007; Sirmon, et al., 2007). At times, both theoretical perspectives may be employed in collaborative decisions (Holcomb andHitt, 2007; LuvisonandBendixen, 2010b). However, in employing these approaches, firms may strategically error and outsource core competencies. “Mistakes in identifying core and non-core activities can lead organizations to outsource their competitive advantage” (Harland, et al., p. 839). Such strategic errors will increase risk to an organization (Chopra andSodhi, 2004; Windrum, et al., 2009).

In antithetical manner, TCE and RBV approach strategic decisions from conceptual opposites. TCE takes a markets failure approach, and RBV in contrast, takes an organizational hierarchy approach, assigning priority to competitive advantage obtained through organizational management (Crook et al., 2013).

Common to both theories, TCE and RBV ambiguously prescribe the operational and behavioral changes firms experience post-strategic collaborationcommencement (Harland et al., 2005; Holcomb, Holmes, and Connelly, 2009; LuvisonandBendixen, 2010b). “More recently, scholars have added that while owning or having access to valuable and rare resources is necessary for competitive advantage, they must be effectively managed and synchronized to realize a competitive advantage” (Holcomb et al., 2009, p. 457).The link between valuable resources, rare resources and management practices has experienced disparate results. Management exhibits differences in the way resources are combined, managed and utilized (Holcomb, et al.). Sirmon, Hitt, and Ireland (2007) define resource management as; “the comprehensive process of structuring the firm’s resource portfolio, bundling the resources to build capabilities, and leveraging these capabilities with the purpose of creating and maintaining value for customers and owners”, (p. 273).Sirmon, Hitt, Ireland, and Gilbert, (2011) extend this resource management framework to research orchestrationby integrating the complimentary characteristics of asset orchestration:

The complementarities of these frameworks suggest that integrating them will facilitate research of managers’actions within capability and resource based logics. To support this integration we adopt the term *resource orchestration*. In

the context of the work presented here, resource orchestration draws upon both resource management and asset orchestration and focuses on how managers affect a resource based competitive advantage.” (p. 1394)

Component activities of resource orchestration include structuring the resource portfolio; bundling resources for capability; and leveraging said capabilities to secure value to stakeholders (Sirmon et al., 2011; Sirmon et al., 2007). Through an expository examination of this extant body of knowledge upon research orchestration, logic leads to a need to ascertain the organizational hierarchy or structure most facilitative to research orchestration.

The literature on research orchestration affords perspicuous direction. First of all management must perceive the level of environmental uncertainty and munificence and adapt the organizational structure sub-processes accordingly (Sirmon et al., 2007). These sub-processes must be integrated across organizational levels “Such integration often requires that managers create special liaison units or liaison positions that facilitate the flow of information, encourage joint decision making, and attempt to build trust between key managers in each of the units represented” (Sirmon et al., 2011, p. 1395). Transaction cost economics theorizes that the appropriate structure minimizes transactions costs (Williamson, 1991) and achieves a “discriminating alignment”. Crook et al., (2013) add; “Second, consistent with the newer (i.e., resource-based) theory, assets that are both specific and strategic are more strongly related to hierarchical governance than assets that are just specific” (p. 64). The perceptible conclusion is that matching organization structure to the characteristics of the strategic collaboration maximizes performance. The strategic collaborations delineated within this work fall under the structural classification of hybrids (Crook et al.), which differ distinctly from markets and hierarchies, where all activities take place within one firm. Theoretical frameworks collectively argue in favor of resource orchestration via a hybrid structure that functions in the liaison role. Taken together, the above arguments suggest that management can add long-term value to an organization through the structural adaptation of a dedicated strategic collaboration unit, leading to the following propositions:

*Proposition 1: A high performance organization that structurally incorporates a dedicated strategic collaboration unit will financially outperform a high performance organization without a dedicated strategic collaboration unit.*

*Proposition 2: A high performance organization that structurally incorporates a dedicated strategic collaboration unit will achieve a higher level of short-term expediency with a given level of complexity and risk versus a high performance organization without a dedicated strategic collaboration unit.*

### **Strategic Collaboration and HPO Integration**

The research orchestration framework supports the combination or extension of organizational units into a dedicated strategic collaboration function. Extant research on collaborations also supports a dedicated function. Specifically, Tadelis (2007) identifies the need to employ a strategic framework that will overcome the costs associated with greater strategic collaboration complexity and risk. These costs principally stem from knowledge transfer and relationship management issues. Rothaermel, Hitt, and Jobe (2006) conclude that firms will have to deal with the paradoxes and complexity of outsourcing through new forms of organizational structure that “taper integration” between internal and external value chain activities. Sirmon et al., (2011) recommend the creation of appropriate governance structures to support and administer dynamic management capability obtained externally.

Kale and Singh (2009) recommend a “portfolio approach” where a firm’s alliance portfolio is managed in aggregate. The creation of a separate organizational unit or entity responsible for managing a firm’s aggregate alliance activity is critical (Kale and Singh, 2009; Kale et al., 2002). Dyer et al., (2001) studied 1, 572 alliances and found that firms that have a separate, dedicated alliance function perform better and create more value. “Enterprises with a dedicated function achieved a 25% higher long-term success rate with their alliances than those without such a function” (Dyer et al., p. 38).

Grant and Baden-Fuller (2004) identify the need for knowledge sharing. Boundary spanning behaviors and competencies to cope with increased management and learning complexity are recommended in research by Luvison and Bendixen (2010a). Boundary spanning functions serve as knowledge coordination mechanisms which facilitate inter-organizational operations in dynamic environments outside a firm’s hierarchy of authority (Luvison and Bendixen, 2010a). These boundary spanning behaviors include relational leadership, risk management, cross-functional teams and organizational learning. Luvison and Bendixen (2010a) state:

one must assume that firms will exhibit differing abilities to transition through this process based on their unique proficiencies for organizational change and their abilities to evolve adaptive leadership styles and cultures. Consequently, more adept firms can be expected to achieve greater levels of expediency than their competitors at comparable levels of complexity. This offers opportunity for future empirical studies, as it suggests that a firm’s behavioral profile, as well as its ability to adapt that profile to ongoing challenges, can determine its ability to achieve maximum efficiency with minimal incremental complexity when outsourcing. (pp. 29-30)

This conceptual research offers HPOs as the organization structure exhibiting “unique proficiencies for organizational change” and “adaptive leadership styles and cultures”. The HPO foundation of intellectual capital addresses the need for knowledge workers at all levels. The self-directed work team component of HPOs can serve as the basis for cross-functional teams, and therefore facilitate relationship management (Schermerhorn et al., 2009). Finally, we posit that risk management can be developed through the combination of organizational learning and teams.

Organizational learning is advocated as a necessary core skill in research by Spekman, Spear, and Kamauff (2002). Sirmon et al., (2007) state; “Organizational learning is especially important for the effectiveness and efficiency of resource management in dynamic environmental conditions” (p. 275). Kale et al., (2002) recommend addressing the need for organizational learning through a dedicated organizational function to manage strategic collaborations; “First, a dedicated function can act as a focal point for learning and leveraging lessons prior and ongoing alliances.” (p. 750). Organizational learning is an HPO component that includes an adaptive culture and leadership. It is imperative that the external cultural adaptation be present to accept strategic collaborations.

The high performance organization component organizational learning is defined largely by the culture that directs the actions and behaviors of members. Kotter and Heskitt (1992) offer three cultural perspectives; strong, fit, and adaptive. A strong cultural perspective is one which is highly resistant to changes in the business environment. A strong culture may therefore be interpreted as reluctant to adopt strategic partnering and inter-organizational alliances. In order to obtain an alliance and partnership culture (Luvison, 2009), an adaptive perspective is preferable since this cultural perspective will more readily respond to dynamic business climates and the attendant changing needs of stakeholders.

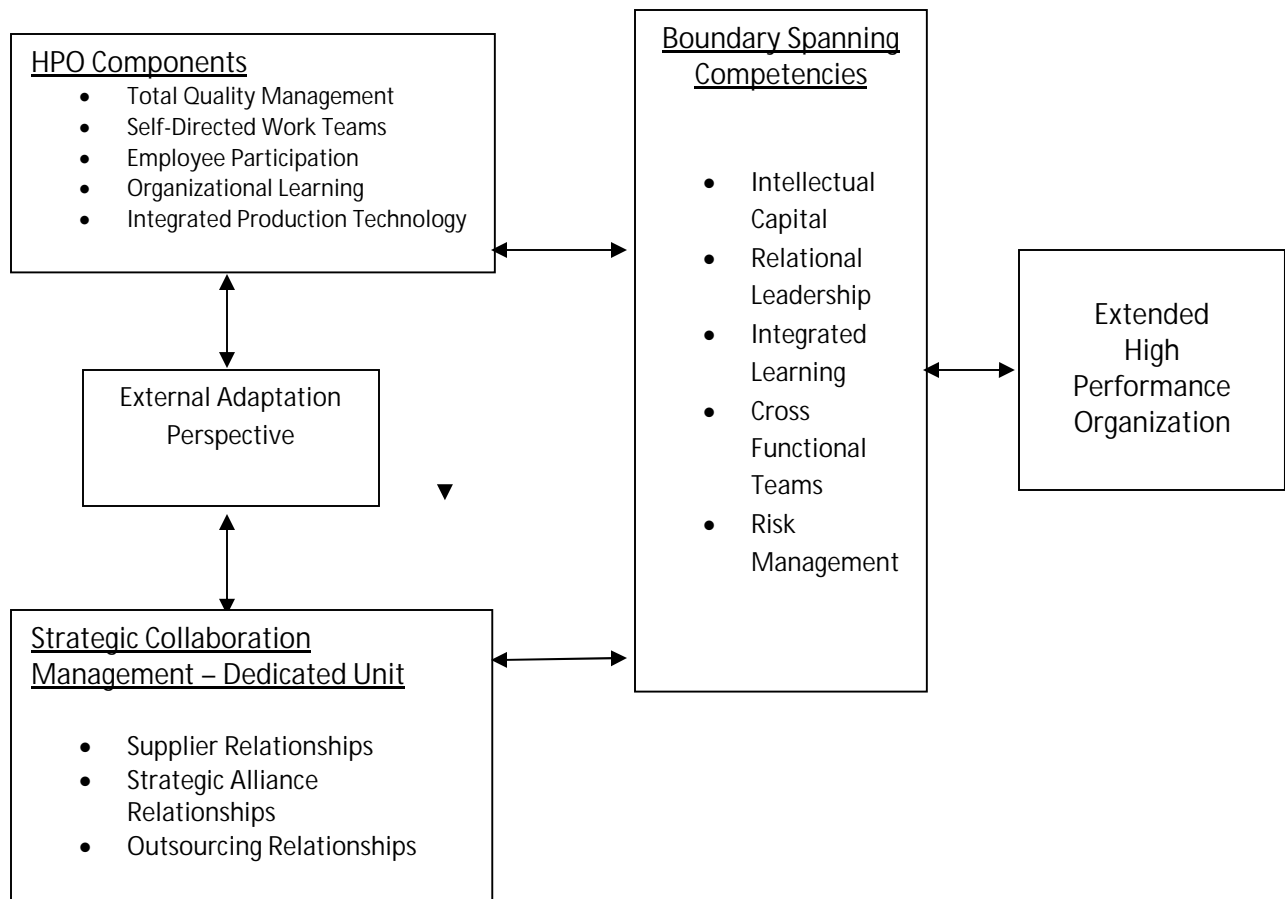
Of critical significance is whether an organizational culture is influenced more by internal integration or external adaptation (Schein, 1990). Internal integration deals with a collective identity and with ways by which members work together. External adaptation involves working with outside stakeholders and goal

attainment. Organizations pursuing increased performance through strategic collaborations will need external adaptation to be the dominant cultural dimension.

Given the interrelated knowledge on resource orchestration, dedicated organizational functions, boundary spanning, organizational learning and HPOs, this study posits a dedicated strategic collaboration unit as the sixth leg of an HPO structure. This research proposes that the revised, synergistic HPO structure will serve as the means to achieve higher levels of performance while reducing organizational risks and complexity from collaboration paradoxes.

A synergistic high performance organization model is offered in Figure 3, which follows.

**Figure 3: Synergistic High Performance Organization Model**



Adapted from; Schermerhorn, Hunt, Osborn, and Uhl-Bien, 2009, Li, Ragu-Nathan, Ragu-Nathan, and Rao, 2006, Scarso and Bolisani, 2008, and Luvison and Bendixen, 2009.

## **DISCUSSION AND IMPLICATIONS**

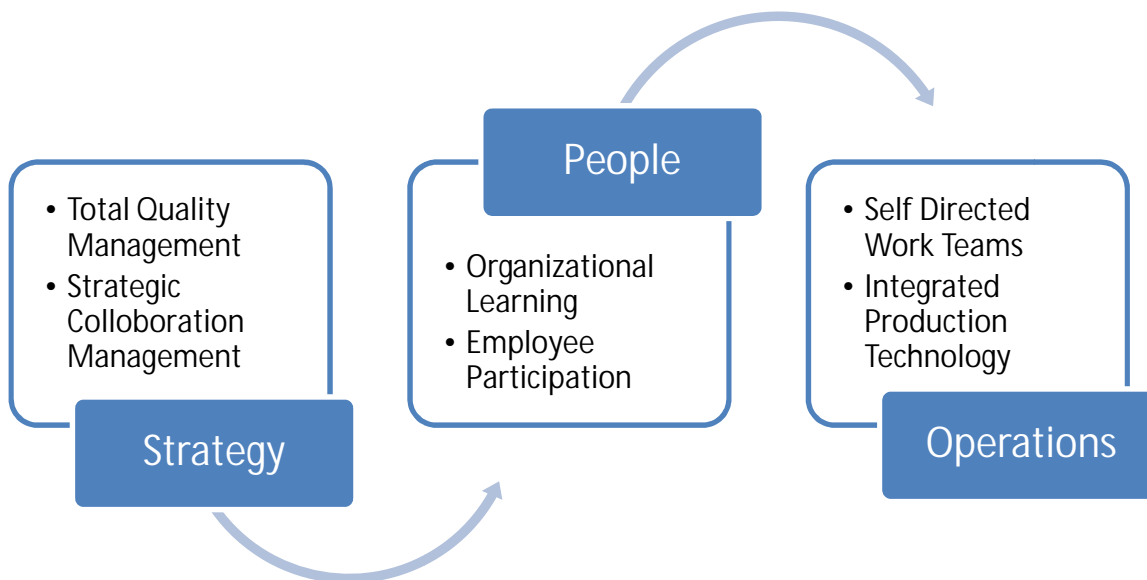
The extended, synergistic HPO structure is offered as the moderator for the constraints and paradoxes of outsourcing, strategic alliances and supply chain management identified by the body of research. It is proposed that an HPO with an external adaptation perspective and boundary spanning competencies incorporated into cultural values will result in an increased level of performance at a greater level of environmental complexity. This integration of a dedicated strategic collaboration unit (DSCU) will complement an HPO with increased performance. Finally, in appreciation of this perceived ability to deliver increased performance we offer the (DSCU) as the sixth component to a common HPO model. The original HPO model (Schermerhorn et al., 2009) is revised to include the sixth component DSCU in Figure 4 which follows. A more interactive model that defines the “new HPO” through the three lens of Bossidy and Charan (2002), strategy, people and operations is offered as Figure 5 below.

The implications of this study include the recognition that dynamic business environments necessitate collaborative agreements with external parties, but said agreements are fraught by failure. Management must explicitly incorporate collaborations into the strategic management process. In addition, within the strategic management process, the inexorable tradeoff between short-term operational expediency and long-term competitive advantage must be afforded greater due diligence. Furthermore, the mechanisms for successfully managing collaborations are very intricate, dynamic and at times counterproductive. This study also emphasizes the need for unique managerial skills, particularly in the behavioral management arena, required to execute boundary spanning between internal organization and external collaboration. This study adds to the body of knowledge on high performance organizations.

The obvious limitation is that this study is a conceptual study. It is hoped that future research will empirically test the propositions. The propositions appear to lend themselves to a combination empirical and qualitative study. Additionally, this study lacks practical detail on the mechanics for effectuating the boundary spanning conditions within the respective HPO components. The intricacies applicable to successful boundary spanning are very suitable for future study.



**Figure 4: High Performance Organization Component Integration**



Adapted from Bossidy and Charan, 2002.



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# Does Customer Service Belong in Higher Education?

An applied MBA 710 research paper about customer service as it relates to higher education and specifically the service excellence initiative at Coastal Carolina University, Feel the Teal.

**Eileen Soisson**  
**August 8, 2013**

# Does Customer Service Belong in Higher Education?

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## SECTION I. EXECUTIVE SUMMARY

“Colleges are starting to see higher education in business- like realities. They are realizing that revenue depends on selling the college (recruitment) to its customers (students and parents). Sales (enrollment) are made based on the college’s brand (image), product (courses, programs, degrees), and by creating a connection with the customer (customer service).”

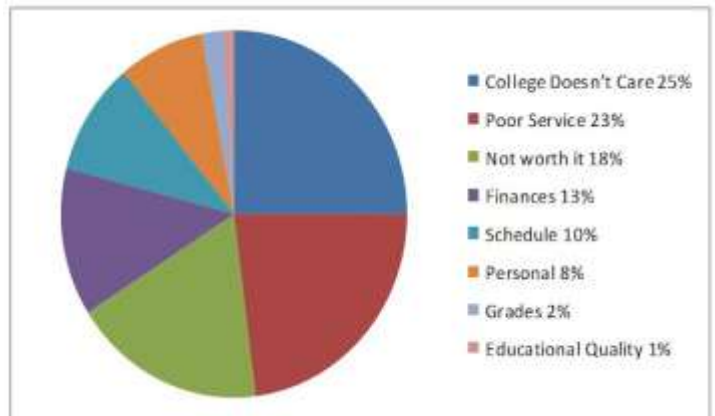
*Embrace the Oxymoron: Customer Service in Higher Education*, Neal Raisman, PhD (7).

Does customer service belong in higher education?

Universities are slowly starting to explore the concept and value of placing a priority on providing good academic customer service. With the current struggling economy and widespread collegiate competition, universities are seeing decreased revenues, lowered budgets, dropping retention numbers and universal cutbacks.

A strategic approach appears necessary to sustain and remain competitive as a university and as a business. As much as some people in colleges and universities cringe at the term “customer service”, colleges and universities are businesses at their very core and must address the reality of customer service in higher education settings. This paper will explore the term “customer service” as well as its current outlooks in higher education and how that applies to higher education.

Neal Raisman’s research shows that almost 50% of students nationwide leave a university due to the perception of the college not caring and/or poor service (12). This research is shared in the side chart and such information about retention is the foundation for Coastal Carolina University’s service initiative and most likely many others. Due to retention being such a hot topic for sustainability in higher education, it is likely that more university will start to explore and ask the question “does customer service belong in higher education?”



Coastal Carolina University (CCU) has recently launched a service excellence initiative called Feel the Teal. CCU’s university wide customer service plan is designed to improve service delivery, customer satisfaction and retention. Successful training programs bring a sense of integrity and loyalty to the institution by all of its customers as well as the extended CCU community. This paper will use that initiative to explore key elements for success of a university service plan.

## SECTION II. CUSTOMER SERVICE OVERVIEW

### Definition of Customer Service

Customer service is a commonly used term the business world, especially in the hospitality and travel/tourism industry. Service is an expectation and business requirement to compete and retain customers. Service is a subjective word and its meanings can differ based on its definition or precedence. Various businesses define customer service for both their internal and external customers through programs, credos and mantras that places a level of priority on serving the customer.

The Ritz-Carlton Hotel has Gold Standards that serve as the foundation of the business and encompasses the values and philosophy by which they operate. The Ritz - Carlton credo assures to be “a place where the genuine care and comfort of our guests is our highest mission. We pledge to provide the finest personal service and facilities for our guests who will always enjoy a warm, relaxed, yet refined ambience. The Ritz-Carlton experience enlivens the senses, instills well-being, and fulfills even the unexpressed wishes and needs of our guests”. This foundation and definition sets the standards that a Ritz-Carlton guest expects.

Customers vary as much as the expectations of service. Each customer brings different history, experiences, and personal feelings to the service experience. Customers’ individual preferences determine whether their needs were met in a satisfactory manner. When the customer meets service, an individual “moment of truth” is determined and the customer decides whether they received decent service. Customer service is not a department but a feeling provided by the employee or representative on behalf of the organization.

Turban, Lee, King, and Chung (2002) define the term customer service as “a series of activities designed to enhance the level of customer satisfaction—that is, the feeling that a product or service has met the customer’s expectation” (87).

Customer service is a current reality in higher education but it is not defined using the term “customer service”. Customer service is simply treating students with respect and courtesy and like their college experience matters, not giving them better grades than they deserve. It is representing the university as a brand and delivering service that best represents the university as not only an institution of learning but also a brand. Vaill (2008) pointed out, “Education is clearly a service, not a product ... in higher education; they have to be mindful of, responsive to the characteristics, needs, and expectations of the student” (p. 1).

“Student will define customer service in terms of how they perceive the communal equity in a school as well as their sense of three types of return on investment: financial, emotional and associative.” (Raisman, 13).



## “The Customer is Always Right”

Customer service can no longer be defined by the outdated, antiquated, and never to be spoken again expression “the customer is always right”. This expression can be traced back to American retailers Marshall Field, John Wanamaker and Gordon Selfridge. This phrase was most likely not intended to be taken literally but to empower employees to create an experience where the customer did not feel wrong. César Ritz (1850-1918), the celebrated French hotelier is credited with saying 'Le client n'a jamais tort' - 'The customer is never wrong'. That's not the phrase that people now remember, but is still translated to be said as 'the customer is always right'.

The customer is not always right but it is the responsibility of anyone working as a service provider to make the situation right. Because of the long standing history and misperception of the expression “the customer is always right” it is important to refute this definition, especially in the context of higher education. When the customer is a student or parent, they are more than likely to be going through this experience of college for the first time. They most likely do not know what they want or most importantly, they do not know what they need.

Customer service in higher education is about so much more than smiling and giving customers what they want. “It is a more complex interaction of expectation, investment, process, actions and certainly, outcome or final result.” (Raisman, 25).

Educating the customer as much as possible is key to providing pro-active service in higher education. Educating the customer means providing as many ways to communicate the resources available in a fast, friendly and easy manner. Many students are sent on the “university shuffle” and told to go to one building to get a signature, only to be told to go to four other buildings only to return to the original location.

Service excellence means addressing the issue and finding ways to make a process more student centered. Student success is the goal of any higher education institution and to achieve this goal, life and activities must be focused on what is best for the students and learning. It is not about who is right and who is wrong, but making the situation right.

## Current Outlooks

There appears to be a disjuncture in higher education between customer service and academic integrity. These two goals are often thought in higher education to be natural enemies; we can't have both it is assumed, at least not at the same time.

Despite some internal push back about the concept of customer service in higher education, more universities are currently re-evaluating the way they view their students and employees. By taking a more customer focused approach and implementing a service excellence initiative, universities are linking service to functional synergy and retention. Addressing customer service

is more important today because of the need of many colleges to compete for and retain students.

Academic integrity is not dependent on maintaining an indifference to student needs. It doesn't serve anyone's interests. Customer service is treating students with respect and courtesy and like their college experience matters, it is not giving them better grades than they deserve.

Georgia Governor Sonny Perdue launched a Customer Service Initiative in 2006 as a unique effort to engage all state employees in improving service to citizens through a three-pronged strategy to become faster (speeding up services); friendlier (developing a customer-focused culture); and easier (adopting an enterprise approach to managing call centers). This program encompasses a statewide communications strategy; uniform customer and employee job satisfaction surveying; customer service focused pre-employment screening, orientation, training and performance measurement; and creation of a central point of access for state services by telephone and the internet. Initial research has shown that Georgia's higher education institutions have benefited greatly by adopting these comprehensive programs and will serve as a great resource and precedent for this plan.

Universities that have some form of service programs are listed below.

<b>Other University Programs</b>	<b>Students</b>	<b>Program Components</b>
Brigham Young University	30,684	I AM BYU: Acronym that reminds employees to create positive environment for customers
High Point University	3,689	Concierge service where all HPU services are located on one page
Kennesaw State University	24,600	Customer Service Recognition, Customer Service Training and KSU Unit Customer Service Review
Lamar University	14,000	Emphasis on professionalism at all times ("Zero-tolerance")
Lansing Community College	20,000	Everybody is empowered and quality service is provided. Helps faculty and staff work together. Dean reported walking around school greeting everyone
Macon State College	5,702	Emphasis on phone service and greeting customers properly
Middle Georgia State College	8,000	Training program for staff to enhance experiences of customers & how to handle a customer
Northern Arizona University	26,002	On-Site and 24/7 Online training programs
SC State University	4,000	Customer service tips & strategies to improve customer service & to enhance university image
Syracuse University	21,029	CAPS: Communication, Appearance, Problem-Solving
University of Colorado (3 campuses)	57,591	Understanding that everyone can be a leader and sharing ideas that can make a difference
University of Massachusetts Boston	15,847	A "one stop shop" for all customer service needs
University of Texas at Austin	50,000	Specific trainings focused on "plateauing" and how to continuously improve customer service
University of Texas at El Paso	22,740	Golden Rule-Treating others, as we would want to be treated
University of West Virginia	29,707	An initiative to recognize excellent service

Faculty appear to have the most hesitation to customer service being a priority in an academic setting. The word “customer” is met with some reservation because of the connotation of calling a student a “customer”. The word does not appear to fit, as they are such a unique type of customer. For example, students pay for a full semester of classed but will then skip class, turning down the service they paid for - unlike a traditional customer who would not normally do this.

There is a perceived difference between traditional customers and student “customers” in that students can’t expect to just pay and receive a finished product. They must work for what they want even if it doesn’t happen the way they want it (example- 8 a.m. classes). Students aren’t customers in the same way that hotel guests and cruise ship passengers are seen as customers.

Another reservation to the service focus is where the student feels entitled to good grades whether they earn them or not. Just last month, a Lehigh student sued the university for 1.3 million dollars. She did this because she received a C in the class that she needed to pass to graduate. She was denied her license.

“A judge in eastern Pennsylvania ruled Thursday against a former Lehigh University graduate student who sued to have a grade of C-plus changed to a B and was seeking \$1.3 million in damages. Northampton County Judge Emil Giordano made the ruling in the lawsuit filed by Megan Thode, a report by The Express-Times of Easton (<http://bit.ly/VXlYj2>) said. Thode was seeking damages over the C-plus grade in a 2009 graduate-level therapist internship course she alleged was retaliation because she supports gay marriage. She said the grade is preventing her from becoming a licensed therapist. An expert estimated Thode would suffer \$1.3 million in damages in earnings she would never make as a result over the course of her career” (PA Judges rejects...).

## Who is our “Customer”?

Higher education serves such a large variety of customers. There are external and internal customers within any organization or business and higher education is no different. External customers are those who partake or participate in the organization’s product or service while internal customers are those who help to produce the product or service.

It is important to know the type of customer so as to establish appropriate levels of communication. The information we share with fellow internal customers may not be appropriate for the external customer and this is important in any operation.

Customers are very different. No two customers are to be treated the same since all customers are different and have varied experiences and expectations. The Golden Rule states that we should treat people the way we want to be treated and this has worked for many years in providing service. However because we are all so different, there is a new way of service excellence thinking called The

Platinum Rule. The Platinum Rule encourages us to treat others the way they want to be treated and this is meeting the customer where they are. It is much more customer or other focused.

External Customers in Higher Education

Parents	Grandparents/Families	Potential students	Business and industries
Donors	Potential donors	Board of trustees	Community
Media	Other Universities and colleges	Employers	Alumni

Internal Customers in Higher Education

Faculty	Staff	Administration	Student workers
Alumni	Board of Trustees	Alumni	Campus Community

All customers rely on businesses to stay true to their word and do what they say they are going to do. For example, when a pizza company claims their delivery will be “30 minutes or less and it’s free”, the customer expects that the company will not protest or make excuses if they are late. Likewise, universities should keep their promises, and Ricky L. Boyd agrees stating “being true to your word means a lot to students and their families” (36)

**Coastal Carolina University**

Coastal Carolina University (CCU) has launched a service excellence initiative called Feel the Teal. The initiative is focused on creating a university wide culture of exceptional customer service. In doing so, this will positively contribute to customers being served faster, friendlier and easier. Students will then be more sufficiently satisfied with the quality of their college experiences at CCU and they will more likely stay through graduation. This objective is vital to retention at CCU.

Coastal Carolina University is a dynamic, public comprehensive liberal arts institution located in Conway, S.C. The University offers 55 areas of study toward the baccalaureate degree and seven master's degree programs in education, writing, coastal marine and wetland studies, and the MBA. Ten new undergraduate degree programs were recently added, including biochemistry, economics, graphic design, information systems, musical theatre, theatre arts, as well as criminology, health and aging, and social justice tracks in sociology.

CCU is proud to offer world-class faculty, a nationally competitive NCAA I athletic program, an inspiring cultural calendar, and a tradition of community interaction that is fueled by more than

120 student clubs and organizations. The university has, on average, 720 staff and 415 faculty serving approximately 9200 students per semester.

The President of Coastal Carolina University, Dr. David DeCenzo, launched the Feel the Teal Service Excellence initiative in August of 2012. “We must together build a strong university wide culture of exceptional service where everyone can Feel the Teal. By focusing on undergraduate and graduate academic excellence and good academic customer service, we will see an increase in student willingness to learn and engage not only in their studies, but also in experiential learning and leadership activities. Good customer service will better enable us to offer a quality product – education” (DeCenzo, 2013).

### **CCU’s Feel the Teal Service Excellence Initiative**

Coastal Carolina University is dedicated to providing high quality educational programs and services. The Customer Service Initiative is based on the idea and principle that colleges and universities are businesses at their core. Universities must deliver the education experience to their “customers” or “clients” (students) through products or services (courses and majors) that lead to the finished product (graduation and then a successful career and life after college).

The primary objective of this initiative is to make certain that everyone who interacts with Coastal Carolina University in any way—be that person a student, a member of the general public or CCU employees—gets treated with care, courtesy and respect.

Do they “feel the teal”?

This objective of this initiative will be met through the design, development and implementation of an effective and ongoing customer service program that supports and provides university employees with leadership, training and development, departmental collaboration and support, and communications to perform their jobs effectively.

## **SECTION III. SERVICE PROGRAM IMPLEMENTATION PLAN**

### **Key Elements for Success of a University Service Excellence**

The following five elements are key for a university or college to implement a service excellence initiative or plan.

#### **Leadership**

The leadership of the institution will (and must) demonstrate the standard of customer service performance to be emulated by all faculty and staff through personal example. “The first person who has to deliver excellent service to everyone is the president. If he or she is not capable of making people feel as if they matter and are valued at the very least, that sets a tone that pervades the entire institution” (Raisman, 8).

Someone will need to create, implement and carry out the needed structure for the initiative. Coastal Carolina University’s Service Excellence Plan called for a Director of Service Excellence. This person established minimum standards and steps of service for the university. These standards guide behaviors when anyone on campus has the opportunity to interact with a customer. This plan leader will need support through a Steering Committee with a focus on gaining an initial assessment of strengths, weaknesses, opportunities and threats in regard to university - wide service. Ideal members of this committee will include a representative from faculty, staff, housing, campus recreation, admissions, and any service strong departments.

This committee will help to ensure the service plan undergoes continuous improvement and compliance. Committee members will communicate frequently by way of e- mail, telephone, committee meetings, and personal visits to ensure timely flow of ideas and fine tuning of the Service Plan. The focus of the meetings will be to review progress and to address concerns and challenges that may hinder the implementation of a process, friendliness of our team and/or making things easier.

Institutional performance appraisals should include customer service as a primary rating area for enhanced departmental and personal accountability. Employees supporting the initiative through attitude and action will be recognized and rewarded. Supervisors of any employees demonstrating deficiencies in this area will develop individual improvement plans to assist the employees in enhancing their performance.

The university’s leadership must cast the vision for a culture moving toward a more defined “customer focus”. The aspiration is to have the right people on the bus headed in the same direction. As Jim Collins states in one of the best business books of our time, *Good to Great*, “It is better to first get the right people on the bus, the wrong people off the bus, and the right people in the right seats, and then figure out where to drive.” Retention applies to keeping those customers (external and internal) that will steer the figurative bus in the right direction.

## Training and Development

Dr. Neal Raisman and Associates' research has found that it is customer service or the lack of it that either propels students to enroll or causes 12% of them to turn away once they have had contact with a school. This statistic alone tells us that how we answer a phone is very important and can create a positive moment of truth or a negative moment of misery for the potential student/customer.

Training is key to provide the needed instruction and expectation level of such service skills. A basic training course should be created and used in training various departments to start the process. This workshop will be the foundation for customer service learning and all employees should go through this training.

To better serve students, Ewers (2010) suggested that institutions have employees attend customer service training sessions to learn the basics of customer service. Yet many in academia find this a hard pill to swallow.

Coastal Carolina University piloted the first training with Campus Recreation on a training module called CCU Service Basics on August 15, 2012 to help prepare the staff with the needed service skills for the opening of the HTC Student Convocation and Recreation Center. The session was very well received and scored very high marks on the evaluations (78 evaluations were turned in with an average rating of 4.86 out of 5). Below are comments from the evaluations.

*"This training not only helped me with my job on campus, but it will help me with my future jobs." Stephanie Bunch*

*"The workshop was awesome! I learned an extremely large amount of information that will be very helpful in college and the real world." Dana Thael*

*"This was a great workshop; it definitely gave me encouragement on always giving 150% in my job every day. I am very thankful for this opportunity and look forward to putting these lessons into practice." Erica Peterson*

Target frontline staff with the most amounts of "touch points" with the customers for the following trainings (example – campus tour guides, welcome center, orientation leaders, etc.).

Workshops like this will have benefits and will hopefully be reflected in future retention scores. For example, "following a workshop at the University of Maine in Fort Kent, retention was reported to have increased 5% by UMFK Provost Dr. Rachel Albert. This was 2% more than the administration had hoped for and was achieved because the University took the ideas from the workshop and made them part of the culture." (Raisman, 14).

All newly hired employees at a university should be required to complete a formal orientation program. An overview of the university's commitment to customer service should be included

in the orientation program. The Director of Training and Development will lead these sessions of orientation as often as appropriate.

A university-wide training plan is important to serve as part of the initiative's minimum standards. Training topics will include customer service as a base but also include soft skill developmental opportunities in areas such as leadership, attitude, business etiquette, communication skills, and others. Departments will be able to customize departmental training plans and choose specific training seminars and activities to enhance their specific department's training needs.

A "Train the Trainer" program can be offered for each department to take advantage of so that training is a consistent and constant process and not just an annual event. This is to ensure uniform training in all departments and an adherence to the brand within everyday service. Th

## **Departmental Collaboration and Support**

Employees should be included in the improvement process of plan and given meaningful opportunities to provide input and solutions. Allowing support for time in the quarterly meeting to share goals and nurture motivation and collaboration is just a start. Staff should be encouraged to improve customer service in their departments in creative way that best reflects their department's specific customer needs, values and direction.

Forums yield candid conversation to share goals, address concerns and develop relationships. These types of "open trainings" should be encouraged within all departments. They bring staff together to share in specific customer service accomplishments for the year, build morale and instill a sense of unity among our departments. A strong recommendation for this phase is to highlight best practices from various departments and use personal connections through testimonials (building on the relationships). These opportunities build strong internal customer service skills, which will only sustain will departmental support and a commitment from the "top down".

This key element is necessary to create an effective support network that best serves the customers (students, parents, external clients, the local community and each other). Through this "customer focused" plan, a college can build its culture based on collaboration and strengthened through customer retention.

## **Communications**

Effective communication is paramount to the initial perception and eventual success of the customer service plan. Effective communications are the very essence of interpersonal relations, efficiency and productivity. How well we communicate with our customers, both



internal and external, ultimately determines our success or failure as an educational institution of higher learning.

Vision casting from the president about the new customer service initiative and direction should be shared with the campus community. All employees should receive a plan summary as soon as possible. Continued vision sharing is imperative to creating a culture of service and team morale in all employees representing the university.

For the vision to become part of the culture and every day service, employee “buy in” must be fostered through continued communication. This must be a top priority for the President more than anyone in the institution. He must establish his full endorsement and commitment. The quote “communication does not equal understanding” is very applicable. The vision must be repeated and threaded throughout the everyday culture and service experience so everyone can “feel the teal”.

This plan will need to include action items that show a true commitment to a “customer focused” culture. Once customer service is used in everyday decisions and results in positive experiences, employees will move past the perception that this initiative is not the “flavor of the month” and acknowledge it’s here to stay.

Communications includes the current university website and showcasing the philosophies that drive the initiative, tools/tips to help units improve customer service, changes in campus policies and procedures, best practices, customer service highlights, and other relevant resources. A URL based resource page for employees would create easy access to training materials and additional resources for new and veteran staff.

The customer service plan will need to be branded to create an image of the program and to properly market the commitment to service delivery. A name, logo and Facebook page will be created to increase the awareness of this new program.

## **Evaluation and Measurement**

Evaluation of performance improvement include, but are not limited to, web-based surveys, comment cards, training workshop evaluations, on-the- spot comments through campus interviews, personal oral or written testimonies, and eventually retention as a customer service indicator. Survey results will be disseminated to appropriate faculty and staff.

Institutional Research department can create, administer, and compile the results from customer service surveys to gather feedback from students, employees and external customers regarding consistency and usefulness of information received, timeliness of assistance, and level of customer service received. The survey results may create additional action items to achieve exceptional and friendly customer service.

Mapping is a tool to review each step of a process/service through the eyes of the customer and determine areas of opportunity at each step to provide excellent customer service rather than mediocre service.

Quality Assurance (QA) visits will be created in the early phase based on the training content and implemented in a second year to evaluate service delivery. The manner with which a quality assurance program is rolled out is crucial to whether employees buy in or push back. These audits are to catch people doing things right and are never to be punitive. Findings from the shop allow leadership to better measure improvements and assess points of improvement, which then help plan future trainings.

Criteria of the shop will be based on the minimum standards and delivery techniques taught during the trainings. Audits also look at the environment provided for and by the customers in work areas and offices from layout and space through lighting and clutter as they affect the customer's sense of reflected value and quality.

Areas to be audited include reception areas, admissions, counseling, financial aid, registrar, dining halls, and bookstore. At CCU QAs will assess if customers can "feel the teal" – if it's a Tuesday, are faculty and staff wearing teal for "Teal Tuesday"; if a customer asks where a specific room is and a point is appropriate, did the staff member use the "Disney point".

Service levels will be assessed through a focus on the following:

- Wait time- how promptly people are recognized and served
- Acknowledgment of student presence and manner of the recognition given
- How questions are responded to
- Are accurate directions given
- Availability of information at point of contact
- Use of university specific verbiage (i.e.- residence halls instead of dorms, students instead of kids, my pleasure instead of no problem)
- Telephone protocols used by customer contacts to aid to detract from service to campus callers

There should be an environment that encourages and rewards employees who take ownership of customer issues and use their initiative to address customer concerns in a timely and efficient manner. To this end, an employee recognition program – a systematic way to celebrate and reward individual employees and service teams, which provide superior support to the customers-- should be implemented.

**CCU Feel the Teal Phase I – August 2012- July 2013  
“Heightened Awareness”**

The following is a break down assessment of Phase I of Coastal Carolina University’s Feel the Teal Service Excellence. Each key element and its correlating action items accomplished are listed to share what has been identified as priorities in the first year.

Key Elements	Phase I Action Items Accomplished
<p><b>Leadership</b></p> <p>To introduce and implement the Feel the Teal Service Excellence Initiative to the CCU community</p>	<ul style="list-style-type: none"> <li>- Dr. DeCenzo will oversee the immediate implementation (Phase I) and direction of the plan</li> <li>- Eileen Soisson will identify the needed structure for the initiative and transition out of Career Services through Phase I</li> <li>- Soisson will assume the role of Director of Training and Development in January.</li> <li>- Identify Feel the Teal Leadership Team (65 ppl); meets every two months</li> <li>- Identify Steering Committee members as dr. Michael Latta, Dr. mark Mitchell, Steve Harrison, Keshav Jagannathan, Jody Davis, April sager and Eileen Soisson; committee meets every month</li> <li>- Include customer service in institutional performance appraisals for enhanced accountability</li> </ul>
<p><b>Training &amp; Development</b></p> <p>To design and implement a university wide customer service training program.</p>	<ul style="list-style-type: none"> <li>- Create a Service Basics Training</li> <li>- Implement CCU Service Basics (TEAL Module One) training for all staff, students workers and other front line employees; trained over 1300 employees</li> <li>- Created a heightened awareness of the two fingered Disney point, five foot- ten foot rule, platinum rule, verbiage and service skills</li> <li>- Begin to develop service excellence training plan</li> <li>- Present CCU’s commitment to customer service at new employee orientations</li> <li>- Order logo pens and prizes for trainings</li> </ul>
<p><b>Departmental Collaboration &amp; Support</b></p> <p>To encourage idea and solution sharing about current service issues.</p>	<ul style="list-style-type: none"> <li>- Meet with various departments to assess current service delivery and feedback about initiative</li> <li>- Create open discussion through Director of Service Excellence</li> <li>- Provide departmental (customized) training for those who express interest</li> <li>- Identify possible concierge program that evolved into the CHANT411</li> </ul>

	<p>Program and securing April Sager as coordinator</p> <ul style="list-style-type: none"> <li>- Coordinate August retreat to celebrate one year of initiative, address current service realities and plan forward</li> </ul>
<p><b>Communications</b></p> <p>To raise awareness of Feel the Teal through effective and constant communication opportunities</p>	<ul style="list-style-type: none"> <li>- Release official statement from the President about the new service excellence initiative (January 2013)</li> <li>- Monthly submissions about Feel the Teal for the CCU employee newsletter, The Athenaeum</li> <li>- Heighten campus awareness of customer service</li> <li>- Feel the Teal Logo developed by University Communications</li> <li>- Create Feel the Teal Twitter page #feelthetealcccu</li> <li>- Present educational session about CCU's Service Excellence Initiative at ACUHO-I Conference and Expo (June 13-19; Making Good Academic Customer Service A Reality); CCU Student Affairs One Day Conference: May 21; SCASFAA Conference: May 22; SEDUG Conference: November 14</li> <li>- Create customer service video to show what has occurred from January-April</li> <li>- Present Feel the Teal to the Board of Trustees</li> </ul>
<p><b>Evaluation &amp; Measurement</b></p> <p>To research evaluations measurement tools that can be used to assess the university's and customer service processes and delivery</p>	<ul style="list-style-type: none"> <li>- Measure feedback about CCU Service Basics training by from Employees (faculty, staff) are now being measured with satisfaction surveys</li> <li>- Design Quality Assurance evaluation reports based on the content taught in CCU Service Basics training</li> <li>- Piloted Quality Assurance Program with Campus Recreation; CR scored 92% average of all the visits</li> <li>- Research recognition program options that recognize service specific behaviors and results</li> </ul>

## CCU Feel the Teal Phase II - August 2013 – July 2014 “Decisions and Empowerment”

The following is a break down of Phase II of Coastal Carolina University’s Feel the Teal Service Excellence. Each key element and its correlating action items to be accomplished are listed to share what has been identified as priorities in the second year.

Key Elements	Phase II Action Items
<p><b>Leadership</b></p> <p>To lead this initiative from the top down and create a culture of service empowerment and decision making</p>	<ul style="list-style-type: none"> <li>- Create a more visible presence of the President on campus</li> <li>- Signed thank you and support notecards from the President</li> <li>- Surprise visits of appreciation by the President</li> <li>- Empower Director of Service Excellence for effective decision making</li> <li>- Establish specific year goals for Steering Committee</li> <li>- Identify Service Champions (staff) and Student Success (faculty) Committees members and establish bi-monthly meetings</li> <li>- Build Feel the Teal team to include staff to offer administrative duties, marketing duties, technical and graphic support</li> <li>- Encourage departmental leaders to let the “vision leak” to their staff</li> </ul>
<p><b>Training &amp; Development</b></p> <p>To implement a university-wide service excellence training program with various modules and options</p>	<ul style="list-style-type: none"> <li>- Continue to offer CCU Service Basics for all new employees</li> <li>- Add more interactive exercises and videos to training sessions</li> <li>- Design marketing “take away” item for each service training session for participants to take back to work as reminder of content</li> <li>- Implement Attitude of Service (TEAL Module Two), CCU History and Traditions (TEAL Module Three) and Dealing with Difficult Situations and Customers (TEAL Module Four) training sessions</li> <li>- Develop CCU Service Excellence certification program</li> <li>- Work on department training plans</li> <li>- Add faculty to training expectations</li> <li>- Bring in Neal Raisman for staff development and faculty roll out (Nov, 2013)</li> <li>- Bring in guest speakers to add to the training plan</li> <li>- Start creating program for Train the Trainer program</li> <li>- Work with IT to use a course management system</li> </ul>
<p><b>Departmental Collaboration &amp; Support</b></p>	<ul style="list-style-type: none"> <li>- Create time in schedules for quarterly meeting to share goals and nurture motivation and collaboration of best practices</li> </ul>

<p>To explore discussion opportunities contributing to a more empowered, motivated and supported staff.</p>	<ul style="list-style-type: none"> <li>- Support current departmental morale with informal discussion programs</li> <li>- Allow for staff to identify what “is broken” and how to fix it (address the thought of “We’ve Always Done it That Way”)</li> <li>- Create customized for each department Five Steps of Service</li> <li>- Provide retreat and meeting facilitation for open discussion and upwards communication</li> </ul>
<p><b>Communications</b></p> <p>To implement effective communications regarding CCU’s customer service initiative, progress, changes and updates</p>	<ul style="list-style-type: none"> <li>- Continue Athenaeum articles focused on service excellence from the President</li> <li>- Develop CCU Feel the Teal webpage to include monthly President’s message, service tips, archives from trainings</li> <li>- Create URL based resource page for easy access to training materials</li> <li>- Create Feel the Teal Facebook, Instagram and increase presence on Twitter</li> <li>- Design Feel the Teal brochure</li> <li>- Maintain customer service feedback links from all departments.</li> <li>- Identify potential members for advisory council made up of other like universities that currently have a service program</li> <li>- Utilize Feel the Teal print materials such as notecards to recognize service excellence examples campus wide</li> </ul>
<p><b>Evaluation &amp; Measurement</b></p> <p>To measure university and customer service processes, friendliness and accessibility as they apply to customer service satisfaction levels</p>	<ul style="list-style-type: none"> <li>- Acknowledge retention numbers as they may correlate with service excellence</li> <li>- Research other universities and colleges’ service initiatives</li> <li>- Conduct internal focus groups made up of students, faculty and staff in October 2013 and February 2014</li> <li>- Implement Quality Assurance evaluation reports based on the content taught in CCU Service Basics training</li> <li>- Document benchmarks of program</li> </ul>

## SECTION IV. CLOSING SUMMARY

Universities and colleges are much more competitive due to the new options available for learning. It is not a matter of whether they will serve their customers but how they will serve their customers as a competitive advantage. Kotler and Fox (1995) state, “the best organization in the world will be ineffective if the focus on ‘customers’ is lost. This applies to higher education and the sooner universities and colleges start to have this conversation the better. It is the finding of this paper that customer service does indeed belong in higher education.

Coastal Carolina University’s recently launched service excellence initiative Feel the Teal has seen changed behaviors in a short time in regard to behavior changes and a heightened awareness of the value of service. The initiative has only been in place for a year but with the five key elements of leadership, training and development, departmental collaboration and support, communications, and evaluation and measurement in place, there is a great foundation laid out for future success. It is with great encouragement that other universities put a call out for service excellence and measure the benefits of such a program.

Boyd (2012) shares specific tips that academic advisers and other institutional officials can follow to provide quality service:

- Treat students with dignity and respect. This is a basic human necessity and right.
- Give students clear directions on how to solve their problems and issues. Students should not be given the runaround. Students are at college to study and learn, not go on a wild goose chase all over campus trying to find the answers to simple questions.
- Be responsive to students and their parents. “If you tell a parent you will call them back today, then call them back today” (Ewers, 2010, p. 2). Being true to your word means a lot to students and their families.
- Give timely answers to students’ questions and regular feedback on their progress.

Regarding the benefits of good customer-student relationships, Emery et al. (2001) said, “Student-customer satisfaction directly correlates to larger enrollments: Happy student stay in school, so retention rates remain high; happy students tell their high-school friends, so recruitment numbers are higher ...” (p. 2). More students generate more tuition revenue and in the current economic reality this tells us that service excellence must be threaded throughout higher education operations and practices.

For colleges and universities who place a vision and value on service excellence rewards can translate into increased revenue through improved recruitment and retention, reduced recruitment costs, improved service and satisfaction, quicker yield conversions and closer internal working relationships. This term of customer service is still new and somewhat foreign in higher education but it sure to be a competitive advantage in the future.

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# **BRINGING TOURISTS TO THE GRAND STRAND DURING HOLIDAY SEASON**

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## **ABSTRACT**

Seasonality is characteristic of the tourism industry in the Carolinas. Marketing organizations including the Myrtle Beach Area Chamber of Commerce, are constantly experimenting with ways to bring visitors to Myrtle Beach and the Grand Strand in what are known as the ‘Shoulder Season’ or ‘Holiday Season’ to smooth out the tourism businesses activity and keep people employed. This study concerns a hospitality and entertainment bundle with a single price point aimed at ten segments identified by previous research. Although this is not a controlled study, it does suggest, however, that bundled accommodations and nearby attractions can have appeal with a fixed price point in the Myrtle Beach market. Future research could allow better definition of the impact of such partnerships on profitability, employment, and number of visitors to the area during Holiday Season.

## **BACKGROUND**

Myrtle Beach is the heart of the state's tourism industry, where an estimated 14 million visitors a year flock to the area's beaches, 100-plus golf courses and 1,700 restaurants. Horry County received \$3.3 billion in domestic travel expenditures to lead all of South Carolina's 46 counties. Charleston County ranked second with nearly \$1.8 billion, followed by Beaufort County with \$1.0 billion [12].

The tourism business in South Carolina, the Grand Strand, and in Myrtle Beach is seasonal. The market has a peak season from Memorial Day in the Spring weekend to Labor Day weekend in the fall. There are also shoulder seasons, or peak golf seasons, from mid-February through May and September through mid-November. Off-season for golfers is from mid-November through mid-February. Demand for the various attractions varies by the season with the changing demographics and psychographics of the Myrtle Beach visitor. Many attractions have continuous peak demand from mid-June through early August and trough attendance the rest of the year. Local discounts are offered during trough periods of demand to maintain profitability. More recently there has been discussion of a ‘Holiday Season’ which is a short period running from Thanksgiving to New Year's Eve. Stimulating demand in the Holiday Season is a key goal of the Chamber.

On its website, the Myrtle Beach Area Chamber of Commerce says the following:

“The Grand Strand, as the Myrtle Beach area is commonly called, stretches for 60 miles along the South Carolina coast and encompasses many communities within two counties Horry County and Georgetown

County. Each community has its own identity and unique qualities. These are some of the major communities comprising the Grand Strand:

- Myrtle Beach
- Atlantic Beach
- Aynor
- Conway
- Little River
- Loris
- North Myrtle Beach
- Surfside Beach
- Garden City Beach
- Murrells Inlet
- Litchfield Beach
- Pawleys Island”

The Chamber partners with various entities to conduct marketing research to bring tourists to these communities. In 2010 the Chamber partnered with Equation Research, a marketing research firm specializing in dining and travel research. Equation Research conducts an Attitude Awareness and Use survey for the Chamber which includes a question, “What would influence your decision to travel to the Myrtle Beach area in the Holiday season of 2010. Out of 146 survey participants, the following distribution of answers was found:

- 25% A free night stay
- 19% Vacation packages with air service
- 15% Vacation packages without air services
- 15% Better overall value for money
- 09% Attraction offers
- 09% Restaurant offers
- 07% Schedule of upcoming events
- 05% Less traffic/congestion
- 05% Direct air service
- 01% Golf offers
- 00% Email about the destination
- 06% Other
- 44% Nothing

The results indicate there is not a single strong driver of Holiday Season travel to the Myrtle Beach area. There may, however, be a bundle of pricing, attractions, and accommodations that could serve as a driver of demand, and they did not explore barriers to coming to the area in the Holiday Season as it is defined.

In tourism, bundle pricing is a widespread phenomenon to deal with drivers and barriers of consumer behavior. The obvious reasons for this is ‘unbundling or a la carte pricing benefits the buyer and packaged or bundled deals give the advantage to the seller [10]. However, most of the research literature is about how to find optimal bundle prices [3]. Rarely is the research focused on an existing bundle with a fixed price to determine what components of the bundle are important and what modifications in the bundle except for the price might be more relevant to consumers [9]. Some researchers describe bundling, price bundling, product bundling, pure bundling, and mixed bundling based on how the bundling is executed [8]. Mixed bundling was used here.

As noted by other authors [2], executing a bundling strategy requires setting a specific price with limited information and the courage to avoid a simple ‘cost plus’ or a ‘follow the leader’ approach is relevant. Starting with that realization, a cooperative research effort was undertaken involving the Marketing Research Department of the Myrtle Beach Area Chamber of Commerce, one Resort and two attractions, plus a Marketing Strategy class comprising a research team to collect data. Quantitative data were gathered from visitors to the area during the Holiday Season to determine their reactions to an actual bundle offer. In addition to collecting quantitative data, the team also collected suggestions for improving efforts to attract tourists during the Holiday Season.

## METHOD

The focus of the research effort is to determine what is important to tourists who come to the Grand Strand and stay overnight in hotels during the Holiday season. In cooperation with the Myrtle Beach Chamber of Commerce Marketing Research Department, 10 segments were identified and are presented in the sampling plan below. In addition to those segments, the visitors’ gender and prior visit status were also of interest and included in the plan. The complete plan with a total sample size of 200 is presented in Table 1 below.

**Table 1**  
**Sampling Plan**

Segment	Prior Visit		No Prior Visit		Total
	Male	Female	Male	Female	
Blue Collar Trades	5	5	5	5	20
Family Members	5	5	5	5	20
Young Professionals	5	5	5	5	20
Business Organizations	5	5	5	5	20
Golfers	5	5	5	5	20
Low Income Non-Trades	5	5	5	5	20
College Students	5	5	5	5	20
Elderly or Retired	5	5	5	5	20
Canadians	5	5	5	5	20
Military	5	5	5	5	20
Total	50	50	50	50	200

The Self-Administered Questionnaire (SAQ) including the bundle offer appears in the Appendix.

### Sample Demographics

The total sample reached 202 and was well distributed across segments as can be seen in Table 2 below which shows the distribution of respondents across segments.

**Table 2**  
**Actual Sample Distribution Across Segments**

Segment	% of Sample
Blue Collar Trades	10.4

Family Members	9.9
Young Professionals	10.4
Business Organizations	9.9
Golfers	9.4
Low Income Non-Trades	9.4
College Students	10.9
Elderly or Retired	10.4
Canadians	8.9
Military	10.4
Total	100.0

Other demographics indicated the majority of the sample tended to be:

- Less than 40 years old (61%)
- Female (56%)
- From the Mid-Atlantic or South-East region (74%) with an equal split at 37%
- Had made two or fewer overnight trips to Myrtle Beach in the past five years (59%), 28% had made none
- Either made or shared in the final decision about visiting the area (84%) with 35% making the final decision alone
- In a full-time job (60%)
- Renting with others (42%) or owning with others (33%)
- Were either single or married (91%) with many singles in the sample (49%)
- Earning an annual household income less than \$75 thousand (57%), but with many less than \$50 thousand (37%)

### Driving Distance

Table 3 below shows the distribution of respondents and their longest acceptable driving distance to the Myrtle Beach-Grand Strand area defined in hours of driving time. Consistent with other research, the natural break point is 7-8 hours indicating the sample is in line with the target market for the Chamber of Commerce and Myrtle Beach.

**Table 3**  
**Longest Car Travel Distance for a Three Night Stay**

Driving Time	%
2 Hours or Less	13.4
3-4 Hours	26.7
5-6 Hours	13.4
7-8 Hours	15.8
9-10 Hours	9.4
11-12 Hours	4.5
13-14 Hours	2.5
Would not Drive	14.4
Total	100

### Bundle Offer

The bundle offer appears below in the SAQ in the Appendix. It was a real offer, presented to the target market through direct mail. The price point and the options were used in developing the SAQ portion where importance and satisfaction ratings were collected.

The key issue for this research effort is determining which aspects of the holiday season vacation bundled offer are most important and have the highest utility to the market. The \$53.55 offer based on availability, double occupancy, and a three-night stay with four potential partners in the bundle:

- Ocean front accommodations at the Sand Dunes Resort
- Two tickets to the Carolina Opry Special Christmas Show of the South
- Two tickets to The Laser Holiday Show tickets
- Optional upgrades to the Marriott Grand Dunes Resort

In addition, a less expensive two night stay was included in the bundle offer. A concern about local ground transportation availability by the Chamber Members led to inclusion of this item as a decision factor in the questionnaire, but it was not part of the offer.

### **Importance, Satisfaction, and Utility of Decision Factors**

The percentage of respondents indicating a decision factor is Very Important and the percentage indicating the same decision factor is viewed as being Very Satisfied in the offer bundle along with a mean utility score appears in Table 3 below. The utility score is formed by multiplying the importance score by the satisfaction score for each decision factor [1].

**Table 3**  
**Importance, Satisfaction and Utility of Decision Factors**

Decision Factor	% Very Important	% Very Satisfied	Mean Utility
3 Night Stay in Ocean Front Accommodations	44.1%	23.9%	15.3
2 Tickets to the Holiday Show	39.5%	27.9%	15.0
2 Tickets to the Laser Light Show	15.8%	24.1%	11.4
Upgrades Available	20.5%	33.7%	11.9
2 Nights Available	9.9%	27.6%	10.4
Local Ground Transportation Available	11.4%	31.3%	12.5
Price of \$53.55 Per Person Per Night with Double Occupancy Required	24.3%	26.6%	13.4

### **Comments**

A total of 369 comments were made up to five by a single respondent at the end of the SAQ interviews. In order they numbered as follows:

- First comment 170 respondents
- Second comment 98 respondents
- Third comment 66 respondents
- Fourth comment 32 respondents
- Fifth comment 3 respondents

These comments will be content analyzed for the final draft of this research paper if it is accepted for inclusion in the program.

## Conclusions

Beginning in the September, 2012 issue of Marketing News, there have been seven different options for additional 'Ps' to be added to Kotler's original four of product, price, place, and promotion [4]. These new items in the order in which they appeared in Marketing News include:

- Purpose (Carol L. Cone and Brian Solis)
- People (Philip Kotler, Eric Larse, and Brian Solis)
- Process, and Physical Evidence (Philip Kotler)
- Productivity (Rick Jensen)
- Privacy (Chris Babel)
- EmPathy (Manila S. Austin)
- Packaging (Philip Kotler and Michael Latta)
- Partners (Michael Latta)

Each of these authors gave supporting evidence for their nominations in papers published in Marketing News during 2012 and 2013 [7].

The two 'Ps' involved in bundling for purposes of this study are, Partners and Packaging [5].

Based on the Quantitative data, the following conclusions can be drawn concerning the bundle offered to the public. The top three aspects of the bundle are below in descending order of utility.

1. Three Night Stay in Ocean Front Accommodations
2. Two Tickets to the Holiday Show
3. Price of \$53.55 Per Person Per Night with Double Occupancy Required

The Partners involved are the Sand Dunes Resort and Carolina Opry Special Christmas Show of the South with the Packaging involving three nights, two tickets, and a single price per night per person with double occupancy. The Laser Holiday Show tickets, optional upgrades to the Marriott Grand Dunes Resort, and a less expensive two night stay along with local ground transportation availability were not as high in utility as the other components of the offer and could be eliminated.

Smith, an Associated Press correspondent, conducted an interview with Duane Parrish, the Director South Carolina's Department of Parks and Recreation [11]. The report indicated, "From 1990 to 2008, the state tourism industry enjoyed average growth of about 4 percent a year. The recession started in late 2007, but the impact wasn't immediate, and 2008 was a record year for the industry. But in 2009, tourism was off 8 percent. Now the industry seems to have recovered, growing in 2011 even faster than before the 18-month recession, which officially ended in June 2009."

As a result of the Myrtle Beach Area Chamber of Commerce's efforts to understand the segments of visitors to the Grand Strand, The Associated Press also reports that according to the state Department of Parks, Recreation and Tourism South Carolina's tourism industry has bounced back after the Great Recession with tourism spending reaching a record \$16.5 billion in 2012 [11].

Unfortunately this is a retrospective study and not a prospective study. It does suggest, however, that bundled accommodations and nearby attractions can have appeal with a fixed price point. Future research could allow better definition of the impact of such partnerships on profitability and number of visitors to the area during Holiday Season.

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## APPENDIX

### Visiting the Myrtle Beach-Grand Strand Area During the Holiday Season

For each question below, please check the blank indicating the BEST answer to the following questions.

1. Are you currently a college student? [check one]  
1 \_\_\_ Yes      2 \_\_\_ No
2. What is your age? [check one]  
1 \_\_\_ Under 24      2 \_\_\_ 24-39      3 \_\_\_ 40-49  
4 \_\_\_ 50-59      5 \_\_\_ 60-69  
6 \_\_\_ 70 or over
3. What is your gender? [check one]  
1 \_\_\_ Male      2 \_\_\_ Female
4. Where do you live? [check one]  
1 \_\_\_ Georgia      2 \_\_\_ North Carolina  
3 \_\_\_ Ohio  
4 \_\_\_ Pennsylvania      5 \_\_\_ South Carolina  
6 \_\_\_ Virginia  
7 \_\_\_ West Virginia      8 \_\_\_ Tennessee  
9 \_\_\_ Canada  
10 \_\_\_ Other [Please Specify]  
\_\_\_\_\_
5. How many overnight trips have you taken to the Myrtle Beach-Grand Strand area in the last 5 years? [check one]  
0 \_\_\_ None      1 \_\_\_ 1      2 \_\_\_ 2      3 \_\_\_ 3  
4 \_\_\_ More than 3
6. What role do you play in making decisions about
7. What is your Employment Status? [check one]  
1 \_\_\_ Full-time job      2 \_\_\_ Part-time job  
3 \_\_\_ Not currently employed
8. What is your housing Arrangement? [check one]  
1 \_\_\_ I rent an apartment, condo or house alone  
2 \_\_\_ I rent an apartment, condo or house with others  
3 \_\_\_ I own an apartment, condo or house alone  
4 \_\_\_ I own an apartment, condo or house with others
9. What is your marital status? [check one]  
1 \_\_\_ Single [never married]  
2 \_\_\_ Married/Partnered  
3 \_\_\_ Separated/Divorced  
4 \_\_\_ Widowed
10. What is your combined household annual income? [check one]  
1 \_\_\_ Less than \$50,000      2 \_\_\_ \$50,000 to \$75,000  
3 \_\_\_ \$75,000 to \$100,000      4 \_\_\_ \$100,000 to \$125,000  
5 \_\_\_ \$125,000 to \$150,000      6 \_\_\_ \$150,000 or more  
7 \_\_\_ Prefer not to say



visiting destinations like the Myrtle Beach-Grand Strand area? [check one]

1\_\_\_\_ I make the final decision      2\_\_\_\_ I share the final decision with others

3\_\_\_\_ I give input to others who decide      4\_\_\_\_ I play no role in the decision

11.      What is the longest distance you are willing to drive for a 3 night vacation to the Myrtle Beach-Grand Strand area? [check one]

1 \_\_\_\_ 2 hours or less      2 \_\_\_\_ 3 to 4 hours      3 \_\_\_\_ 5 to 6 hours

4 \_\_\_\_ 7 to 8 hours      5 \_\_\_\_ 9 to 10 hours      6 \_\_\_\_ 11 to 12 hours

7 \_\_\_\_ 13 to 14 hours      8 \_\_\_\_ 15 hours or more      9 \_\_\_\_ Would not drive

Below you will find a description of a holiday vacation package for the Myrtle Beach Grand Strand area. Please read it and respond to the questions that follow.



**Two Holiday Shows and Oceanfront Accommodations Starting at \$53.55\***

- 3 night stay in an Oceanfront room at Sand Dunes Resort
- 2 tickets to the award-winning Carolina Opry Christmas Special, "The Christmas Show of the South"
- 2 tickets to the dazzling laser light extravaganza, LIGHT: Laser Holiday Show; you have never seen anything like these stunning lasers, choreographed to Christmas music
- Starting as low as \$53.55 per person, per night\*
- 2 night packages also available
- Upgrade to Marriott Grande Dunes Resort also available

Come on! Shop til you drop, eat shrimp, and see the shows that remind you what the holidays are all about: time together.

**Packages sell out - Call 800-313-7313 today!**

\*Pricing based on availability, double occupancy and a three-night stay.

Below is a list of issues concerning the above package for visitors to the Myrtle Beach-Grand Strand area during the holiday season.

Please tell us the RELATIVE LEVEL OF IMPORTANCE of each Factor in your opinion of visiting the Myrtle Beach-Grand Strand area during the holiday season using this package.

Next, please tell us your RELATIVE LEVEL OF SATISFACTION with these six factors.

Circle the number in the boxes below for each Factor listed to indicate your answers.

NOTE: You should provide TWO answers for each Factor listed ... one for IMPORTANCE and one for SATISFACTION by circling the appropriate number.

		How Important Are These Six Factors In Your Decision to Visit the Myrtle Beach-Grand Strand Area During the Holiday Season?					How Satisfied Are You With These Six Factors Concerning Visiting the Myrtle Beach-Grand Strand Area During the Holiday Season?				
Visiting Myrtle Beach-Grand Strand Factor		Not Important At All = 1	Not That Important = 2	Neutral = 3	Somewhat = 4	Very Important = 5	Very Dissatisfied = 1	Somewhat Dissatisfied = 2	Neutral = 3	Somewhat Satisfied = 4	Very Satisfied = 5
1 2	3 Night Stay in Ocean Front Accommodations	1	2	3	4	5	1	2	3	4	5
1 3	2 Tickets to the Holiday Show	1	2	3	4	5	1	2	3	4	5
1 4	2 Tickets to the Laser Light Show	1	2	3	4	5	1	2	3	4	5
1 5	Upgrades Available	1	2	3	4	5	1	2	3	4	5
1 6	2 Nights Available	1	2	3	4	5	1	2	3	4	5
1 7	Local Ground Transportation	1	2	3	4	5	1	2	3	4	5

	Available											
1 8	Price of \$53.55 Per Person Per Night with Double Occupanc y Required	1	2	3	4	5		1	2	3	4	5

## PERFORMANCE ON THE PGA TOUR: A STATISTICAL ANALYSIS

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### ABSTRACT

This paper investigates the determinants of player performance as measured by scoring average on the Professional Golf Association of America (PGA) tour for the 2012 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 scoring average on the PGA tour. We choose in this paper to focus on direct golf skills and among other results, we find that driving distance and driving accuracy are not only important, but are approximately equally important in determining scoring average. These results contrast with recent findings from a Harvard group [9].

### 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, therefore, success on the 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 performance on the PGA tour.

### LITERATURE REVIEW

There are several strains of research on professional golf performance based on the statistics compiled by the PGA, the LPGA (Ladies Professional Golf Association) and European PGA tours. One of the first studies of the statistical determinants of success in professional golf was by Davidson and Templin [4]. 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 [14], 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. [2] 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 [6] 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 [11] 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 [12] 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 [5] 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.

More recently, Alexander and Kern [1] offer some evidence that driving distance has become more important over time as a determinant of success on the PGA tour. Callan and Thomas [3] us a multi-equation approach wherein scoring average is modeled as a function of the normal skill set and earnings are then modeled as a function of scoring average. Finally, Ezekowwitz [9] finds no role for driving distance or driving accuracy as determinants of scoring average. Because of the *ad hoc* nature of the method employed (step-down regression) and implicit assumptions made in [9], we don’t think the conclusions drawn from that study should be taken seriously.

## METHODOLOGY

The primary research method for this paper is multiple regression analysis with scoring average as the dependent variable a general set of performance statistics as the explanatory variables.

The general model may be represented as:

$$SA_i = \beta_o + \beta_1GIR_i + \beta_2DD_i + \beta_3DA_i + \beta_4PPR_i + \beta_5SS_i + \varepsilon_i, \quad (1)$$

Where,

*SA* = Scoring average (strokes per round)

*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

*i* = references the *i*<sup>th</sup> observation—here the individual player

## SUMMARY STATISTICS ON THE PGA TOUR

Table I represents the summary statistics for the 2012 PGA tour. For 2012, the PGA tour reported full statistics on 190 players. These statistics can be described succinctly: the mean scoring average on tour is approximately 71; players hit 65% of the greens in regulation; they drive the ball an average of 290 yards; hit 61% of the fairways; they average 29 putts per round; and they save par (or better) from green side bunkers 49% of the time.

**Table I: Summary Statistics for the 2012 PGA Tour**

Variable	Mean	Standard Deviation	Minimum	Maximum
Scoring Average per (SA)	70.89	0.710	68.87	73.00
Greens in Regulation (GIR)	64.91%	2.68%	57.7%	70.34%
Driving Distance (DD)	290.05	8.41	268.9	315.5
Driving Accuracy (DA)	61.07%	4.71%	47.3%	73.0%
Putts per Round (PPR)	29.2	0.49	27.89	30.50
Sand Save Percentage (SS)	48.56%	6.22%	29.7%	65.4%

(n = 190)

## SOME REGRESSION RESULTS

In this section we present and discuss the regression results for scoring average. Table II contains the results for several regressions with scoring average as the dependent variable. In regression 1, every variable coefficient in the general model specified in the previous section is correctly signed and statistically significant at less than  $\alpha = .01$ . The equation explains almost 80% ( $\bar{R}^2 = .78$ ) of the variation in scoring average across players on the PGA tour for the 2012 season. Note that the estimated coefficient for *PPR* in regression 1 is equal to its theoretical value of one. That is, if a player averages one more putt per round, his score would be one stroke higher, other things equal.

Given the results, it is possible to estimate the practical importance of each of the explanatory variables on scoring average. Here we choose to estimate the effect on scoring average of a one-standard deviation improvement in each of the explanatory variables. This is accomplished by computing the product of each estimated coefficient and the standard deviation of that variable. For example, if a player were to improve on *GIR* by one standard deviation (2.68%), scoring average would be estimated to fall by approximately ½ stroke per round ( $-0.1828 \times 2.68 = -0.49$ ), or approximately 2 strokes over a four round tournament. Using the same method, *PPR* has a nearly identical effect. If a player could improve on *PPR* by one standard deviation (one-half fewer putts per round), *SA* would be predicted to fall by 0.49 strokes. The effect improving sand save percentage by one standard deviation would amount to an estimated improvement of about .11 in scoring average per round.

Much has been written and spoken regarding driving distance and driving accuracy and their relative importance. Based on regression 1, the effect of a player increasing driving distance by one standard deviation (8.41 yards) is estimated to lower scoring average by .294 strokes per round, and if a player could improve driving accuracy by one standard deviation (hit 4.71% more fairways), scoring average would fall by .217 strokes per round. These effects we would judge as similar, with a slight edge going to driving distance. However, recognize that these two measures of performance are, in general, inversely

related. Across players, the correlation between *DD* and *DA* is -0.52 and that negative correlation is highly significant statistically. What this means in practice is that even if a player were to find a way (exercise, technique, equipment, etc.) to improve driving distance, that player would likely hit fewer fairways. Using simple trigonometry, if a fairway were 30 yards wide, a 260 yard drive with a  $\pm 3.3^\circ$  error in direction finds the edge of the fairway, and at 300 yards, the same error lands the ball in the rough.

Though estimations similar to regression 1 are common in the literature and often are the basis for the argument that *GIR* represent the most important statistical determinant of scoring average, we are interested in golf *skills* as they relate to scoring average. Greens-in-regulation, we argue, is not directly a golf skill, but is, rather, the effect of other golf skills. A player who drives the ball both long and accurately will on average hit more greens in regulation, assuming some degree of proficiency with iron shots to the green. (We also recognize that professional golfers are at times willing to miss greens versus hitting greens in places that are likely to results in higher scores than a missed green in a better position.)

We offer regressions 2 and 3, in which the explanatory variables are, in our opinion, direct measures of skills on which professional golfers continually seek to improve. In regression 3 with *GIR* omitted, the coefficients are again correctly signed and meet strict tests of statistical significance. The regression equation explains less of the variation in scoring average across players, that is,  $\bar{R}^2$  is now .60. The calculations for the effects of the distance versus accuracy in driving question again yield similar effects. A one standard deviation improvement would lower scores by 0.53 strokes per round for *DD* and 0.50 for *DA*. Note that these estimated effects are now larger with *GIR* no longer in the equation.

**Table II: Regression Results: Scoring Average = Dependent Variable**

Variable/ Summary Statistics	Regression 1 Dependent Variable = SA	Regression 2 Dependent Variable = SA	Regression 3 Dependent Variable = SA	Regression 4 Dependent Variable = SA
Constant	67.46	72.40	78.01	52.13
<i>GIR</i>	-0.1829* (-12.17)			-0.2589* (-19.63)
<i>PPR</i>	0.9971* (13.28)	0.4499* (5.58)	0.7567* (10.43)	1.217* (16.93)
<i>DD</i>	-0.0349* (-8.34)	-0.0630* (-13.46)	-0.0448* (-10.59)	
<i>DA</i>	-0.0460* (-5.83)	-0.1058* (-12.78)	-0.0975* (-14.39)	
<i>SS</i>	-0.0183* (-3.81)	-0.0332* (-5.36)	-0.0242* (-4.72)	
<i>IRONS</i>			-0.1203* (-9.82)	
$\bar{R}^2$	.78	.60	.74	.69
<i>SEE</i>	.3335	.4468	.3629	.3931
$F_{k, n-k-1}$	134.75*	73.21*	108.04*	215.07*

(notes: n = 190; k = number of regressors; t-statistics in parentheses;  
\* indicates significance at  $\alpha < .01$ )

The decline in explanatory power of regression 2 versus regression 1 is likely due, at least in part, to *GIR* acting as a proxy in regression 1 for another golf skill—namely iron play. The PGA tour currently keeps numerous statistics that can be utilized to measure skill with irons. We choose to use greens-in-regulation



from the fairway, which we denote as *IRONS* in regression 3 from Table II. Since the regression includes driving distance, the equation controls for the fact that some players are closer to the greens than others. Note that the explanatory power of regression 3 ( $\bar{R}^2 = .74$ ) is similar to that of regression 1, and all of the estimated coefficients of the variables are again correctly signed and meet strict tests of statistical significance. For our purposes, we strongly prefer regression 3 to regression 1 on the theoretical grounds that the explanatory variables in regression 3 are direct skills. Interestingly, on the driving distance versus accuracy question, regression 3 suggests that, other things equal, *DA* is slightly more important than *DD*, again measured as before. A one standard deviation improvement lowers *SA* by .377 for *DD* and .46 for *DA*. Also a one standard deviation improvement in the measure of iron play (2.75% more greens hit from the fairway) would lower *SA* by 0.33.

Since regressions 2 and 3 result in estimates for *PPR* that differ significantly from the theoretical value of 1, we also estimated equations with other measures of putting efficiency (strokes gained and others). The value of explanatory power of the equation was higher with *PPR* than with any of the other measures of putting skills.

Finally for reference only, regression 4 suggests that *GIR* and *PPR* explain as much as 70% of the variation in scoring average across players—a result consistent with much of the prior literature. Regression 4, however, is not directly indicative of the skills we wish to measure.

## CONCLUSIONS

We present evidence of the determinants of success on the US Professional Golf Association (PGA) 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 desirable to remove *GIR* from the estimating equations. Those formulations suggest that driving accuracy and driving distance are approximately equally important in determining scoring average on the PGA tour.

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# College Football's Home-Field Advantage

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## Abstract

American college football is the most popular and highest revenue generating collegiate sport. The National Collegiate Athletic Association (NCAA) organizes several competitive levels of football including its highest level, the Football Bowl Subdivision (FBS), which is comprised of 120 teams. The Bowl Championship Series (BCS) determines an FBS national champion by a single head-to-head game between the two top-ranked FBS teams. The BCS ranking and selection for the championship game has been a persistent source of criticism and complaint. The BCS uses six computer models to estimate the relative competitiveness of each FBS team. As such, the BCS ranking implicitly create a prediction for the outcomes of college football games. No one doubts that a statistically significant component of any such prediction should account for the home-field advantage.

The home-field advantage is a conglomeration of influences (such as familiarity with the stadium and fan support) that results in an advantageous scoring imbalance that favors the home team. This research confirms the existence of a home-field advantage in FBS games of about  $3\frac{1}{2}$  points. Fair and Oster (2007) reported that the home-field advantage has a "fairly precise estimate" of about 4.3 points. Harville (2003) reported that a general assessment is three to four points. Furthermore, Harville (2004) claims that failing to account for a home-field advantage biases rankings.

One of the issues related to determining rankings and the home-field advantage has been large margins-of-victory against non-competitive opponents. Stern (1992) suggested that large margins-of-victory might be affecting team ranking estimates and suggested "downweighting" margins-of-victory beyond 20 points. Harville (2003) addressed the "running up the score" problem using a modified least squares with a hazard function and a cutoff value of 21 points. Bassett (1997), in an application to professional football, proposed that instead of using the most common least-squares criteria to instead use an  $L_1$  estimate to reduce the effect of large margins-of-victory. And, Harville and Smith (1994) suggested modeling the home-field advantage as categorically team dependent, with a principal emphasis on categorizing home teams with differential home-field advantages. As shown below at the average team level, there is no team dependent home-field advantage.

This research does provide a general consideration and positive results for a game-dependent home-field advantage. Smith (2005) discussed some elements of the home-field advantage. While the previous research focused on games with large margins-of-victory, this research focuses instead on the relative rankings of teams. All ranges of relative rankings are considered for differential home-field

advantage effects. For example, it could be the case that extra scoring (a home-field advantage) occurs only in games featuring a large mismatch for the home team, as is commonly observed in the first part of the season. Or, it could be the case that extra scoring (a home-field advantage) occurs only in games featuring a competitive match for the home team. This research finds that maximum explanatory power is achieved when allocating a home-field advantage of approximately seven points only in games in which the home team is expected to win. If the home team is not expected to win, then this research estimates the scoring effect of the home team is zero additional points. These results are significant since all common models presume that the home-field advantage is constant for each individual team, a condition which is demonstrated.

The data for this study is the 771 games from the 2011 FBS football season. For each game  $i$ , the home team's score is denoted  $H_i$  and the visiting team's score is denoted  $V_i$ . A paired  $t$ -test is conducted for the mean of the home team's score and the mean of the visiting team's score. The results are statistically significant in that home teams score more points than visiting teams.

$$\bar{H} = 31.54 \quad \bar{V} = 23.40 \quad t\text{-statistic}_{771} = 10.07 \text{ (1\% critical value 2.58)}$$

Furthermore, the scoring averages for home teams and for away teams are relatively consistent week-to-week throughout the season as shown in Figure 1 below. The only week in which the visiting team averaged out-scoring the home team was in Week 7.

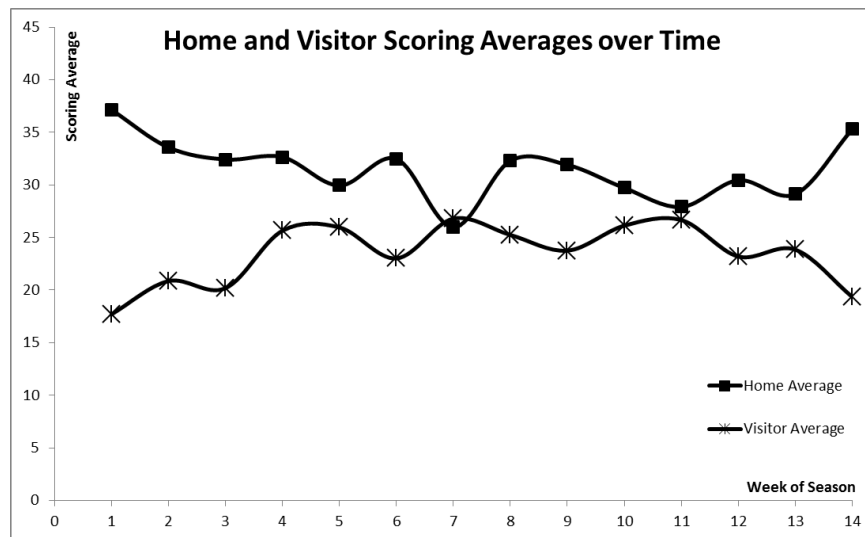


Figure 1 – Scoring Averages over Time

The focus of this research is to look at structural features of this scoring difference between home teams and visiting teams. The home scoring differential is defined as  $D_i = H_i - V_i, i=1..771$ . The easiest structural feature to parse out is the differential between scoring in games between two FBS teams and games between one FBS team and one non-FBS team.

# **A Load Service Structure in Ad-hoc Computer Networks**

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## **Abstract**

It is important how wireless hosts find other hosts efficiently for load service purposes because hosts in an ad-hoc network moves dynamically. This paper talks a new design method for load services in computer networks. Directory agents use databases to save information provided by load-server agents and protocols are built for how a host can find available hosts for load service and load transfer purposes when it moves to a new region. This includes how a directory agent builds its database, how a load-server agent provides its services, and how a load-client agent gets the services it needs. The protocols also use fuzzy logic control mechanism to transfer loads for load balancing, instead of fixed threshold level methods. The purpose of this new system structures is to provide efficient ways in building communication and accessing resources in ad-hoc computer network systems. This helps users to find data easily and securely.

Keywords: Load Service, Ad-Hoc Network, Directory Agent, Load-server Agent, Load-client Agent, Peer-to-Peer

## **1. Introduction**

Computer networks can provide parallel computation and services. It is important that hosts send their loads to other hosts for certain function implementation through network transfer. With the increasing popularity of mobile communications and mobile computing, the demand for load services and load balancing grows. When a computer is

overloaded or it needs special services from other computers, it may send requests to other computers for load transfer or load services. For example, a computer may need some jobs to be executed with higher quality of services or it needs some jobs to be done with a short period of time that its processor is too slow to perform the jobs; therefore, it may send part those jobs to other computers with higher speeds of processors. Since wireless networks have been widely used in recent years, how a host transfers its loads to other nodes has become a very important issue because not all wireless hosts have the ability to manipulate all their loads. For instance, a host with low battery power cannot finish all its jobs on time and should transfer some of them to other hosts. Currently, most of load balancing algorithms are based on wired network environments, it is important to find an efficient way for load service purposes.

Before a wireless host transfers its loads to other hosts or asks for load services from other hosts, it has to find available hosts using resource allocation algorithms. There are several resource allocation protocols been developed, for example, IETF Service Location Protocol (SLP) [1] and Jini [2] software package from Microsystems. However, these protocols address how to find the resources in wired networks, not in wireless networks. Maab [3] develops a location information server for location-aware applications based on the X.500 directory service and the lightweight directory access protocol LDAP [4]; while it does not cover some important issues about the movements of mobile hosts, for example, how to generate a new directory service and how a host gets the new services, when a directory agent moves away its original region. In an Ad-Hoc network, system structure is dynamic and hosts can join or leave any time. Therefore, how to provide load services and how to find available hosts providing load services become importance issues in an Ad-Hoc network system.

In this paper, a system structure for load services is constructed in wireless Ad-Hoc network systems using peer-to-peer concept [8, 9]. In Ad-Hoc network systems, hosts move dynamically without base stations for communication. The load service architecture provides special services upon requests from hosts and these services, e.g., include resource location services and load balancing services. A host may send its special requests to other hosts for load services or send its loads for load balancing. The

requests include service types the host needs or the amount of loads to be sent to other hosts. For those special services, the host should define the conditions that other hosts may accept the services. For example, the request includes the price of job execution, the limit requirement of execution time, etc.

In Section 2 discusses the system structure. Section 3 expresses the details of the method. Section 4 and section 5 illustrate the information format for databases, and the scalability respectively. Section 6 presents the conclusion.

## **2. System structures**

This section describes the structure used in the system. Basically, there are three components in my load service system – directory agent, load-server agent and load-client agent. A load-server agent provides load services that are queried by other hosts (load-client agents) which require load services. Load-server agents post the types of services periodically to their directory agents to update the services they can provide to load-client agents. A load-client agent is a host in the network, which may need some services performed by other hosts. It sends requests to its directory agents to ask for services from load-server agents when it is heavily loaded or it needs some special services, which it does not have the ability to perform. A directory agent forms groups for both load-server agents and load-client agents respectively and builds a database for service queries from load-client agents.

Figure 1 shows an example based on the architecture of my load service system. Each directory agent has a query database, which stores all the query information from load-server agents. Load-server agents and load-client agents may join directory agents upon requests. In Figure 2, for example, Load-server Agent 1 and Load-client Agent 1 register with Directory Agent 1; Load-server Agent 2 registers with Directory Agent 1 and Directory Agent 2 at the same time. Load-client Agent 1 may send requests to Directory Agent 1 for querying load services and Directory Agent 1 checks its database to find fitted load-server agents and sends those available load-server agent addresses to Load-client Agent 1. The fitted load-server agents can be Load-server Agent 1, Load-

server Agent 2, or both. Load-client Agent 1 can choose one of them based on its best convenience; or it can choose both of them for special purposes. Of course, it is possible that none of the load-server agents can be found.

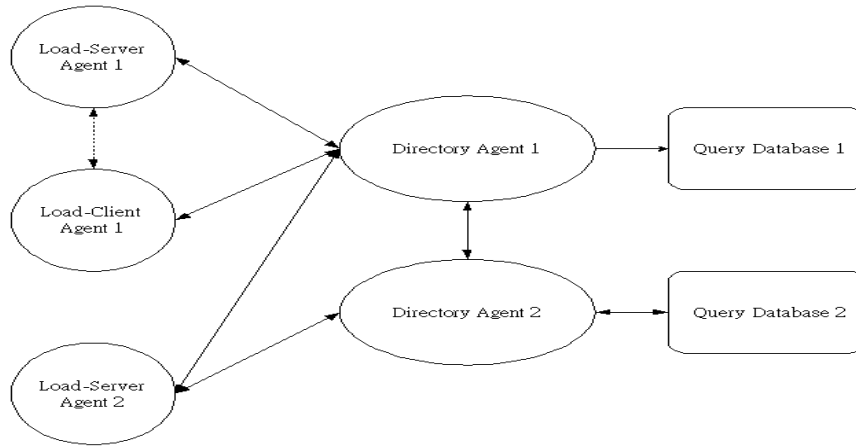


Figure 1: Load service system architecture

### 3. Algorithm for wireless ad-hoc load services

There are several issues consider when the system architecture is constructed, for example, how a directory agent asks a host to register with its database, the effects of the movement of mobile hosts to the join of load-server and load-client agents, and fault tolerance of the system. Below it describes the details how hosts join or leave directory agents and how directory agents form their databases when they move.

This paper also describes how a load-client agent should pay load-server agents that it asks the services from and how hosts in the system gain tokens in order to pay the services it need. How to transfer loads between load-server agents and load-client agents is also mentioned in this section.

#### 3.1 A directory agent asks hosts for registration

In order to collect load service information from other hosts and provide results for queries, a directory agent builds a query database. The information in the database



includes the addresses of load-server agents which provide information, the service types, or the loads that load-server agents can accept. The host can be a desk computer or a laptop once it has the ability; for example, it has high-speed processors, enough power for communication, etc. The method how a directory agent asks for registration is discussed below.

1. A directory agent broadcasts a message to the other hosts within the range that its power can reach.
2. A host, which receives the broadcast message from a directory agent and is willing to register with the directory agent's database as a load-server agent, sends an ACK message to the directory agent for registration. The ACK message includes information, such as the service types it can perform and/or the loads it can accept, etc., provided by a load-server agent.
3. The directory agent keeps the ACK information in its query database and therefore builds a link from itself to the load-server agent sending the ACK message.
4. To check if a load-server agent is still available in the database, a directory agent periodically sends multicast messages to all the load-server agents, which have query information in its database. This purpose for this is for database information update because load-server agents might move away anytime. When a load-server agent receives a query message from a directory agent, it should send back a response to the directory agent to indicate that it is still existed in the directory agent's power range. If the directory agent does not get the acknowledgement from a load-server agent that has query information in the database, it deletes the information provided by that load-server agent from its database and therefore deletes the link between them. The Figure 2 demonstrates the steps how a directory agent builds its query database.

- (1) A directory agent sends requests to hosts for registration.
- (2) Hosts, which are willing to register as load-server agents, send ACKs back to the directory agent.
- (3) The directory agent saves all the information in those ACKs to its database for future use.
- (4) The directory agent also builds links between itself and its load-server agents.

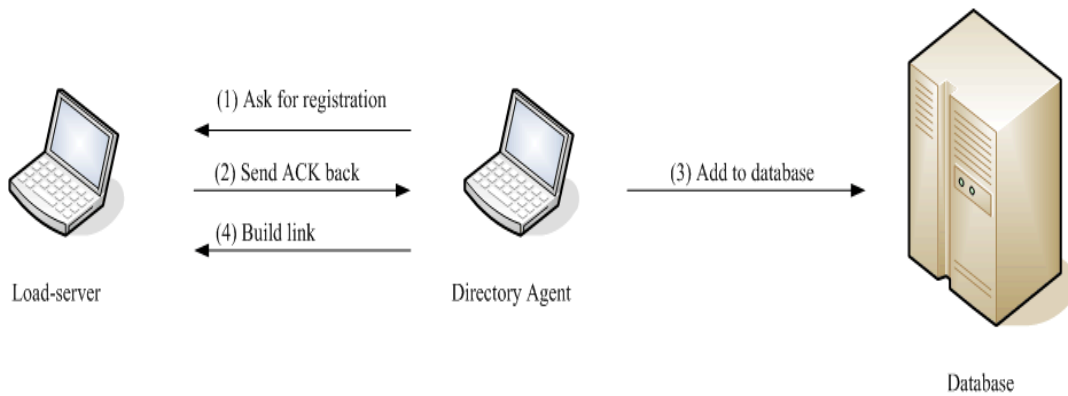


Figure 2: The procedures for a directory agent asks for registration

### 3.2 A host join directory agent's databases as a load-server agents

A mobile host may join directory agents' databases as a *load-server* agent when it has the ability to provide services, or it is lightly loaded and is willing to accept loads from other hosts. Not only a load-server agent may join a directory agent, but also it may join multiple directory agents. A load-server agent joins directory agent's databases in two ways.

Method 1: The first method is that it sends out messages to ask for registering with directory agents within its power range and waits for the replies from those directory agents. After receiving acknowledgements from directory agents, the mobile host registers with the databases of those directory agents by sending its address, the service types it can provide, and the amount of loads it can accept for load transfer. A mobile host can register with several directory agents at the same time; which means a mobile host can join several databases simultaneously.

Method 2: The second method, like the method in Section 3.1, is that a mobile host receives messages from some directory agents for requesting joining their databases. Thereafter, the mobile host may join those databases by replying acknowledgements (ACKs) back to those directory agents and the directory agents add the ACKs into their databases.

After the directory agents receive the ACKs from load-server agents, they build links between them. The following figure illustrates the procedures of Method 1 for a load-server agent to a directory agent database.

- (1) A host sends request to directory agents for registering as a load-server agent.
- (2) Directory agents send ACKs back to the host when they receive the request and allow it to join their databases.
- (3) The host sends registration information to those directory agents once it receives the ACKs.
- (4) Those directory agents add the information into their databases.
- (5) The directory agents also build links between themselves and the load-server agent.

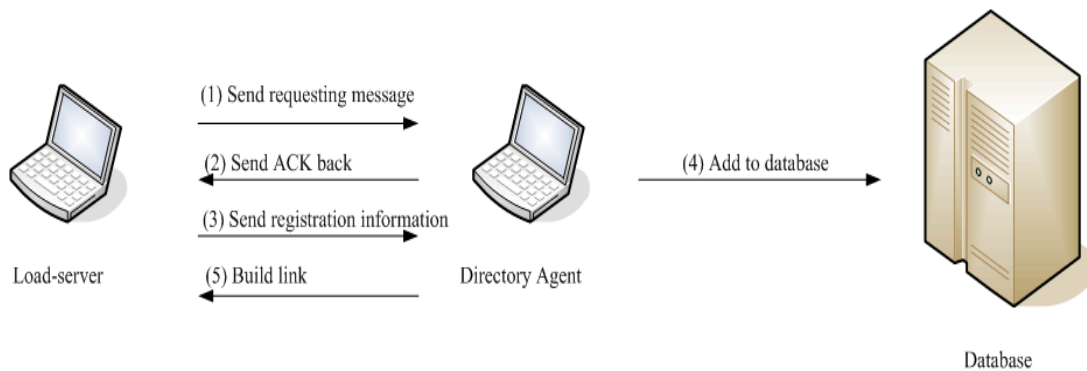


Figure 3: How a load-server joins a directory agent database for Method 1

### 3.3 Queries from load-client agents

A mobile host may join directory agents' databases as a *load-client* agent when it needs services from other hosts. Since directory agents broadcast their addresses periodically to ask for mobile hosts to register for services, a load-client agent can find the addresses of directory agents from those broadcasting messages. When a load-client agent needs load services, it sends queries to directory agents that it can contact and waits for the replies from them. The contents in these replies include the addresses of available load-server agents that can provide the services the load-client agent asks. The load-client agent may receive several replies from different load-server agents at the same time and it chooses the best-fit one. If it cannot find available load-server agents (without any reply from

directory agents in a period of time), it waits for a certain period of time and sends queries again.

A load-client agent selects the best-fit load-server agent based on the service conditions it requests. For example, it may choose the one that satisfies the price the load-client agent asks. When a load-client agent selects the best-fit load-server agent, it directly sends service requirements or loads to the chosen load-server agent. Figure 4 shows the steps.

- (1) A load-client agent sends query to directory agents to request services
- (2) Directory agents search their database for the desired services requested by the load-client agent.
- (3) Directory agents send replies back, which indicate the information they have in the databases.
- (4) The load-client agent gets the services it needs from load-server agents.

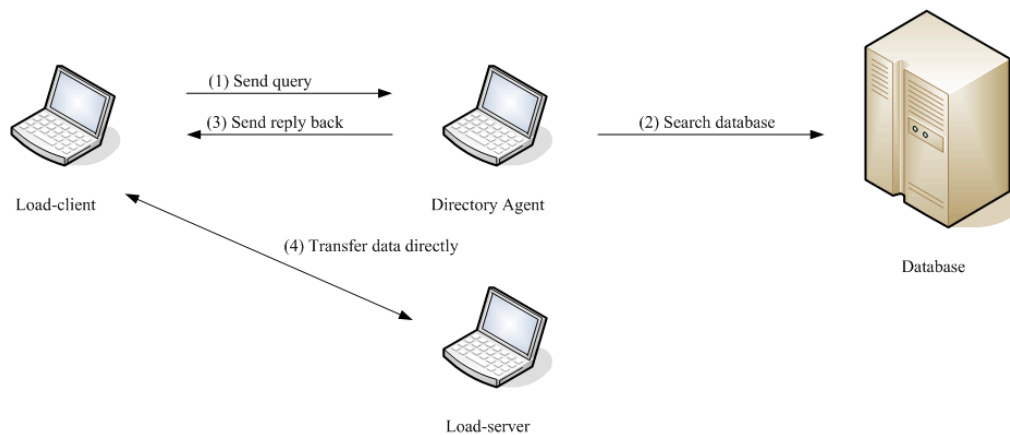


Figure 4: How a load-client agent sends queries

### 3.4 Movement of directory agents

When a directory agent moves to another region, it loses all the information in its database about load-server agents and its peer directory agents. How a directory agent notifies all the other agents about its movement becomes an important issue. There are two ways that other agents can detect the leave of a directory agent. The first is that the directory agent sends a message to notify other hosts about its movement. Hosts receiving

the message will stop sending queries to this directory agent and remove the links between them.

The second method is to use the fact that hosts cannot detect the existence of a directory agent. Since load-server agents send update information to a directory agent periodically, load-server agents can notice that a directory agent does not exist in the region if hosts do not get the reply from that directory agent. For a load-client agent to detect the existence of a directory agent, if it does not receive any broadcast message during a period of time, then it deletes the link to that directory agent.

After moving to a new region, a directory agent sends messages to hosts in the power range it can reach to ask for hosts to join its database for load services as discussed in section 3.1. It may happen that some hosts do not have any directory agent to contact to once a directory agent moves away. Those hosts will keep sending messages to other hosts for finding new directory agents as described in section 3.2 and 3.3.

### **3.5 Movement of load-server agent**

When a load-server agent moves to a new region, it may lose its original directory agents and it has to establish new links to its new directory agents as described in section 3.2. Once a directory agent does not receive update information from a load-server agent for a period of time, it deletes the information about that load-server agent from its database and therefore deletes the link between them.

### **3.6 An example**

Figure 5 illustrates a flow how a directory agent, load-server agent, and load-client agent communicates each other. (1), (2), (3), (4), and (5) indicate the procedures for setting up the processes.

- (1) A Directory Agent broadcasts join message to hosts.
- (2) Load-Server Agent replies an acknowledgement to that Directory Agent to join the database.
- (3) Directory Agent saves the information to its database.

- (4) Load-Server Agent sends requests to Directory Agent for load services.
- (5) Directory sends the address of Load-Server Agent if Load-Server Agent is suitable for load service.
- (6) Load-Client Agent communicates with Load-Server Agent directly.

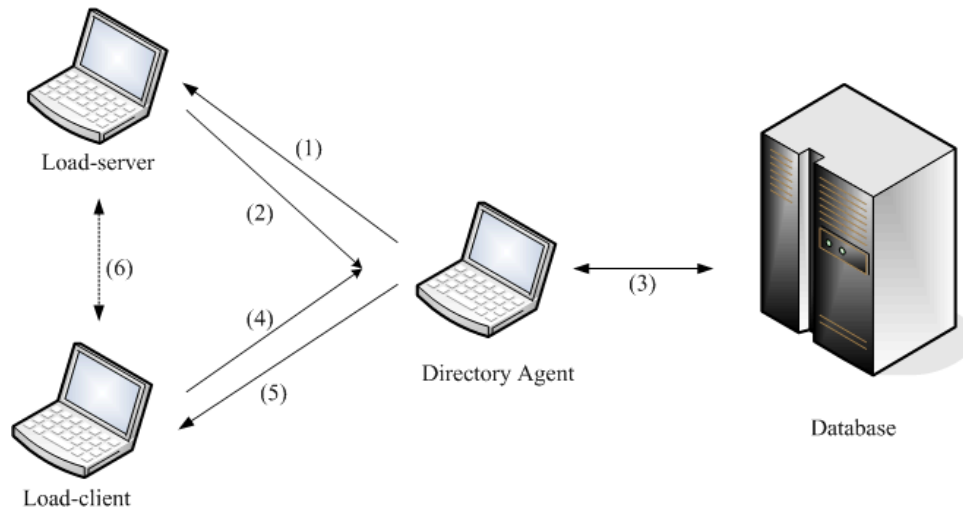


Figure 5: An Example for Communications between Agents

### 3.7 Load transfer

A host may transfer loads to other hosts when it is heavily loaded. Instead of using fixed threshold method to decide whether a host is heavily loaded, fuzzy logic control method is applied to improve the performance. First, the host finds an available host by sending service request as mentioned before. Once it finds a host that accepts its request for load transfer, it transferred its loads to the selected host. The amount of loads to be transferred is equal to half of the difference of loads between the load-client agent and the load-server agent. It is possible that there are several server load-server agents, which satisfy the request by a load-client agent. In order to reduce the distance and moving effect, a load-client chooses the load-server agent that is the closest one to it. Figure 6, for example, shows the power range that load-client agent C can reach and there are three load-server agents – S1, S2, and S3 – which satisfy the request from agent C. Since S1 is the closest one to C, it is chosen which C will transfer its loads to.

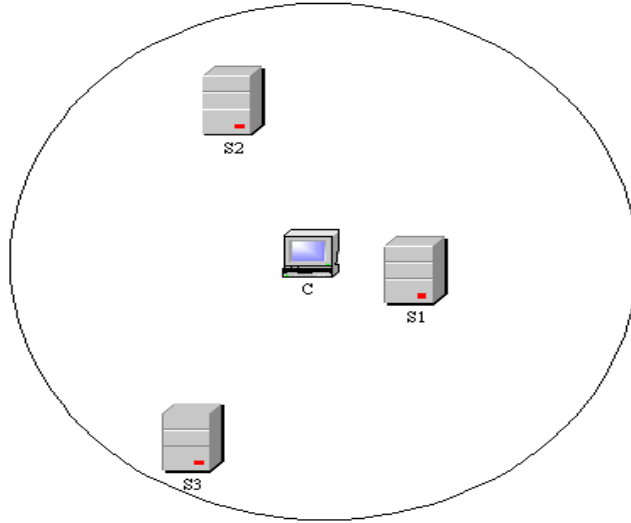


Figure 6: An example for a load-client agent to choose a best-fit load-server agent

The following steps show the details of load transfer.

- (1) When a host detects that it is heavily loaded, it broadcasts a request message to hosts in its power range to ask for load transfer service. Instead of using fixed threshold levels to check if it is lightly loaded or heavily loaded, fuzzy logic control [5] is used to check its queue status to improve the performance. This method is mentioned in [6, 7].
- (2) Hosts, which receive the request, check their queue status using fuzzy logic control method, and returns ACKs, if they are lightly loaded, to the load-client agent that sent the request.
- (3) When the load-client agent gets the ACKs from load-server agents, it chooses the load-server agent, which is the first one to send its ACK, for load transfer. That means that the load-client agent chooses the closest one in order to improve the performance.
- (4) If there are no available hosts in the load-client agent power range, the load-client agent sends requests to its directory agents to look for the registered load-server agents for load transfer. Then it waits for the responses from its directory agents.
- (5) The directory agents find available (lightly loaded) load-server agents when they

receive requests from a load-client agent. Then, the directory agents send addresses of these available load-server agents to that load-client agent for load transfer. The load-client chooses the best host to transfer its loads to the selected host.

#### 4. Service type format and service price

In the future, it is possible that hosts have to pay if they ask for service from other hosts. This section discusses this situation, and defines the service type format for load services and the price for each service. This format is for a directory agent to store the information in its database. Figure 7 shows the format that there are 4 fields in it – *address*, *service-type*, *number-of-tokens*, and *load*.

The *address* field is the address of a load-server agent, so that a load-client can directly connect to it. The *service-type* field indicates which kind of services that a load-server agent provides. The *number-of-tokens* shows the price of a service for a load-client to pay, and the *load* field shows the current load for a load-server agent. When a load-server agent provides load services to directory agents, it provides directory agents the information about the type(s) of services it can provides, the tokens (price) for a load-client agent to take the service, and the current load status and address for the load-server agent. A load-client agent can get the service only it matched the service type, and the price that the load-server agents ask, or it can find an available load-server agent for load transfer purpose if the load-server agent is lightly loaded and the load-client agent can pay the price.

<i>address</i>	<i>service-type</i>	<i>number-of-tokens</i>	<i>load</i>
----------------	---------------------	-------------------------	-------------

Figure 7: Service Type Format Stored



There are some assumptions in the architecture for hosts.

1. A load-client agent has to pay a load-server agent when it needs load services from that load-server agent.
2. When sending a request to a directory agent, a host loses tokens as the price for asking load service.
3. In order to increase the number of tokens and therefore increase the ability to ask for services, a host must try its best to gain tokens. There are two possible ways to implement it. First of all, a host can provide the services to other hosts to gain tokens. Secondly, a host should avoid sending useless requests to network to save tokens. This can be implemented by increasing the waiting time for a load-client agent to send requests. This also may avoid network congestion because the number of messages is reduced.
4. A load-client agent may find several available load-server agents for a particular request such that those load-server agents satisfy the requirements for the load-client agent. Then the client host has to choose the best-fit one.
5. If a host does not have enough tokens to find a load-server agent for load services, it should stop sending requests to its directory agents for asking load services until it can provide enough tokens.

The request message, which a load-client agent sends out when it needs a service, includes a price that the load-client agent can pay. The directory agent, which receives the message, finds available load-server agents by comparing the key words and the prices. For example, if a host needs a service with higher speed calculation, it sends requests to its directory agents. In these requests, the speed of the load-server agent's processor and the price the load-client agent can provide are included. Directory agents match these requirements to the information via the key words and the number of tokens in their database and therefore find the available load-server agents. The addresses of those load-server agents are sent to the requesting load-client agent. Upon receiving those addresses, the load-client agent chooses one available and sends jobs directly to that load-server agent. To choose an available load-server agent from those addresses by directory

agents, the load-client agent may choose the one, which asks the lowest number of tokens for performing the requesting service.

## **5. Scalability**

As the number of clients and servers in the network system increase, so does the burden to the system because of the increases of messages for service discovery and request. When a host joins or roams into a network, it sends out requests. If there are too many hosts that move too frequently, they may send many requests, which may cause the congestion of the network. Therefore, careful consideration of scalability issues is very important to the design of the protocols. In this system, it uses the number of tokens (the price to pay) to control the scalability of load-server agents registered with directory agents and load-client agents sending load service requests. For example, a client host cannot send requests to directory agents for services if it does not have enough tokens. It should provide its services to other hosts to gain enough tokens before it sends requests.

## **6. Conclusion**

This paper introduces a new load service method in wireless ad-hoc networks. Since the hosts in a wireless ad-hoc network can move anywhere by anytime, it is difficult for a host to find other host for load service or load transfer purposes. It discusses several issues about, for example, how a directory agent asks for hosts to register as load-server agents, how a load-server agent registers with directory agents' databases, and how a load-client agent finds available load-server agents when it needs load services. Directory agents can find the available load-servers which provide services that clients need.

This paper also discusses a new concept that a host should pay the price when it needs services from other hosts in networks and how it works by using token as the price in the networks. It presents the token concept to control the scalability of networks and congestion control of network flow. For the load transfer protocol, fuzzy logic control is used to check load status of hosts.

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# **A Framework for User Participation Approaches to Information Systems Development**

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## **ABSTRACT:**

User participation in information system development (ISD) has been discussed in the literature from many theoretical and practical perspectives. In reality, most of this discussion is grounded in empirical research that has yielded mixed results on the importance of user participation and its relationship to system success. The goal of this research is to extend the line of inquiry into user participation during ISD by providing information systems (IS) researchers and IS practitioners with both a technically and organizationally valid foundation. This framework organizes user participation approaches that emerge from the different worldviews that exist within organizations.

## **INTRODUCTION**

Today most people would consider user participation as a critical factor in successfully developing an information system (IS). Interestingly enough, empirical studies have had mixed results and cannot conclusively prove a link between user participation and system success. Indeed, attempts to organize and synthesize past empirical studies on user participation have resulted in conflicting results (Olson and Ives, 1981; Cavaye, 1995; Hwang and Thorn, 1999). One of the reasons for the conflicting results may be the existing approaches managers and analysts use when users participate. These approaches are both explicitly and implicitly imbedded in the worldview (Bostrom and Heinen, 1977) of the analyst, who has traditionally guided the information system development (ISD) process. Certainly a worldview is the overall perspective from which one sees and interprets the world. In reality, the worldview of an analyst, user, manager and stakeholder is like a pair of glasses through which they view the world. They all have one and they aren't all the same. Furthermore, the IS literature seems to indicate that there is no approach that guarantees that user participation leads to a successful information systems project. Therefore, numerous user participation approaches maybe needed that are congruent with the worldviews that exist in an organization.

## **LITERATURE REVIEW**

Participation is the subject of research is many other disciplines like organizational behavior, human relations, and psychology. This section presents a review of literature that is meant to enlighten and enliven the current approaches used for user participation during ISD. As a point of departure, we will define some basic terminology. We will review four themes that exist during ISD that dominate this research agenda: user participation, the four paradigms, a social

network perspective, and leadership. To our knowledge, social network analysis has not been applied to user participation during ISD. Therefore this section will lay a foundation to better understand how to approach user participation as a social network in the ISD context only.

## **User Participation in Information Systems Development**

User participation has been discussed in the literature from many theoretical perspectives. Indeed, attempts to organize and synthesize the literature have proven difficult. In ISD the user participation process has numerous ambiguous terms that need to be defined. This will provide a frame of reference for the remainder of this research. First, Barki and Hartwick (Barki and Hartwick, 1989) suggest that the term user participation should be used “when referring to the set of operations and activities in the systems development process, and the term user involvement “should be used to refer to a subjective psychological state which influences user perceptions of the system.

Due to the diverse use of the terms user participation and user involvement, user engagement has emerged as a term that refers to either user participation or user involvement or both (Hwang and Thorn, 1999). In addition, recent research also looks at user attitudes as a separate term and defines it as affective or evaluative judgment (e.g., good or bad) towards an object or behavior (Barki and Hartwick, 1989). Simply said, it is a psychological state that reflects the user’s feelings about IS. This is important because recent research has suggested that user participation, user involvement, and user attitude exert different impacts on system outcomes. Indeed, a circular relationship is suggested (Lin and Shao, 2000), because when user’s perform participatory activities, they can help users get more involved, which may improve the user’s attitude and make them feel more satisfied with the IS.

Indeed, there is an extensive amount of literature on user participation in information system development. These individual papers discuss separate components, terms and individual factors about the participation issue. They do contribute to the body of knowledge on user participation and system success, but the findings are not consistent or cumulative because the concept has many complex dimensions. In 1995, Cavaye attempts to explain many of the inconsistencies in the empirical literature. This study highlights a number of important attributes of participation and presents a framework which is used to describe and synthesize existing research findings (through 1995) on user participation and its link to system success. This framework is the foundation of the framework extended in this research.

### **A Worldview of User Participation**

A worldview is the overall perspective from which one sees and interprets the world. A worldview of user participation is both explicitly and implicitly imbedded in the worldview (Bostrom and Heinen, 1977) of the analyst, who has traditionally guided the information system development (ISD) process. The worldview of an analyst, user, manager and stakeholder is like a pair of glasses through which they view the world. They all have one and they aren’t all the same. If we understand this basic concept, then it is important to have a scheme for analyzing

the worldviews that exist in a user participation context. This research uses Burrell and Morgan's (1979) research as a foundation to understand the complexity of the user participation process.

Following Burrell and Morgan (Burrell and Morgan, 1979), Hirschheim and Klein (Hirschheim and Klein, 1989) map the dimensions onto one another to yield the four paradigms of information systems. These four paradigms are sets of assumptions about ISD which reflect different worldviews about the physical and social world (Hirschheim and Klein, 1989; Hirschheim, Klein et al., 1995). Different worldviews tend to be reflected in different theories. Indeed, all approaches are located in a frame of reference (worldview) of one kind or another. In 2001, Iivari, Hirschheim and Klein (Iivari, Hirschheim et al., 2001) extended this line of research by supplying a four-tiered framework for classifying and understanding ISD approaches and methodologies that have been proposed in the literature. These frameworks are a frame of reference for the user participation process in ISD. They provide a comprehensive schema for analysis of user participation in ISD and in particular, the user participation domain.

Burrell and Morgan's use the term paradigm as a classificatory device to structure their thesis that "all theories of organization are based on a philosophy of science and a theory of society" (Burrell and Morgan 1979: 1). Hirschheim and Klein (1989) map the Burrell and Morgan (1979) dimensions onto IS dimensions to yield a classificatory device about the information systems domain. Both research studies took the metaphor of a map (another type of classificatory device) as a way of trying to lay out theory and explore and expose assumptions. The premise of both these studies is that we must come to grips with the fact that everyone makes assumptions. Assumptions tend to shape everything and therefore need to be made explicit.

## **ORGANIZE THE USER PARTICIPATION APPROACHES**

Adapted from Cavaye (1995), the traditional variables in the factor research component that have been used in previous user participation research, but extends the model by synthesizing numerous other ideas put forward in the literature, including the four paradigms for the analysis of social theory proposed by Burrell and Morgan (1979) and the four paradigms of information systems proposed by Hirschheim and Klein (1989) into the process research component. It is important to remember that process research is frequently marked by gradual changes through a series of states. This framework is designed to present a more complete picture of a complex phenomenon that is often influenced by the political activities of actors (Franz and Robey, 1984). The philosophical research model addresses the nature of relationships in the social network of the actors. This is important because an effective relationship is achieved through a dialectical process (communication) that results in mutual understanding (Churchman and Schainblatt, 1965; Hartwick and Barki, 2001). In addition, this extension will help organize existing research findings and continue the cumulative research tradition on user participation. The organization of user participation approaches into a framework, therefore is predominantly descriptive, characterized by answering the first of four fundamental questions a researcher asks about a phenomenon, "what is it?". This framework is an aid to presenting some of the information about user participation approaches coherently.

Burrell and Morgan (Burrell and Morgan, 1979) use epistemological assumptions (how you obtain knowledge) and ontological assumptions (your social and technical worldview) to yield two dimensions: a subjectivist-objectivist dimension and an order-conflict dimension. The subjectivist position seeks to understand the basis of human life by exploring the depths of the subjective experience of individuals.

The main concern is with understanding the way in which an individual creates, modifies, and interprets the world. The objectivist position applies models and methods resulting from the natural sciences to the study of human affairs. The objectivist thinks of the social world as being the same as the natural world (Burrell and Morgan, 1979). The conflict-order dimension is described as where an order or integrationist worldview emphasizes a social world characterized by order, stability, integration, consensus, and functional coordination. The conflict or coercion worldview emphasizes change, conflict, disintegration, and coercion (Burrell and Morgan, 1979). The dimensions are offered as a theoretical schema for analyzing organizational theory.

Following Burrell and Morgan (Burrell and Morgan, 1979), Hirschheim and Klein (Hirschheim and Klein, 1989) map the dimensions onto one another to yield the four paradigms of information systems. These four paradigms are sets of assumptions about ISD which reflect different worldviews about the physical and social world (Hirschheim and Klein, 1989; Hirschheim, Klein et al., 1995). Different worldviews tend to be reflected in different theories. Indeed, all approaches are located in a frame of reference (worldview) of one kind or another. In 2001, Iivari, Hirschheim and Klein (Iivari, Hirschheim et al., 2001) extended this line of research by supplying a four-tiered framework for classifying and understanding ISD approaches and methodologies that have been proposed in the literature. The framework proposed in this paper is a frame of reference for the user participation process in ISD. This provides a comprehensive schema for analysis of user participation outcomes (issues and problems) within ISD and in particular, the user participation domain.

**Table 1. User Participation Approaches Framework**

<p><b>I. Idealist (subjective-user dimension)</b></p> <ul style="list-style-type: none"> <li>○ Alternative, balanced approach to user participation</li> <li>○ Remove barriers to emancipation- balance between controls and freedoms (joint system development) (Burrell and Morgan, 1979; Newman and Robey, 1992)</li> </ul>	<p><b>II. Realist (objective-user dimension)</b></p> <ul style="list-style-type: none"> <li>○ Alternative, reversed approach to user participation</li> <li>○ Allows social regulation and control by the workforce (user-led) (Burrell and Morgan, 1979; Newman and Robey, 1992)</li> </ul>
<p><b>III. Interpretive (subjective-analyst dimension)</b></p> <ul style="list-style-type: none"> <li>○ Alternative, emergent approach to user participation</li> <li>○ Postponing or eliminating any particular type of leadership from occurring allows social regulation and control to emerge from group interaction (equivocation) (Newman and Robey, 1992; Hirschheim, Klein et al., 1995)</li> </ul>	<p><b>IV. Functionalism (objective-analyst dimension)</b></p> <ul style="list-style-type: none"> <li>○ Traditional, problem-oriented approach (Burrell and Morgan, 1979) to user participation</li> <li>○ Effective social regulation and control (directed by management, analyst-led) (Burrell and Morgan, 1979; Newman and Robey, 1992; Hirschheim, Klein et al., 1995)</li> </ul>

In summary, this framework is an adaption of the four paradigms (see Table 1). They encapsulate the main assumptions of the traditional and some alternative approaches to ISD in a simplified, yet useful way.

## CONCLUSION

Empirical research on the importance of user participation and its relationship to system success exists (Ives and Olson, 1984; Hartwick and Barki, 1994; Cavaye, 1995; Hwang and Thorn, 1999; Lin and Shao, 2000; Iivari, 2006). In addition, studies have shown that user participation is affected by social processes (Newman and Robey, 1992; Robey and Newman, 1996), political perspectives (Franz and Robey, 1984) and cultural impact (Butler and Fitzgerald, 1997; Iivari, 2006) has been explored. Still other research has examined how the backgrounds and perspectives (worldview) of users and analysts affect their relationships, but these studies generally focused on specific aspects, such as conflict during the user-analyst interaction (Robey, Farrow et al., 1989; Robey, Smith et al., 1993). There are various aspects to studying user participation, and one promising approach is looking at the context within which user participation can result in improved user satisfaction. This approach seeks to explain where and how user participation should occur and find strategies based on the results for the most appropriate involvement for users during system development (McKeen and Guimaraes, 1997). Another interesting approach is to capture the institutional and development-related contexts that shape and influence the processes of user participation and the management of change (Butler and Fitzgerald, 2001). The IS literature offers a large amount of useful and interesting research, yet it is clear that little is known about the influence of worldviews on the user participation process or how the relationships of participants affect the user participation process.

This research is focused on organizing and conceptualizing user participation from a worldview perspective. Though people are quite adept in participating in ISD in new and ever-more detailed and persistent ways, they often lack the ability to see the relationship in intelligible, useful, and business oriented ways. Worldviews play a critical role in determining the way problems are solved, organizations are run, and the degree to which individuals succeed in achieving their goals.

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# **DEVELOPMENT AND TESTING OF A SURVY INSTRUMENT TO ASSESS ETHICAL PERCEPTIONS OF IT AND IS STUDENTS**

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## **ABSTRACT**

The purpose of this research study is to design a survey instrument to determine the effectiveness of the information technology (IT) and information systems (IS) programs in teaching ethics and ethical behavior as it relates to the IT profession. As researchers and as teachers, we want to know if students learn what constitutes ethical behavior in the information technology and information system programs and understand the obligations of an information technology professional with regards to ethical behavior in the workplace. A survey was designed as a tool to assess the effectiveness of teaching ethics in IT and IS curricula. The survey addresses ethical issues such as plagiarism, intellectual property rights, computer related issues, privacy concerns, and law and public policy issues. The survey was administered to classes in an IT degree program in Spring 2013. The development and results of the survey are presented.

**KEY WORDS:** Ethics, ethical behavior, information technology, information system, Georgia Southern University, Information Technology ethics, Association for Computing Machinery (ACM), Association of Information Technology Professionals (AITP).

## **1. INTRODUCTION**

Ethics is the system of moral principles of right and wrong that ought to guide human conduct (Shurden et al., 2010; Masrom et al., 2010). A set of principles of conduct that guide decision making and behavior in an organization is a code of ethics (USLegal.com). Several organizations, including academic organizations, business organizations, and societal organizations, have codes of ethics to guide the conduct of their students, employees or members, respectively. In making ethical decisions, a code of ethics provides humans with guidelines for conduct in their day to day activities within various organizations. As the use of computers has become part of routine work life, the concern over issues of ethics as they relate to computing in organizations continues to grow.

The integration and implementation of IT into the academic and workplace environments has borne rise to a variety of ethical issues. Student's ethical behaviors and values will help form the perception of the institution from external constituents. The varied ethical behaviors and values of students will eventually emerge and appear in the business organizations in which they will be employed. Therefore, it is important to study the ethical beliefs of students in IT related degree programs.

Sound ethical principles, once learned and accepted, impact individuals' behavior not only in the academic environment but also in the workplace. Ethical behavior related to academics in high school leads to higher academic achievement in college (Williams & Zhang, 2009) while a history of cheating in high school is related to a greater willingness to cheat at the college level (Harding et al., 2004). The personal characteristics of college cheaters are comparable to those of individuals who engage in unethical workplace behaviors (Martin et al., 2009). Furthermore, there are profound similarities in the decision processes used to evaluate ethical dilemmas in the college environment and in the workplace environment (Harding et al., 2004).

The purpose of this study is to design a survey instrument to determine the effectiveness of the IT and IS programs in teaching ethics and ethical behavior as it relates to the IT profession. Results of this research will help to explore beliefs and perceptions of ethical behavior of college students in IT and IS programs as well as on what constitutes ethical behavior for IT professionals.

## **2. LITERATURE REVIEW**

Ethics should be an issue of concern for students in their personal lives, in their role in the workplace as well as in their role as a member of society. Ethics can affect an individual, an organization or an institution. Several organizations and companies address the concern of ethics using codes of conduct or ethics. These organizations will be discussed and examined in this section of the paper to better understand what is expected of an individual to be ethical.

Researchers have done studies related to the perceptions of students with regards to ethics in information technology and information system curricula. Many studies have examined students' perceptions of ethical behavior when it comes to the academic environment. Charlesworth and Swery (2002) examine ethical issues within information systems and discuss how these issues fit into the IS curriculum. They further concluded that "Ethics needs to be included into the curriculum and students educated in the process of ethical decision making" (Charlesworth & Swery, 2002, p. 168).

Molnar et al., (2008) mentioned the importance of the study of IT ethics by emphasizing that by working to improve IT ethics in students that it may positively influence the direction of the students IT ethics in the organizations where they work after graduation. Aashiem et al., (2012) focuses on comparing ethical behavior in an IT related class assignment (programming)

to other non-IT related class assignments. The Aasheim et al. (2012) study examines students' attitude towards behaviors which range from acceptable means of seeking help on assignments to unacceptable behaviors such as copying from another student or paying someone to complete an assignment. Although there has been literature which contains or focuses on research studies on ethics in the IT and IS programs (Molnat et al., 2008; Lau et al., 2011; Miller & Engeman, 1998; Sherman, 2007; Aashiem et al., 2012), there has been a lack of specific empirical research on studying student perceptions and beliefs about being ethical in the IT and IS programs as well as students' understanding of ethical behavior as it relates to the IT workforce.

### *2.1 Relevant Codes of Ethics for IT-Related Degree Programs*

This section describes the Association for Computing Machinery (ACM), Association of Information Technology Professionals (AITP), and some major IT companies' codes of ethics, their standards of conduct and their obligations to members and employees as professionals. The Association for Computing Machinery code of ethics (ACM, 1992) and professional conduct is "one of the most widely recognized and publicized code of ethics in information technology" (Perlak, 2007, p.1), examining important ethical areas experienced in IT practice. This code consists of 24 imperatives which apply to one's conduct as a computing professional, formulated as statements of personal responsibility. "The code and its supplemented guidelines are intended to serve as a basis for ethical decision making in the conduct of professional work" (ACM, 1992). In the context of this study, this code has been revised in relation to ethics in the IT and IS programs and the work environment. The ACM code of ethics (ACM, 1992) content and guidelines have been described in the general moral imperatives, special professional responsibilities, organizational leadership imperatives and compliance with the code. The general moral imperatives addresses issues such as a member's contribution to society and human well-

being, avoiding harm to others, honest and trustworthy actions, fair treatment without discrimination, and commitment to honoring proper rights; which includes copyrights and patents, giving proper credit for intellectual property, respecting the privacy of others and honoring confidentiality. With more specific professional responsibilities, as an ACM computing professional, it is expected that one will strive to achieve the highest quality of professionalism in competence at work, respect professional work laws, accept an appropriate professional review, give comprehensive and thorough evaluations of computer systems, honor contracts, agreements and assigned responsibilities, improve public understanding of computing and its consequences, and access computing and communication resources only when authorized to do so. Organizational leadership imperatives address obligations as a member and organizational leader, to articulate social responsibilities of members of an organizational unit and encourage full acceptance of those responsibilities, manage personnel and resources to design and build information systems that enhance the quality of working life, acknowledge and support proper and authorized use of an organization's computing and communication resources, ensure that users and those who will be affected by a system have their needs clearly articulated during the assessment and design of requirements; later the system must be validated to meet requirements, articulate and support policies that protect the dignity of users and others affected by a computing system and create opportunities for members of the organization to learn the principles and limitations of computer systems. In compliance with the code, a member is expected to uphold and promote the principles of the code and treat violations of the code as inconsistent with membership in the ACM (ACM, 1992).

The Association of Information Technology Professionals (AITP) also provides a code of ethics (AITP, n.d.). AITP members have obligations to management, fellow members, society,

employers, college and university, and country and are expected to abide by the code of ethics and follow various standards of conduct. These obligations as stated in the AITP standards of conduct are described below:

*“In recognition of my obligation to management I shall:*

- Keep my personal knowledge up-to-date and insure that proper expertise is available when needed.
- Share my knowledge with others and present factual and objective information to management to the best of my ability.
- Accept full responsibility for work that I perform.
- Not misuse the authority entrusted to me.
- Not misrepresent or withhold information concerning the capabilities of equipment, software or systems.
- Not take advantage of the lack of knowledge or inexperience on the part of others.

*In recognition of my obligation to my fellow members and the professional I shall:*

- Be honest in all my professional relationships.
- Take appropriate action in regard to any illegal or unethical practices that come to my attention. However, I will bring charges against any person only when I have reasonable basis for believing in the truth of the allegations and without regard to personal interest.
- Endeavor to share my special knowledge.
- Cooperate with others in achieving understanding and in identifying problems.
- Not use or take credit for the work of others without specific acknowledgment and authorization.
- Not take advantage of the lack of knowledge or inexperience on the part of others for personal gain.

*In recognition of my obligation to society I shall:*

- Protect the privacy and confidentiality of all information entrusted to me.
- Use my skill and knowledge to inform the public in all areas of my expertise.
- To the best to my ability, insure that the products of my work are used in a socially responsible way.
- Support, respect, and abide by the appropriate local, state, provincial, and federal laws.



- Never misrepresent or withhold information that is germane to a problem or situation of public concern nor will allow any such known information to remain unchallenged.
- Not use knowledge of a confidential or personal nature in any unauthorized manner or to achieve personal gain.

*In recognition of my obligation to my employer I shall:*

- Make every effort to ensure that I have the most current knowledge and that the proper expertise is available when needed.
- Avoid conflict of interest and insure that my employer is aware of any potential conflicts.
- Present a fair, honest, and objective viewpoint.
- Protect the proper interests of my employer at all times.
- Protect the privacy and confidentiality of all information entrusted to me.
- Not misrepresent or withhold information that is germane to the situation.
- Not attempt to use the resources of my employer for personal gain or for any purpose without proper approval.
- Not exploit the weakness of a computer system for personal gain or personal satisfaction”

(AITP, n.d.)

Different companies and organizations have varying ways of performing business activities. Organizations have established separate codes of conduct to guide their daily activities or business processes. There is some similarity in the established code of ethics or standards of conduct of many companies. The code of ethics or standards of conduct of companies such as Apple, Dell, Microsoft, Google, and AT&T were examined in order to better understand what is expected of students as a professional working in these companies. This understanding has helped generate a series of questions related to the hypotheses that will be discussed later in this study. In the research of these companies’ codes of ethics or standards of conduct, it was discovered that honesty and integrity is highly expected of professionals (AT&T, n.d.; Dell, 2012; Google, n.d.; Microsoft, 2010; Yahoo!, n.d.).

These companies in general address the issue of compliance with the laws, rules and regulations of their company. It is expected of professionals in these companies to abide by the rules and laws established for these companies. Issues addressed include health and safety issues, disclosure of information in companies interest, conflict of interest being addressed in the best interest of the company (Amazon, n.d.), no improper advantage (Dell code of conduct), proper communication, privacy policy issue (Yahoo!, n.d.), the use of information technology and other resources which are the company's assets (AT&T, n.d.), safeguarding confidential information, protection of intellectual property rights, fair judgment or treatment, protecting human rights and environment, respect for others, reporting violations (Apple, 2009), and equality and diversity. Most of issues were addressed in the code of ethics or standards of conduct for these companies.

To mention a few statements as described in the code of conducts of these companies, Yahoo addresses copyrights issues by stating that "the absence of a copyright notice does not necessarily mean the materials are not copyrighted" (Yahoo!, n.d.). It is expected of the employees to check with the legal department if in doubt of copyright issues. Stating that, "articles, images, audio and video recordings, lyrics, TV shows, movies, computer software, and other authored materials may be covered by copyright laws", (Yahoo!, n.d.). Addressing copyright issues and intellectual property rights, Microsoft, a software company, stated in its code of ethics that as a member "we prohibit the making or using of copies of non-licensed copyrighted material, including software, documentation, graphics, photographs, clip art, animation, movie/video clips, sound, and music (Microsoft, 2010)." "Code of ethics provides general guidance on how to carry out our daily activities in accordance with our purpose and values, as well as in compliance with the letter and spirit of applicable legal requirements and Dell policies, standards and ethical principles" (Dell, 2012).

For the benefit of this research, these ethical issues addressed by these organization and companies in their code of ethics and standards of conducts, have been combined in order to develop a survey instrument that will help address the general perceptions and beliefs of student as to what constitute ethics and ethical behavior in the academic and work environment as a student and as a professional, respectively.

### **3. METHODOLOGY**

#### *3.2 Hypotheses*

In order to assess the efficacy of the study, three hypotheses were proposed and assessed via the survey instrument. Based on the research findings narrated in the literature review section of this paper, the current research study attempts to examine beliefs of students as to what constitutes ethical behavior in the IT and IS programs. Secondly, the study investigates students' beliefs as to what constitutes ethical behavior in the workplace. It was decided that the survey instrument would be designed in such a way that various statements would be posed as scenarios and students would be asked to choose the response that best reflects their opinion about each of the behaviors stated as it applies to their ethical perceptions (See the Appendix for survey questions). Ethical behavior encompasses or deals with variety of circumstances that surround the academic and workplace environment. Therefore, Hypothesis I was established to help comprehend what constitutes ethical behavior in the IT and IS programs' as perceived by students in those programs at the authors' institution.

*Hypothesis 1 (H1): Students in IT and IS programs understand what constitutes ethical behavior in their programs.*

The question of whether IT and IS programs students are ready to be an ethical IT professional in the work environment is the basis for Hypothesis 2. Hypothesis 2 helps faculty understand if students in the authors' institution in the IT and IS programs understand their obligations as an IT professional with regard to ethical behavior in the workplace.

*Hypothesis 2 (H2): Students in IT and IS programs understand the obligations of an IT professional with regards to ethical behavior in the workplace.*

Finally, a comparison of the perceptions of freshmen and senior students will be made to determine whether faculty are effective at teaching ethical behavior. Hypothesis 3 expresses the belief that ethical perceptions of these two groups of students will differ and that seniors will be more knowledgeable than freshman.

*Hypothesis 3 (H3): The ethical perceptions reported by freshmen IT and IS students will differ from that reported by senior IT and IS students.*

### *3.2 Survey Design*

Extensive research on various codes of conduct or ethics as well as extensive literature review of issues related to ethical behavior provided the foundation for the questions on the survey (See Section 2 of the Appendix for survey questions). Table 1 provides a mapping of the survey questions to the source used in developing the question as well as a mapping of the survey questions to the hypothesis addressed by that question. Questions related to the academic environment on the survey are used to address the general issues related to beliefs and understanding of ethical behavior of students in the IT and IS programs. The general perception questions are to address the understanding of ethics as an IT and IS student or as a prospective IT professional. General moral imperative questions are to address the general issues related to beliefs about and understanding of ethical behavior as a student in a general perspective, in the

IT and IS programs, and as a professional in the work environment. Organization and profession questions are to address the general issues related to beliefs about and understanding of professional ethical behavior. There are questions that address and recognize the need for codes of ethics in an academic or work environment.

The questionnaire consisted of two sections. The first section of the questionnaire consisted of questions about the participants demographics. In the second section, a brief statement was cited to explain to the students that the section is about their ethical beliefs (see Appendix). The second section of the survey instrument consisted of various statements which will be used to test the hypotheses related set forth in the study. The demographic questions do not include any form of information that could be used to associate any participants with a response. The survey instrument presents no identified risk to the participants. Therefore, the students' personal or confidential information and privacy rights were protected.

<b>Topic (Ethical Issues)</b>	<b>Code of Conduct</b>	<b>Survey Question</b>
Software Piracy (Copyright)	Companies	12, 13, 14, 15, 16, 17, 18, 19, 44
Intellectual Property rights	AITP & ACM & Companies	1, 2, 4, 5, 7, 8, 10, 21
Plagiarism	AITP & ACM	1, 3, 6, 8, 9, 10, 23
Privacy Rights/Issues	AITP, ACM & Companies	8, 20, 21, 24, 28, 30, 34, 35, 36
Misuse of computer and other technological resources	AITP, ACM & Companies	11, 20, 22, 31, 32, 33, 34, 35, 42, 44
Cheating	AITP & ACM	4, 5, 8
Fair Treatments, Thoughts, Decisions, and Judgments	AITP, ACM and Companies	25, 26, 27, 29, 37, 39, 40, 41, 43, 45, 46, 47, 48, 49, 50
Honesty, Integrity and Trust	AITP, ACM and Companies	28, 29, 30, 34, 36

**Table 1: Mapping of survey questions to hypotheses and code of conducts topic areas**

The questions in the survey amounted to a total of 50 questions plus the demographic questions. The questions were directed to understand ethical beliefs of students in the IT and IS programs and as a prospective IT professional. For each question, students were asked to indicate

their ethical perception or belief as a student in either the IT or IS program and as a professional in the work environment. For each survey question, it was stated for the respondent to choose the response that best reflects their beliefs with regard to ethics. The responses are scaled on a 5-point Likert scale with 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, and 5 = Strongly Agree. These statements related to unethical behaviors such as software piracy, copyright and intellectual property rights, plagiarism, privacy rights/issues, misuse of computer and other technological resources, cheating, fair treatment, and thoughts, decisions, and judgment and honesty, integrity and trust in the academic and work environments.

Feedback from select professors in the IT and IS departments was used to review the questions in the survey instrument to determine if the survey addressed the needs of the respective departments. Also, with regard to the fact that the questions on the instrument were developed using the codes of conduct of various information technology companies, the code of ethics for ACM, the code of ethics for AITP, and various related research studies suggested criteria for evaluating factors affecting ethical perceptions, the survey questionnaire had desirable validity from an expertise standpoint.

#### **4. RESULTS**

The survey was built and administered using Qualtrics, an online survey tool that is currently licensed at the authors' institution. The survey was administered in several IT classes identified in Table 2. The survey was anonymous.

To assess whether or not students learn ethical behavior as it relates to information technology during their time in the IT program, responses from students in freshman level courses will be compared to responses from students in senior level courses. The first section of the survey asked for demographic information (see Appendix – Survey Instrument). In the

second section of survey questionnaire, students were asked to choose their level of agreement on a variety of question statements measured on a five-point Likert scale of (1) strongly disagree to (5) strongly agree as they perceived or believed the statement to describe ethical or unethical behavior. A total of 90 students participated in the survey questionnaire with 87 responses complete enough to include in the analysis.

Course	Description
IT 1130 (Introduction to Information Technology)	It also provides students with an introduction to the range of applications of Information Technology. It introduces students to some of the techniques that they will need for later courses, in particular object-oriented design and databases and SQL.
IT 4335 (Network Architecture)	The course covers the hardware required for interconnecting digital devices for the purpose of enabling data communications through a network. Bus architectures, ports, network cards, cabling, routers, switches. Ensuring network reliability. Optimizing network performance.
IT 4131 (Information Technology Capstone Project)	The course covers the main topics of IT project management including requirements specification, project integration, scope, time, cost, quality, human resources, communications, and risk management. In addition, techniques and methods used in IT project management will be covered. To reinforce the course concepts, students will complete projects related to their specialization and/or second discipline.

**Table 2: Courses where students were surveyed**

#### *4.1 Demographic Results*

Thirteen percent (13%) of respondents were female and 87% were male. This is consistent with the gender break down of the overall population of the IT program. The majority of respondents were information technology majors (83%), with 3% information systems students and the remaining 14% of the respondents represented a variety of other majors. The 14% in other majors are students registered in the introductory course where many students are still trying to figure out what major they want to be.

Students were predominantly typical college aged students with 74% of the respondents between 19 and 24 years old. This is also consistent with the breakdown of students at the authors' institution as it is a typical university campus.

#### 4.2 Hypothesis Results

The first hypothesis concern students' perceptions and beliefs about ethical behavior in the IT and IS programs in an academic environment. The results related to Hypothesis 1 can be found in Table 3. Note that students strongly agree about how unethical it is to take credit for other's work, cheat and plagiarize. However, they are mixed in their sentiments regarding software piracy.

<b>Question:</b> <b>As an IT/IS student, I believe it is unethical to:</b>	<b>Mean</b>	<b>Standard Deviation</b>
Take credit for someone else's work	4.50	0.91
Hire someone to write an essay	4.27	1.07
Purchase or submit a research or term paper from the internet to a class as one's own work	4.44	0.98
Cheat on a graded assignment	4.26	0.99
Cheat on an exam	4.37	1.01
Plagiarize other people's work without citing or referencing the work	4.28	0.98
Add the name of a non-contributing person as an author in a project/research study	4.02	1.00
Copy and paste material found on the Internet for an assignment without acknowledging the authors of the material	4.03	1.16
Deliberately provide inaccurate references for a project or research study	4.39	0.91
Knowingly permit student work done by one student to be submitted by another student	4.21	1.01
Surf the internet for personal interest and non-class related purposes during classes	2.55	1.11
Make a copy of software for personal or commercial use	2.98	1.25
Make a copy of software for a friend	2.86	1.09
Loan CDs of software to friends	2.55	1.15
Download pirated software from the internet	3.05	1.18
Distribute pirated software from the internet	3.51	1.10
Buy software with a single user license and then install it on multiple computers	2.91	1.19
Share a pirated copy of software	3.25	1.14
Install a pirated copy of software	3.03	1.23

**Table 3: Results related to hypothesis 1**



The second hypothesis (H2) is concerned with the perceptions or beliefs of students as to what constitutes ethical behavior in the work environment as IT professionals. The results related to Hypothesis 2 can be found in Table 4. Note that students tend to strongly agree with the statements related to ethical behavior in the workplace.

<b>Question: As an IT/IS professional I believe (or I should):</b>	<b>Mean</b>	<b>Standard Deviation</b>
Providing unauthorized access to other people's personal information to be unethical	4.46	0.87
I have an obligation to respect and protect the integrity of intellectual property and confidentiality agreements	4.22	0.93
Using social media networking as a tool for cyber-bullying to be unethical	4.37	0.92
It is unethical, and potentially unlawful, to take an unauthorized copy of someone else's work	4.20	1.00
Providing unauthorized access to an organization's private information to be unethical	4.41	0.84
Ethical behavior is better understood by information technology and information system students than students in other majors	3.18	1.28
Education has an influence on one's ethical behavior	3.79	1.24
Being ethical is important in the information technology sector	4.26	0.94
Not disclose confidential organizational information to co-workers without authorization	4.30	0.94
Uphold and abide by the laws, code of conduct, ethical and moral principles of my organization	4.23	0.92
Not violate the privacy and confidentiality of information entrusted to me to further personal interest	4.29	0.90
Not surf the internet for personal interest and non-work related purposes at work	3.16	1.16
Not involve in the act of phishing (unauthorized stealing of people's valuable data)	4.32	0.87
Not involve in the act of email spoofing (deformation of email for phishing purposes)	4.36	0.85
Not violate other people's privacy with the use of internet monitoring devices	4.10	1.01
Not use technology to infringe on other people privacy rights	4.18	0.99
Adhere to strict confidentiality rules regarding privacy and proprietary matters	4.23	0.94

**Table 4: Results related to hypothesis 2**

Hypothesis 3 proposed that students become more knowledgeable about what constitutes ethical behavior in the workplace as they progress through the IT program. To assess this hypothesis, responses from freshmen level courses were compared to those in the senior level courses using an independent samples t-test. Table 5 shows the results for those t-tests. Note that in general, the difference is positive, which indicates that seniors are more knowledgeable than freshman and in many cases, that difference is significant. However, there are two statements that resulted in a negative statistically significant difference, indicating seniors were in lesser agreement with these statements than freshman, which is cause for concern.

<b>Question: As an IT/IS professional I believe (or I should):</b>	<b>p-value</b>	<b>Difference of means</b>
Providing unauthorized access to other people's personal information to be unethical	0.2919	0.11
I have an obligation to respect and protect the integrity of intellectual property and confidentiality agreements	*0.0488	0.36
Using social media networking as a tool for cyber-bullying to be unethical	*0.0196	0.45
It is unethical, and potentially unlawful, to take an unauthorized copy of someone else's work	0.2226	0.17
Providing unauthorized access to an organization's private information to be unethical	0.1754	0.18
Ethical behavior is better understood by information technology and information system students than students in other majors	*0.0256	-0.53
Education has an influence on one's ethical behavior	*0.0201	-0.53
Being ethical is important in the information technology sector	0.1616	0.21
Not disclose confidential organizational information to co-workers without authorization	**0.0680	0.34
Uphold and abide by the laws, code of conduct, ethical and moral principles of my organization	**0.0996	0.27
Not violate the privacy and confidentiality of information entrusted to me to further personal interest	**0.0612	0.32
Not surf the internet for personal interest and non-work related purposes at work	0.2480	-0.18
Not involve in the act of phishing (unauthorized stealing of people's valuable data)	**0.0549	0.32
Not involve in the act of email spoofing (deformation of email for phishing purposes)	**0.0750	0.28
Not violate other people's privacy with the use of internet monitoring devices	0.4634	0.02
Not use technology to infringe on other people privacy rights	0.1851	0.20
Adhere to strict confidentiality rules regarding privacy and proprietary matters	0.1554	0.22

\*Significant at 5%, \*\*Significant at 10%

**Table 5: Results related to education making a difference**

## 5. CONCLUSIONS/RECOMMENDATIONS

The findings in this research study presented several ethical implications in the academic environment as well as the professional environment. The question of how to address unethical behavior in students is complex. Though, no conclusions can yet be drawn about the ethical behavior of students in the IT and IS programs, the survey instrument does provide faculty in

both programs with the ability to collect and analyze the data to draw those conclusions, which was the original goal of this study.

Though, the student responses were anonymous and the survey was definitely voluntary the response result to the survey questionnaire was deliberate. The value to be derived from this survey assessment is the importance of improving students learning and understanding of ethics. The objective of this study was to develop a survey instrument that will help faculty assess students understanding of what constitutes ethical behavior in the IT and IS programs and in the work environment as a professional. Furthermore, the survey instrument can be used to assess the difference in the perceptions and beliefs at different college levels. For example, the ethical beliefs of freshman students can be assessed and compared with the ethical beliefs of senior students to see if there is a better understanding of what constitutes ethical behavior as students' progress through the IT and IS programs.

In conclusion, this study was undertaken to gauge the ethical beliefs of students with a survey instrument to be administered online through Qualtrics. With the intent of pilot testing the survey instrument, the survey questions were administered online through the online survey tool and the students' responses with regard to their beliefs on ethical issues surrounding the academic and work environment was gathered and analyzed. The result of pilot testing was a success from the responses gathered from the students. Qualtrics also prove the capability of analyzing the result and addressing the hypotheses through the findings. The findings address the hypotheses by supporting the fact the students were able to provide responses that address all hypotheses.

As the survey instrument was administered to a limited sample, both in size and scope, that was designed to be used as a pilot test of the instrument, the findings cannot be generalized. Future research will involve administering the survey to a larger sample in multiple departments.

In addition, a mechanism will be devised to pair the data so that the results of the survey administered to a student at the freshman level can be compared to results for that same student at the senior level.

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## APPENDIX – SURVEY INSTRUMENT

### *Section 1: Demographic Questions*

#### ***Gender***

- Male
- Female

#### ***Age***

- 16 -18 years
- 19 – 21 years
- 22 – 24 years
- 25 – 27 years
- 28 – 30 years
- Specify ( )

#### ***Race/Ethnicity***

- Asian
- Black or African American
- Hispanic
- Native American
- White/Caucasian
- Specify ( )

#### ***College Level***

- Freshman
- Sophomore
- Junior
- Senior
- Graduate

#### ***Marital Status***

- Single
- Married
- Divorce
- Specify ( )

#### ***Major***

- Information System (IS)
- Information Technology (IT)
- Specify ( )



### ***Work Experience***

- None
- 0 – 1 year
- 2 – 4 years
- 5 – 7 years
- 8 years and above

### ***Section 2: Question Related to Ethics***

For each statement, please choose the response that best reflects your opinion about each of the behavior below as it applies to your ethical perceptions. All questions answered using a 5 point Likert scale ranging from 1 - Strongly Disagree to 5 - Strongly Agree.

#### ***As an information technology (IT) or information system (IS) student, I believe it is unethical to***

1. Take credit for someone else's work
2. Hire someone to write an essay
3. Purchase or submit a research or term paper from the internet to a class as one's own work
4. Cheat on a graded assignment
5. Cheat on an exam
6. Plagiarize other people's work without citing or referencing the work
7. Add the name of a noncontributing person as an author in a project/research study
8. Copy and paste material found on the Internet for an assignment without acknowledging the authors of the material
9. Deliberately provide inaccurate references for a project or research study
10. Knowingly permit student work done by one student to be submitted by another student

#### ***As an information technology (IT) or information system (IS) student, I believe it is unethical to***

11. Surf the internet for personal interest and non-class related purposes during classes
12. Make a copy of software for personal or commercial use
13. Make a copy of software for a friend
14. Loan CDs of software to friends
15. Download pirated software from the internet
16. Distribute pirated software from the internet
17. Buy software with a single user license and then install it on multiple computers
18. Share a pirated copy of software
19. Install a pirated copy of software

#### ***As an IT/IS professional, I believe***

20. Providing unauthorized access to other people's personal information to be unethical
21. I have an obligation to respect and protect the integrity of intellectual property and confidentiality agreements

22. Using social media networking as a tool for cyber bullying to be unethical
23. It is unethical, and potentially unlawful, to take an unauthorized copy of someone else's work
24. Providing unauthorized access to an organization's private information to be unethical
25. Ethical behavior is better understood by information technology and information system students than students in other majors
26. Education has an influence on one's ethical behavior
27. Being ethical is important in the information technology sector

***As an IT/IS professional, I should***

28. Not disclose confidential organizational information to co-workers without authorization
29. Uphold and abide by the laws, code of conduct, ethical and moral principles of my organization
30. Not violate the privacy and confidentiality of information entrusted to me to further personal interest
31. Not surf the internet for personal interest and non-work related purposes at work
32. Not involve in the act of phishing (unauthorized stealing of people's valuable data)
33. Not involve in the act of email spoofing (deformation of email for phishing purposes)
34. Not violate other people's privacy with the use of internet monitoring devices
35. Not use technology to infringe on other people privacy rights
36. Adhere to strict confidentiality rules regarding privacy and proprietary matters

***As a member of society, I should***

37. Advise in an honest and trustworthy manner to enable people to behave ethically
38. Be ethical in my behavior in all aspects of life
39. Protect fundamental human rights
40. Respect the diversity of all cultures
41. Abide by and not violate the laws of the country and community
42. Not misuse computing or technology resources
43. Report any violations of ethical regulations to an authority
44. Protect against the act of piracy (downloading or copying copyrighted music/video/books/software or any electronic materials)
45. Take action if I catch someone involved in unethical use of computing resources

***As an IT/IS student or professional, I believe***

46. Establishing an organizational code of ethical standards encourages employees in that organization to behave ethically
47. Establishing a code of ethics for IT professionals encourages IT/IS professionals to behave ethically
48. Students acquire and develop their ethical standards by taking ethics as a part of the IT/IS curriculum
49. Ethical standards are important in IT/IS programs Ethical standards should always be included in the IT/IS curriculum

50. Establishing an organizational code of ethical standards encourages employees in that organization to behave ethically

# **Apply Service Oriented Architecture with Web 2.0 Application for Computer Network Web Services**

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## **Abstract**

It is important how wireless hosts find other hosts efficiently for load and web service purposes because hosts in an ad-hoc network moves dynamically. This paper proposes a three-tier architecture, which includes content network, social network and service network. It also presents a structure for web and load services in ad-hoc computer networks, which is a new system architecture using SOA (Service Oriented Architecture) and Web 2.0 concepts to implement functions for web and load services. It is a three-tier system structure based on Web service functions to implement services seeking and load distribution. Furthermore, this project would construct a knowledge sharing and learning platform based on the mentioned three-tier architecture. Different communities can provide their services to each other using this new knowledge platform and this forms a “virtual community.” This will leads to the desired accomplishments of “service reusability” and “service innovation” too. In addition, it can also propose the frameworks of new SOA, and evolve in other application in web2.0 style, and further more provides a platform and more resources in order to enhance the interactions between academia and industry.

**Keywords:** Web Services, Web 2.0, SOA, Service Oriented Architecture, Ad-hoc computer network, Load service and distribution

## 1. Introduction

Computer networks can provide parallel computation and services. It is important that hosts find services from other hosts, and send loads to other hosts for some certain function implementation through network transfer. With the increasing popularity of mobile communications and mobile computing, the demand for web and load services grows. When a computer is overloaded or it needs special services from other computers, it may send requests to other computers for web and load services. For example, a computer may need some jobs to be executed with higher quality of services or it needs some jobs to be done with a short period of time that its processor is too slow to perform the jobs; therefore, it may send part those jobs to other computers with higher speeds of processors. Since wireless networks have been widely used in recent years, how a host finds services it needs or how it transfers loads to other nodes has become a very important issue because not all wireless hosts have the ability to manipulate all their loads. For instance, a host with low battery power cannot finish all its jobs on time and should ask other nodes to provide services to finish the jobs, or it should transfer some of them to other hosts.

Before a wireless host transfers its loads to other hosts or asks for load services from other hosts, it has to find available hosts using resource allocation algorithms. There are several resource allocation protocols that have been developed, for example, IETF Service Location Protocol (SLP) [8] and Jini [25] software package from Microsoft. However, these protocols address how to find the resources in wired networks, not in wireless networks. Maab [15] develops a location information server for location-aware applications based on the X.500 directory service and the lightweight directory access protocol LDAP [26]; while it does not cover some important issues about the movements of mobile hosts, for example, how to generate a new directory service and how a host gets the new services, when a directory agent moves away its original region. In an Ad-Hoc network, system structure is dynamic and hosts can join or leave any time. Therefore, how to provide load services and how to find available hosts providing load services become important issues in an Ad-Hoc network system. The goal of this paper

is that users can easily find and share resources based on the concepts of “service reusability” and “service innovation”

Based on the population of Web Services techniques, this paper discusses a new architecture which uses SOA model with Web 2.0 [8, 11] for web services. By using Web 2.0 with SOA, the network resources should be easily found by the hosts which need services. Based on XML, the SOA load service system can be used in any computer system platform [1, 2, 3]. This is a very important characteristic for hosts to share or request services in different systems. With the help of Web 2.0, hosts can find the required services easily from the Internet [4].

Figure 1 shows the basic SOA structure [5, 6, 7], which is built by three major components – the Directory, Service consumer, and Service provider. SQA is operated by the following: The Directory provides a platform for information that a service provider can register in the Directory for providing services; a service consumer can find its desired service it needs in the Directory. Once the Directory finds services that a service consumer needs, it sends a query response back to the service consumer to notify it the result. At this time, the service consumer has the information about the hosts which can provide services; therefore the consumer contacts the service provider directory by sending requests. The service provider now will send responses back to the consumer for the services the consumer needs. This is also called the “invoke” process.

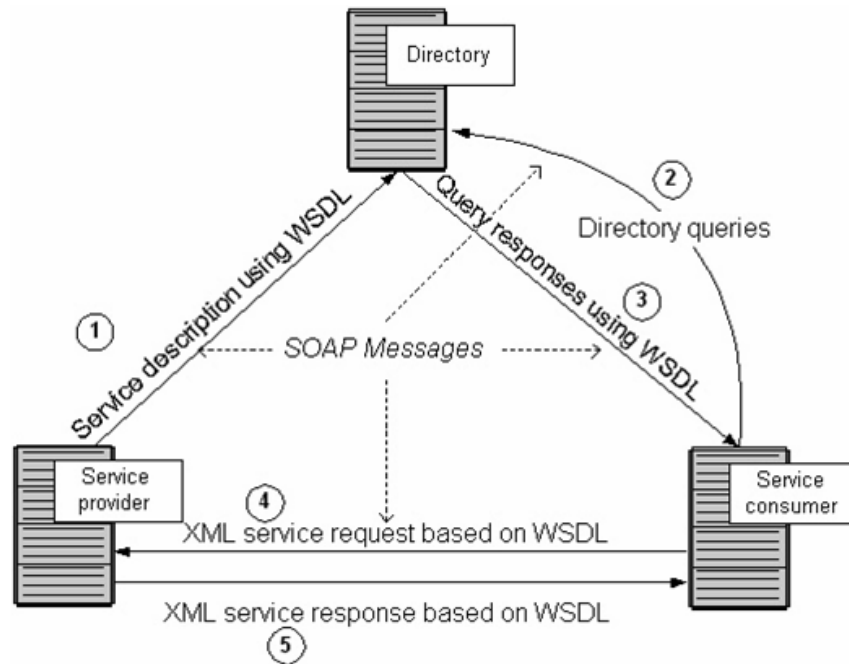


Figure 1: SOA structure

## 2. System structure

The system structure for the SOA model is illustrated in Figure 2. There are two layers in this structure – the Service Network layer, and the Service Logic layer.

The Service Network layer is the main network that connects to the internet using the regular network protocols. It receives requests from internet and forwards requests to the Service Logic layer in Web Service (WS) object forms. Each WS object is based on the SOA model which can communicate each other in social network way. The Service Logic layer is the main layer that uses WS objects to communicate each other in the sub-network under the Service Network layer. Different WS object has different objectives, for example, some WS objects are used for social network communication, while other WS objects are used for accessing contents in Content Networks. Since they are in SOA form, it is easy for them to find the resources they need for different purposes. Inside the Service Logic layer, there are sub-networks for different purposes and functions. For example, nodes can form social networks; storage devices can also form a content network for data accessing. All these operations are

managed by the WS objects under the SOA model. For the service reusability purpose, most WS objects are generated by the Service Network layer for data and object consistency.

In Figure 2, all the services and requests are in the forms of Web Service objects which are defined and implemented by XML. For users who need services, requests are sent by the users to the Service Network Layer. The Service Network is the gateway for accepting requests and sending back requesting results to the requesters.

All the requests are processed by the Service Logic Layer, which finds the required information and applications for requests. The Content Network is a network which communicates databases. The Social Network contains the relations for social communities. The following procedure illustrates how it works.

1. Users send requests to a Service Network.
2. The Service Network forwards requests to Service Logic Layer via Web service functions.

In this step, requests are transferred to objects that can communicate with the Service Logic layer.

3. When users send requests, Service Network has the ability to generate the desired WS objects according to the requests forwarded by the Service Network.
4. Service Logic Layer performs the required functions for the requests. It accesses data and information from Content Network using Web service functions. A User can also contact other users using WS objects under the Service Logic Layer.
5. After the Service Logic Layer has the results for the requests, it sends the results back to the Service Network using Web service functions.
6. Service Network then sends the results back to the users who sent initial requests.



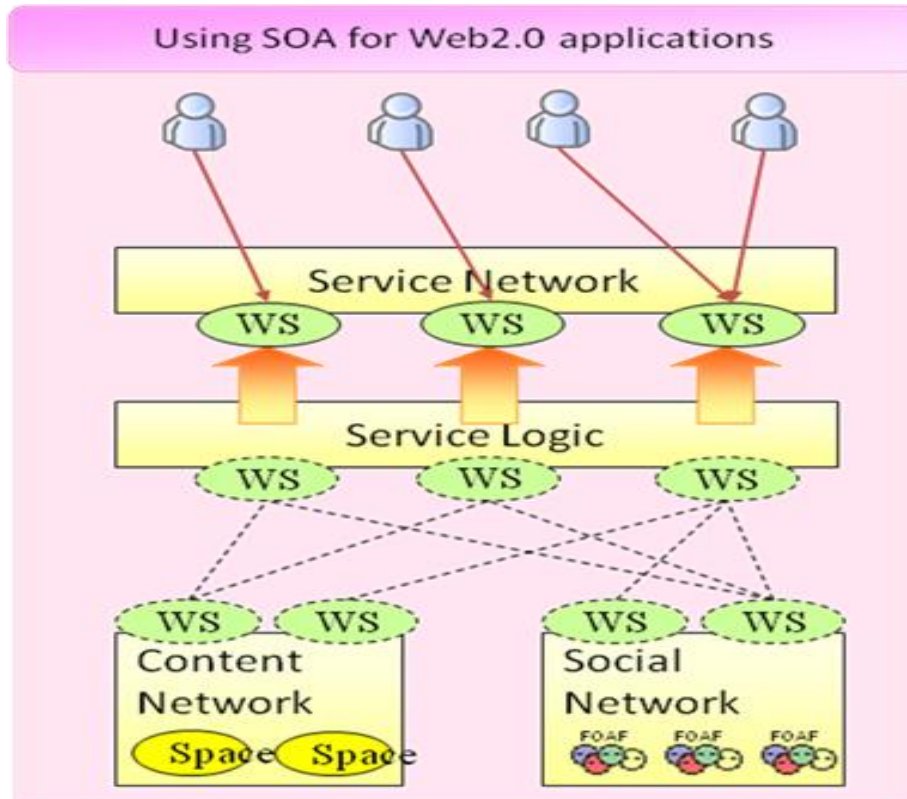


Figure 3: Using SOA for Web2.0 applications

There are several advantages with the design structure.

1. With the system structure, users can join the desired networks anywhere once they connect to the Internet.
2. With the characteristics of Web 2.0 with SOA model, users can join the desired networks they need to share or find resources easily they need.
3. Using WS objects for the communication makes it easy for service reusability and service innovation. Users do not need to construct special system or programs for data accessing and analysis.
4. Different Service Networks communicate with each other to find and share available resources.

### **3. Implementation and Simulation**

Based on the structure of SOA model with Web 2.0 application, the system can be built in a three-tier structure. The lowest level is the sub-networks including Content Network, Social Network, which provides resources for data sharing. The middle level is the Service Logic layer, which provides WS objects. The top level is the Service Network layer that accepts requests or sends request results back to the users.

This paper is going to construct a virtual community, and work on a simulation for data generation and analysis. Ten thousands nodes with a thousand Web services will be used in the simulation. The simulation will compare the performance for data sharing and load transferring to the system without using SOA structure.

### **4. Conclusion**

Usually that it is hard to find the required network resources in the Internet for load balance and load service purposes. Because of this, a new structure is proposed for hosts in the computer networks to find the resources for web services. This new structure provides new way that finds resources easily for web services. Especially, when a user needs services which are not very commonly provided in the Internet, with the help of Web 2.0 and SOA, users can find what they need because of the “long tail” property of Web 2.0 and the platform free property of SOA.

This system performance will be evaluated by using a simulation. Usually it is very hard to evaluate the performance for Web 2.0; therefore this project should have great helps in finding the performances for the usage of Web 2.0 and SOA.

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## **The Effectiveness of Techniques in User Compliance of IT Policy**

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# **The Effectiveness of Techniques in User Compliance of IT Policy**

## **Abstract**

In the field of information systems, much work has been done with regard to user compliance, and with policy creation. However, very little literature exists on the link between policy revision and users' compliance. Given that mobile data connections have reached and in some cases surpassed current land broadband speed, any user with a modern mobile device capable of 3G or LTE connections can simply circumvent an enacted acceptable use policy on a corporate network. This study adapts the theory of planned behavior and draws from sociological compliance-gaining techniques in order to further understand what techniques managers could use in order gain full compliance. The results are analyzed and the efficacy of various techniques evaluated.

## **Introduction**

With the advent of broadband speeds over wireless infrastructure accessed in the form of mobile devices, an organization's ability to effectively implement policy in which to control what a user accesses during work hours has become increasingly difficult. While organizations retain control over their respective internal information systems infrastructure, they effectively have no way to govern a third party device that could cause for a distraction and loss of productivity. Given how ubiquitous and mobile devices are, and the rate at which mobile data speeds are gaining ground, managers find new challenges with their employees when it comes to productivity issues and the amount of distractions their employees encounter every day.

With these considerations in mind, managers must turn to alternative strategies in order to engage employees who would otherwise seek distractions from their work day. In light of this change in how users access what would be otherwise restricted content on the company's infrastructure, it is important to examine the psychological and sociological aspects of what managers can do to incentivize their employees. This study looks at the Theory of Planned Behavior (Ajzen, 1991) and takes perceived behavioral controls and casts them in the light of compliance-gaining techniques (Marwell & Schmitt, 1967a).

## **Literature Review**

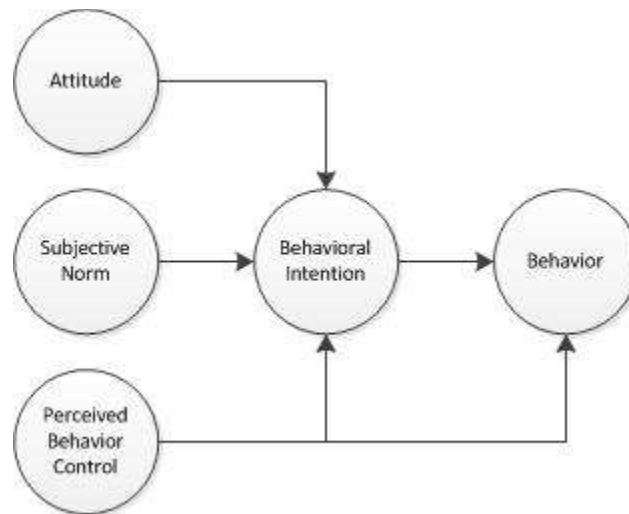
### **Theory of Planned Behavior**

The theory of planned behavior (see Figure 1) is an extension of the behavioral work done previously with the theory of reasoned action (Ajzen, 1991; Madden, Ellen, & Ajzen, 1992). In the extended model, the theory posits that there exist several independent variables of a dependent behavior variable, including attitude, subjective norm, and most notably, perceived behavior controls.

Attitude: In the theory of planned behavior, there are three factors that affect behavioral intention, including attitude. A person's attitude toward the behavior refers to their psychological perception of the intention to act based on behavior. This along with subjective norm made up the original theory of reasoned action that Ajzen has since extended to the theory of planned behavior.

Subjective Norm: Subjective norm is another independent variable identified in the theory of planned behavior, and also part of the theory of reasoned action. Subjective norm refers to the body of people around the user, and how their attitudes, actions, and experiences influence the user (Pelling & White, 2009).

Perceived Behavioral Control: Lastly, the theory of planned behavior incorporates a new aspect not included in Ajzen's original theory: perceived behavioral control. Here, perceived behavior control is that which is apparent to perception and subject to being modified. This aspect of the model will be examined in detail when looking at methods to gain user compliance with policy.



**Figure 1. The Theory of Planned Behavior**

### **Compliance-Gaining Techniques**

In an empirical analysis of proposed compliance-gaining techniques, Marwell and Schmitt identified sixteen prominent techniques (see Table 1) and classified them into five cluster factors. These five cluster factors include (I) rewarding activity, (II) punishing activity, (III) expertise, (IV) activation of impersonal commitments, and (V) activation of personal commitments. (Marwell & Schmitt, 1967).



**Table 1. Compliance Gaining Techniques**

1. Promise	(If you comply, I will reward you.)
2. Threat	(If you do not comply I will punish you.)
3. Expertise (positive)	(If you comply you will be rewarded because of “the nature of things.”)
4. Expertise (negative)	(If you do not comply, you will be punished because of “the nature of things.”)
5. Liking	(Actor is friendly and helpful to get target in “good frame of mind” so that he/she will comply with request.)
6. Pre-giving	(Actor rewards target before requesting compliance.)
7. Aversive Stimulation	(Actor continuously punishes target making cessation contingent on compliance.)
8. Debt	(You owe me compliance because of past favors.)
9. Moral Appeal	(You are immoral if you do not comply.)
10. Self-Feeling (positive)	(You will feel better about yourself if you comply.)
11. Self-feeling (negative)	(You will feel worse about yourself if you do not comply.)
12. Altercasting (positive)	(A person with “good” qualities would comply.)
13. Altercasting (negative)	(A person with “bad” qualities would not comply.)
14. Altruism	(I need your compliance very badly, so do it for me.)
15. Esteem (positive)	(People you value will think better of you if you comply.)
16. Esteem (negative)	(People you value will think worse of you if you do not comply.)

Cluster I: Rewarding Activity involves three of the sixteen identified techniques as to manipulating the target’s environment with a positive intention. These techniques include *pre-giving*, *liking*, and *promise*.

Cluster II: Punishing Activity involves two of the sixteen identified techniques as to manipulating the target’s environment with a negative intention. These techniques include *threat* and *aversive stimulation*.

Cluster III: Expertise involves two of the sixteen identified techniques as to utilizing an expert opinion on the potential outcome if the user complies. These techniques include both *positive expertise* and *negative expertise*.

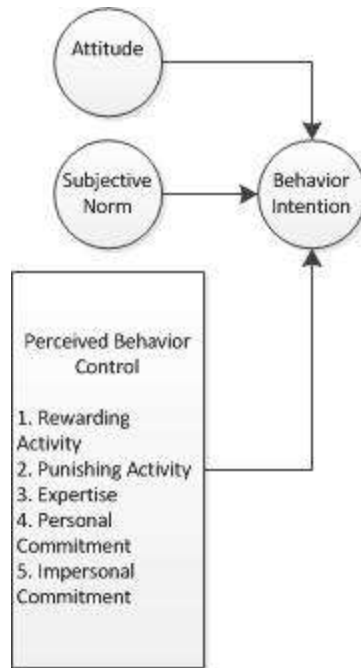
Cluster IV: Activation of Impersonal Commitments involves seven techniques that Marwell and Schmitt describe as “non-active” techniques. These techniques include *positive self-feeling*, *negative self-feeling*, *positive altercasting*, *negative altercasting*, *positive esteem*, *negative esteem*, and *moral appeal*.

Cluster V: Activation of Personal Commitments involves the remaining two techniques, along with slight overlap of some techniques identified in Cluster IV. The primary two techniques identified in this cluster are *altruism* and *debt*, with some considerations for overlap with *negative esteem*, and *negative altercasting*.

### **The Research Model**

The five clusters of techniques can be considered forms of behavior control. Augmenting the techniques with the theory of planned behavior produces the research model shown in Figure 2.

Attitude has been examined multiple times in the context of user behavior. What has not been examined is the efficacy of techniques of behavior control, and to some extent subjective norm. Therefore, our study targets various forms of compliance control and subjective norm. Our study proposes that many of the above clusters of compliance-gaining techniques can be used to predict end user behavior, in the context of policies dictating what is acceptable use on a network (Siau, Nah, & Teng, 2002). If effective techniques can be identified, they will be helpful to management in policy compliance in this turbulent environment.



**Figure 2. The Research Model for Policy Compliance**

## Hypotheses

This study hypothesizes that users are now empowered to simply circumvent acceptable use policy that they do not like, in order to access any network they would want to while on the clock. Because the users are now empowered with this mobile connectivity, managers have to reassess how they get users back on task, and the proposed techniques are those of identified compliance gaining techniques.

Hypothesis 1: Compliance-gaining techniques in the rewarding activities cluster will have a positive effect on behavioral intention of policy compliance.

Hypothesis 2: Compliance-gaining techniques in the punishing activity cluster will have a positive effect on the behavioral intention of policy compliance.

Hypothesis 3: Compliance-gaining techniques in the expertise cluster will have a positive effect on behavioral intention of policy compliance.

Hypothesis 4: Compliance-gaining techniques in the personal commitment cluster will have a positive on behavioral intention of policy compliance

Hypothesis 5: Compliance-gaining techniques in the impersonal commitment cluster will have a positive effect on behavioral intention of policy compliance.

Hypothesis 6: Attitude has a positive effect on behavioral intention of policy compliance.

Hypothesis 7: Subjective norms have a positive effect on behavioral intention of policy compliance.

## **Methodology**

### **Survey Instrument**

A survey instrument was developed and subjected to a pretest and pilot test. Several revisions were made from each phase of the testing, in order to improve instrument design and validity. This survey offered users a scenario in which they were in the part-time employment of a call-center, and the call center had recently implemented a new Acceptable Use Policy that included blocking access to social media websites. The survey then offered a scenario in which a manager utilized each of the aforementioned compliance techniques, and captured the users' intention to comply against their response to comply or circumvent the policy.

### **Pretest**

A pretest was conducted in order to develop and refine the survey instrument. In the pretest, 9 respondents evaluated the survey instrument. In doing so, several refinements have been made in order to account for demographic information, as well as level of education, and level of exposure to mobile technology. In the pretest, there was strong evidence that the users would simply circumvent the policy no matter what technique was used.

### **Pilot Test**

After the pretest was conducted, several revisions to the survey instrument had been made, including greater control over the response variables of users' likeliness to comply and the

technique being incorporated in the survey. The pilot test included 11 responses, and offered direction for future results, including the same results that users would simply circumvent the policy. The final instrument is included in the appendix.

### **Subjects and Procedure**

The subjects for this research are undergraduate and graduate students at a regional U.S. university. Students at any level of their degree program were invited to respond, along with their demographic information. The demographic analysis was conducted on the basis of education level (some college, completed bachelors, completed masters, etc), age, and gender.

### **Measurement**

A measure of the mean and standard deviation has been used to identify the relationships between users' likeliness of compliance and the technique being employed. In order to capture more rich data, both a "high" and a "low" scenario for each technique (e.g., high reward and low reward) have been employed in order to further understand if a user would be more likely to respond to a higher reward/punishment scenario verses a lower reward/punishment scenario.

## **Results**

A survey of 61 users was completed. From the data, seven of the surveys were not completed, and as such, had to be discarded. The demographics included 35 respondents from 18 to 25 years of age, 19 respondents from 26 to 34 years of age, and 6 respondents over the age of 35. The gender split of the data is 28 male, and 32 female. On education, 54 respondents had completed at least some college, while six had either completed or were in the process of graduate degrees.

User compliance was measured on a 7-point Likert scale, where lower numbers mean lower compliance (extremely resistant), higher numbers mean higher compliance (extremely

accepting, and 4 meaning neutral to the policy. From the pretest and the pilot test, the data hinted that users would simply reject the policy in the survey, as well as circumvent the policy if managers were not subjected to the policy. After collecting the full data, a two sample t-test was used to assess if the compliance activities had any measurable effect from the users intention to comply with the policy. The user's intention to comply without using any technique (i.e., the base case) was averaged from two questions, giving a mean of 2.59. Therefore, each technique's compliance value is compared with this base value. As noted before, each technique was assessed using both a low and high compliance scenario to assess the effect these techniques have on the user's intention. Presented below in Table 2 are the t-test results on the effectiveness of these techniques. For ease of interpretation, the techniques and subjective norm are presented in descending order of effectiveness.

**Table 2. Effectiveness of the Compliance Techniques**

<b>Column1</b>	<b>Cluster</b>	<b>Mean</b>	<b>t-value</b>	<b>P-Value</b>
Promise-high	1	5.33	9.7	<.00001
Promise-low	1	5.12	9.19	<.00001
Pre-giving-high	1	5.22	8.96	<.00001
Altercastingpositive-high	4	4.73	8.1	<.00001
Esteem-high (positive)	4	5	8.03	<.00001
Esteem-low (positive)	4	4.73	7.97	<.00001
Pre-giving-low	1	4.82	7.57	<.00001
Liking-high	1	4.78	7.39	<.00001
Altruism-high	5	4.73	7.31	<.00001
Liking-low (	1	4.45	6.78	<.00001
Altruism-low	5	4.39	6.66	<.00001
Altercasting (negative)-low	4	4.22	5.92	<.00001
Self-feeling (positive)-low	4	4.22	5.79	<.00001
Moral Appeal-high	4	4.12	5.5	<.00001
Threat-low	2	4.12	4.92	<.00001
Debt-low	5	4.04	4.89	<.00001
Self-feeling (positive)-high	4	3.96	4.82	<.00001
Expertise(positive)-high	3	3.9	4.43	<.00001
Moral Appeal-low	4	3.82	4.38	<.00001

Self-feeling (negative)-high	4	3.98	4.17	<.00001
Debt-high	5	3.73	4.01	<.00001
Expertise (negative)-low	3	3.65	3.63	<.00001
<b>Social Norm</b>		3.59	3.12	<.00001
Altercasting (negative)-low	4	3.51	2.97	<.00001
Expertise(negative)-high	3	3.53	2.95	<.00001
Expertise (positive)-low	3	3.45	2.87	<.00001
Self-feeling (negative)-low	4	3.29	2.33	0.022
Altercasting (positive)-high	4	3.12	1.85	0.067
Threat-high	2	3.16	1.79	0.076
Esteem (negative)-low	4	3.08	1.69	0.095
Esteem (negative)-high	4	2.71	0.4	0.69
Adverse Stimulation-low	2	1.73	-2.76	<.00001
Adverse Stimulation-high	2	1.73	-3.14	<.00001

## Discussion

From the results, it is evident that the most statistically significant cluster is that of Cluster I, or rewarding activities. The important thing to take away here is that all six of the tested high and low rewarding activities were ranked in the top 11 statistically significant results. The implication of this result is that managers can adapt their strategy in order gain user acceptance. What if the manager promised not to threaten?

Interestingly, Cluster 2, which is punishing activities, goes against the hypotheses, in that it causes users to reject the policy changes. Or in simpler terms, they'd circumvent the policy with their own mobile devices if they were faced with either a situation which activates adverse stimulation, or that of a threat from a manager.

Of the remaining clusters: expertise, activation of impersonal commitments, and activation of personal commitments were found to be interspersed between each other in terms of gaining user compliance. This may be due to the nature of cluster 4, which incorporates more activities than the other clusters, or it may be a result of a clearly defined strategy that works,

such as rewarding activities, and a clearly defined strategy that doesn't work, such as punishing activities.

The most significant contribution of this research is the fact that fifteen of the sixteen activities identified showed statistically significant results in either a moderate usage of the technique (low) or a more explicit usage of the technique (high). The one technique that did not show any compliance effect was the usage of negative esteem. On the other hand, adverse stimulation reduced compliance. In conclusion, the results support hypothesis 1, 3, 4, 5, and 7. Hypothesis 2 was found to have the opposite effect.

### **Future Direction**

Given the strong evidence that suggests that users will simply circumvent the policy with their own mobile devices, this research offers insights into compliance gaining techniques. Further research should examine these techniques in more detail and with different scenarios. Such research is timely for management when compliance is difficult to enforce in open in age of Web 2.0 technologies and social media.

### **Limitations**

This study is not without limitations. The data has been collected from a student population at a single university. The average age range captured was strongly towards the 18-25 demographics, which have had more exposure to social networking than other demographics, simply due to the age of social networking. As such, a study that captures the full gamut of age ranges could offer better insights. This isn't to say that the results are insignificant, given the scenario of a part time worker at a call center, which offers a realistic scenario to any student seeking supplemental income.



The survey instrument had to be developed by the authors and may require further validation. It has been executed on a population once, and as it needs to be checked for reliability and replicability. Furthermore, the instrument needs to include a control for users who have very little experience with mobile technologies.

## **Conclusions**

Policy compliance is an important concern for IS managers. With new technologies, smart devices and social media, it has become increasingly possible for users to circumvent IS policy. This research therefore attempted to assess the efficacy of various compliance techniques. Two theories from psychology and sociology: the theories of *planned behavior* and *compliance-gaining techniques* were been identified to develop a research model to assess user compliance to any changes in a policy revision. Sixteen techniques and the effect of subjective norm were assessed. Most techniques were effective in compliance. However, the reward-based techniques were more effective and the punishment based techniques less effective. In fact, some high punishment techniques had the opposite effect of reducing compliance. These results are useful for both researchers and practitioners. The practitioners, armed with these results, can carefully select compliance techniques in their organization. Researchers need to further examine these techniques for a deeper understanding and a contextual examination.

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## Appendix

### Survey Instrument

Scenario: You work part-time as a call center representative at a local call center whose pay is based on commission, with a computer that has access to social media websites including Twitter, Facebook, and Pinterest. Up until today, the acceptable use policy of the network allowed you to use these resources to your best judgment. Today, management is suggesting a change to the policy to block these websites because of too much lost productivity. With the policy being changed, it is still possible to access these websites via a mobile device such your personal iPad or smartphone.

Each of the scenarios listed below should be taken independently of each other, in order to measure your reaction.

On a scale of 1 to 7, 1 being extremely unlikely and 7 being extremely likely, please indicate your reaction, given the following situations.

1. You will comply with the policy.
2. You plan on using a mobile device to circumvent the policy.
3. Several other co-workers plan on bringing in their own devices to get around the policy, so you will as well.
4. Several other co-workers are searching for other jobs, and you will as well.

On a scale of 1 to 7, 1 being extremely resistant and 7 being extremely accepting, please indicate your reaction to the policy given each of these situations.

1. The managers aren't subjected to the policy.
2. The policy is changed without any notice.
3. The company had mentioned briefly before that the policy would be changed, but solicited no input from you or any other users.
4. Management offers a \$25 gift card if your productivity increases after the policy change.
5. Management offers a \$200 gift card if your productivity increases after the policy is implemented.
6. If you are caught circumventing the policy with a mobile device, then you could be reprimanded.
7. If you are caught circumventing the policy with a mobile device, then you will be fired.
8. The managers offer the following reason for the policy change, "Since you won't be distracted any longer, your quota and thus commission will go up."
9. The following reason given for the change is "This policy will passively increase your sales since you won't have this distraction."
10. Management says, "If you stay on these websites, you will make no sales, and thus we have no reason to be here."
11. Management says, "If you stay on these websites, you have more important things to do than work here, and will be fired."

12. Your manager approaches you personally, and says, “You’ve been really good with your sales, and, I think you could be even better if we focused entirely on that.”
13. Your manager approaches you personally, and says, “You’ve been really good with your sales, you’re a terrific person with a great personality. I think if you really apply yourself and not spend so much time facebooking, you could move up in this organization.”
14. Your commission is raised by 2% as an incentive to stay off of your mobile devices.
15. Your commission is raised by 10% as an incentive to stay off of a personal mobile device.
16. The manager asks to view your profiles on the social media sites, to see if there are timestamps matching up with working hours.
17. The manager asks for your password to social media sites, in order to monitor your usage without incurring I.T. expenses.
18. The manager speaks with you and mentions, “Hey, you know I looked the other way when you were doing this. Do me this favor and just tone down the tweeting.”
19. The manager is a close friend of yours. They mention “Hey, I helped get you this job. I think you owe it to me so we both don’t look bad.”
20. The company equates using these sites to the same as time theft.
21. One of your coworkers spends a disproportionate time on Facebook. A fellow college notices and mentions, and that every hour they are not working, they have stolen resources from the company.
22. Management mentions that you’ll feel better about your work if you stay on task.
23. Management mentions that you’ll feel better about yourself and your work and can apply the increased productivity skills to future job prospects.
24. A manager mentions that you will have to have a talk about the company policy if you’re caught circumventing the policy with a mobile device.
25. A manager mentions that, “getting fired isn’t the best feeling in the world” if you’re caught circumventing the policy.
26. The company uses George, who has the #1 sales record, as an example of what can happen if you stay on task.
27. A manager approaches you and says that they believe in you, and that you can break the sales record, especially after this policy change, and it will reflect positively on you.
28. A manager mentions to you that only bad employees would try to circumvent the policy.
29. A manager mentions that previously employees who had been fired had tried to get around company policies.
30. A manager mentions that they had looked the other way when you were on Facebook on the company computer before, and that, maybe as a personal favor, you could try not to go around the policy for them.
31. A manager who recommended you for the job has looked the other way when you were using company time with Twitter, and that as a personal favor, given that they helped get you the job, you could try not to go around the policy for them.
32. The company has implemented a “Sales person of the week” program, and the person following the policy gets special recognition.
33. The company has implemented a rolling “Sales person of the week” program wherein if the person continues to get the “person of the week,” a rolling bonus is given.
34. The company has started to display everyone’s sales on a whiteboard, highlighting the people following the policy.

35. The company has started to display everyone's sales on a whiteboard, highlighting the people not following the policy, and potential layoffs could result.

#### Demographics

Please indicate your age:

Please indicate your gender:

Please indicate your level of education (ie: freshman, sophomore, graduate student):

## **PROMPTED REFLECTIONS IN LEADERSHIP CLASSES: PICTURE THIS!**

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### **ABSTRACT**

Today's corporate world is constantly changing and adapting to new technology. If the "real-world" is constantly changing; what do college students need to be effective employees? One of the skills that employers are always looking for in a new hire is the ability to communicate. Developing students to be effective communicators is needed in the workplace as many of these students will be communicating with their co-workers, clients, and teammates every day. Therefore, college students (potential employees) need practice in written and oral communication while in school. So what activities can be created for classrooms that will help students in the future? In a team taught foundational leadership course, our strategy was to incorporate a reflection assignment on various components of the course.

### **REFLECTIVE WRITING MODELS**

Existing literature points to numerous ways that experiential learning can be assessed. The National Society for Experiential Education suggests that all good experiential learning (regardless of the type of activity) share the same principles [6]. These include:

- 1. *Intention***
- 2. *Preparedness***
- 3. *Authenticity***
- 4. *Reflection***
- 5. *Orientation & Training***
- 6. *Monitoring and Continuous Improvement***
- 7. *Assessment and Evaluation***
- 8. *Acknowledgement***

These principles are reflected in most of the literature dedicated to this subject. Our approach was informed by several of the specific techniques that have proven to be highly effective in not only helping students to have a better recall of an experience, but in giving them the ability to reflect on what they learned from that experience. In this section, we briefly discuss various models for assigning and assessing experiential learning exercises.

#### **Lower to Higher Level Reflection**

Lower to higher reflection follows Bloom's Taxonomy in that it provides specific questions that parallel each of Bloom's critical factors (i.e. Remembering, Understanding, Applying,

Analyzing, Evaluating, and Creating) [3]. These questions are asked after the student is exposed to an event or has been involved in some sort of experiential learning exercise [6]. The following table shows how specific questions can prompt students to focus on a deeper understanding of what they have experienced.

<b>Bloom's Taxonomy</b>	<b>Reflection Prompts</b>
<i>Remembering</i>	What did I experience? How was I involved?
<i>Understanding</i>	Did the situation reveal something about me? Did it expose my strengths & weaknesses?
<i>Applying</i>	How did the experience apply to course material? How can I apply the learning to other situations?
<i>Analyzing</i>	What did I learn from the experience? How did I learn it?
<i>Evaluating</i>	How important was the experience? Did it challenge my prior understanding of the situation?
<i>Creating</i>	In what way will I use this learning? How will this experience influence my future behavior?

### **Open Learner Model (OLM)**

An Open Learner Model suggests that students can learn from their peers by being involved in group work and by being exposed to other students learning models [4]. In this situation, learners can start to reflect on their experience earlier in the process and improve their ability to better discuss and express what they learned. The main objective of this model is to increase collaboration among students and allow them to organize and express their learning through reflections. It provides both the instructor and students a better understanding of various perspectives that each group member can bring to the team experience. Perhaps the biggest benefit of applying this methodology is that it forces students to begin reflecting immediately after each experience rather than waiting until the end of the semester.

We felt that this model helped us design our work groups so that each student could individually reflect on an experience that he/she has shared with other group members. This method was also of interest to us because it fit within the framework in which we planned to solicit student reflections. For example, domain-specific prompts can be designed in such a way as to allow students to reflect soon after the experience rather than later in the semester. The added value being the ease with which students' written reflections can be evaluated immediately after they are received. The model also allows for comparing students' learning within certain groups such as teams, subgroups, or the entire class. The methodology also calls for a proprietary piece of software that provides (what the authors refer to as) OLMlets. The system is designed to

anonymously make student models (work) available to other students in the class. We managed to use the available course management software to perform the same function.

### 4Rs Model

The 4Rs Model for Reflective Thinking is a modification of Bloom’s Taxonomy model that suggests that while students can report on what they learned from an experience; they should also be able to reconstruct and relate to what they learned from the experience for a future event [2] [5]. The 4Rs model argues that the level of reflective thinking can follow a hierarchy from Reporting to Relating to Reasoning to Reconstructing. The following table shows how different prompts can help students along these stages.

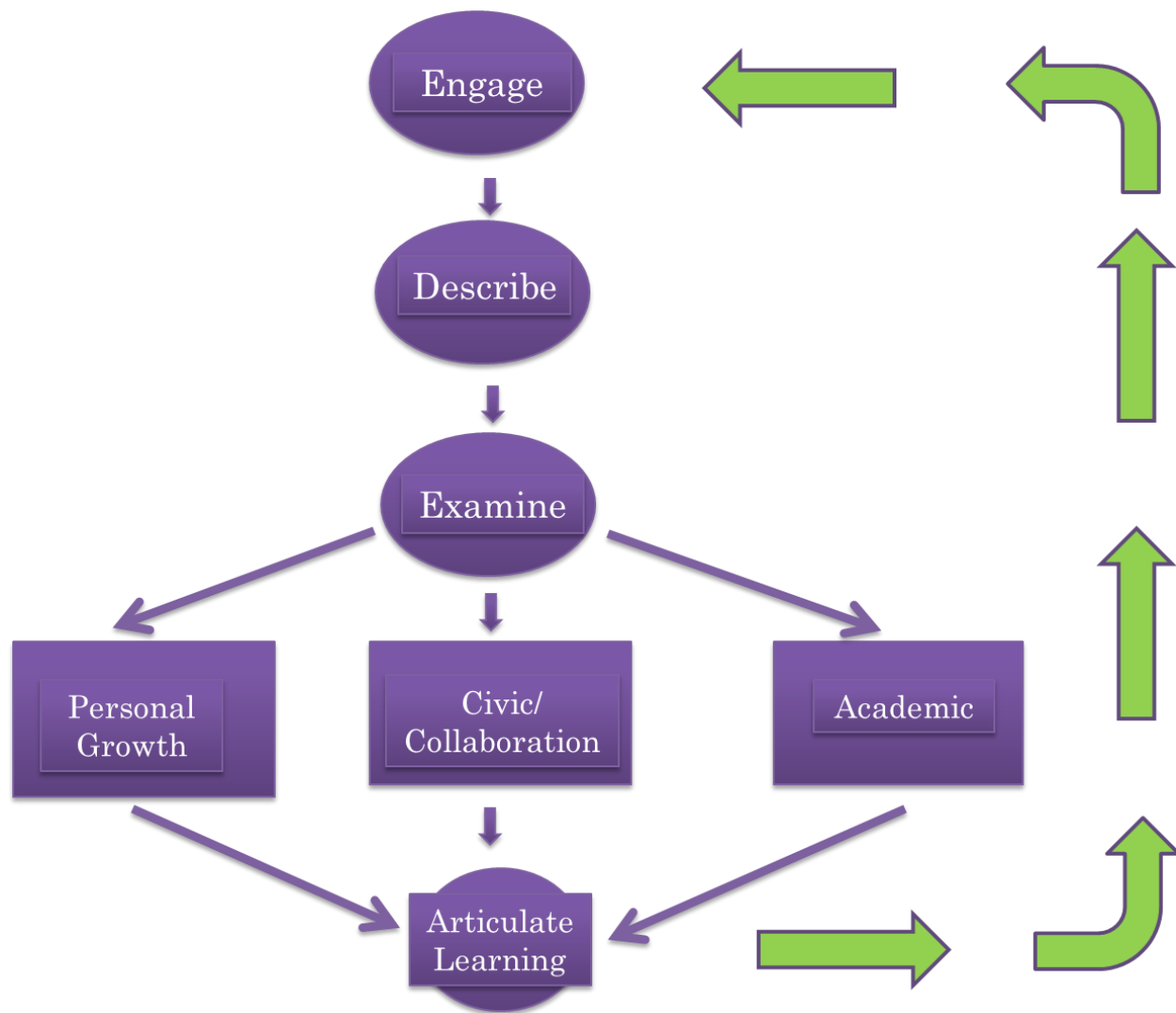
Level	Stage	Sample Prompts
1	<b>Reporting</b>	What’s the best way to reflect on my experience? Can I capture the moment in images or words?
2	<b>Relating</b>	Have I experienced something like this before? What were the similarities and differences with past experiences?
3	<b>Reasoning</b>	What were the significant factors in my experience? How does it fit within the framework of the course?
4	<b>Reconstructing</b>	What would I do differently if faced with the same situation? Can I come up with new ideas for future situations?

### DEAL Model

The DEAL Model is another approach to critical reflection. It was originally developed to be utilized in service learning reflection but is utilized in many pedagogies like K-12, undergraduate and graduate curricula [1]. According to Ash and Clayton, “The DEAL model consists of three sequential steps:

1. **D**escription of the experiences in an objective and detailed manner;
2. **E**xamination of those experiences in light of specific learning goals or objectives; and
3. **A**rticulation of **L**earning, including goals for future action that can then be taken forward into the next experience for improved practice and further refinement of learning [1].”





The first step of the DEAL model wants students to describe their experience. Throughout our experience, reflection starts with describing the experience. Based on the prompts given to the students, this reflection can be a very simplistic or an extremely detailed description. The DEAL model is very intentional in that the prompts ask students to reflect in a very objective and detailed manner when describing their experience [1]. Whether their experience is the place visited in a community service experience, the workplace for their internship, or the activity that was conducted in class, the “description” step prompts students to discuss when, where, who, and what they saw or heard during their experience.

The second step of the DEAL model wants students to examine their experience. The creators/designers of the DEAL model are very specific; they want students to move beyond the initial summary of their experience. In order to help develop the reflection, the DEAL model also incorporates the idea that reflection needs to be examined on three different perspectives: personal growth, civic (collaboration), and academic [1]. We were attracted to this choice of

model because of the additional perspectives of reflection. The additional perspectives offered us an opportunity to think creatively in designing prompts related to these areas. For example, one of our prompts under “personal growth” was:

*During the course, you analyzed your strengths and areas of improvement using many different assessment tools. Recall and reflect on those strengths and areas of improvement. Include in your reflection, your plans to improve your leadership skills.*

A prompt in our course under “civic or collaboration” was:

*We had many team activities during this course. Reflect on a decision that required successful negotiation within a team or with other teams.*

A prompt in our course under “academic” was:

*Briefly discuss 3 key points that you learned from the Disney Institute Leadership workshop and describe 2 specific examples that you observed that exemplified these key points. Perhaps you observed a situation that did not exemplify the key themes discussed – feel free to describe that situation as well.*

The third step of the DEAL model wants students to articulate their learning. Students are asked to critically think: What did I learn from this experience or why was this experience important [1]. The third step of the model provides the depth that most instructors are looking for in reflection, but maybe not getting. It requires students to spend time reflecting on the experience and how it impacted his/her life.

The general structure of the DEAL model lends itself to be utilized online (blogs, etc), in oral communication, or in a written journal. We decided to use this model as the basis of the design of the assignment and the reflection prompts; however, we also added an additional component. We wanted the students to connect the “visual” with the “reflection”; therefore, we designed a photo reflection assignment to be used in their Intensive Learning course “*Basic Leadership Practices*”.

## **PHOTO REFLECTION ASSIGNMENT**

In our Intensive Learning (IL) course “*Basic Leadership Practices*”, we covered foundational material on leadership practices during the first two weeks. We discussed concepts like leadership characteristics, behaviors, motivation, influencing, communication, and teamwork. Travel to Disney World was incorporated into the course and students spent two days in a “Disney Excellence” workshop. A creative assignment was needed that allowed students to reflect on their experiences in the classroom, as well as their experiences during their travels.

For the first attempt at the photo reflection journal, we designed the reflection prompts to incorporate the three perspectives: personal growth, civic/collaboration, and academic. Only 5 reflective prompts required the students to include a photo that illustrated their point and at least 3 of the reflective prompts had to be based on experiences during their travels. *See Appendix A for the Final Reflections assignment in Basic Leadership Practices course.*

The goals of the assignment were (1) to work on written communication, (2) for students to connect the learning that is done when utilizing experiential learning activities, and (3) for students to connect the visual with the learning during the course. As instructors, we realize that communication is essential for the students and want to practice written communication in a very applied learning environment. In this experiential learning course, the students were required to learn many concepts/theories on their own outside of class, so that we could do more hands-on activities in the classroom. Therefore, an assignment that could get students to reflect on the experiential activities and connect to the learning taking place was needed. In addition to the reflection, we wanted the assignment to tap into their creativity. Given that students today are always taking photos of their experiences, we thought the addition of a photo or illustration would require the students to give their reflections more time and consideration. The activity also would require a little planning on their part.

The strength of the assignment was that it required the students to make a lot of connections throughout the course on the material and from a more personal perspective as well. It also required us (as instructors) to spend time determining what was important for the students to “take-away” from the course. We found that students who experience something will remember it much more effectively than students who simply memorize a concept or a theory. However, the problem with most experiential activities is that the instructors are unaware if the activities really meet the purpose without some type of feedback. Therefore, to solve this problem, the reflection assignment was an ideal assessment.

Because the assignment was a newly created one for this one course, there were a few challenges in implementing the assignment. The assignment was finalized and distributed at the beginning of week 2 of the 3-week course. Students were challenged by the time constraints. They only had the last half of the course to complete the assignment and get illustrations. It would have helped the students to utilize the whole course for illustration opportunities. To help mitigate this challenge, the assignment only required five illustrations instead of the original ten. The other challenge for the instructors was to read and grade 250 reflections in a few days, because the assignment was due at the end of the course. In the future, we plan to hand out the reflection assignment on the first day of the three week course so the students have more time to consider and plan the illustrations for their reflections. There is also the option to consider making the reflection prompts due throughout the course to eliminate so many reflections due at one time.

### *Courses utilizing similar assignment*

We really enjoyed reading this photo reflection assignment from our IL Leadership course. Since this assignment was originally designed, the photo reflection assignment has been adapted to be utilized in the Advanced Leadership course and in a general education capstone course.

In the Advanced Leadership course, the photo reflection assignment is distributed as part of the syllabus on day one and the student has the option to complete it over the course and turn it in as one final product or they can upload the journal reflections during the course at certain points during the semester. The reflection prompts are similar to the other leadership course, but require students to draw from all their leadership experiences (other courses and outside the course). The other difference is that all reflection prompts include an illustration. *See Appendix B for the Photo Reflection Journal Assignment in Advanced Leadership course.*

INQ 300 is a general education capstone course that is taught by faculty across disciplines. The course goals are to work on written and oral communication and teamwork. Each course addresses a contemporary issue and requires students to work on a team project to provide a solution to the contemporary issue. The INQ 300 course was titled “Making Life Count”. It provided students the opportunity to explore how to make their life count and how they might measure success. It also included a service learning project that required reflection.

In the design of the photo reflection assignment for this course, the reflection prompts were posted on-line once a week and the students had to respond within the week by uploading their reflection to the course site. The reflections in this course were tied less to mastery of the material and were more personal in nature. The design of the assignment due each week allowed the grading of the assignment to be stretched over the semester instead of concentrated into a few days. It also allowed for the prompts to be written as the course was taught instead of entirely at the beginning with no adjustments for the class. Lastly, it allowed for feedback on the reflections from the instructor. The instructor felt like she got to know her students better on a more personal level and connected with them and what was going on in their lives. Having the prompts due each week is certainly a way to consider helping handle the grading challenge of the original assignment. Even with the challenges, the expansion of the original photo reflection assignment to other classes is a testimony of how much the assignment was enjoyed. *See Appendix C for the Photo Reflection Journal Assignment in INQ 300 – Making Life Count course.*

## CONCLUSION

### Challenges

There were a few challenges in implementing this type of experiential learning assignment and in the assessment of the results. Some of the challenges were:

- Creating the appropriate set of prompts to guide reflections.
- Designing meaningful exercises that can be captured both in words and images.
- Collecting and compiling student reflections, especially ones requiring digital submission.
- Evaluating student work and judging the quality of reports and reflections.
- Assessing the effectiveness of such methodology as compared to other traditional techniques.

With a little time and planning by the instructors, most of these challenges can be mitigated. Instructors may also need to be flexible on the format of submission depending on the course management software.

### Rewards

Although we faced many challenges in incorporating this methodology in our classroom, we feel that the benefits of this method have far outweighed the drawbacks. Some of the benefits included:

- Level of student excitement and buy-in.
- Improved quality of the reflections in terms of depth and relevance to course material.
- Natural extension of student's social interaction.
- Depicting events and experiences and being able to recall and reflect on them.
- Uniformity in student reflections making them easy to compare and contrast.
- Ease of grading and evaluating student work.

We enjoyed designing this assignment for our leadership course and look forward to the opportunity to review and refine the assignment for the next course.

## Appendix A

### IL 277: Basic Leadership Practices Final Reflections

The final reflection for *Basic Leadership Practices* is a series of reflections on the course. There are 10 guided reflection prompts listed below.

- *At least 5* of the reflective prompts should also *include a photo* that illustrates the point.
- *At least 3* of the reflective prompts should be based on experiences during our *travels to Disney World*.

Of the 10 reflection prompts,

- *at least 2* reflections should reflect on improving your *knowledge of the academic concepts* we discussed during the course;
- *at least 2* reflections should examine *your personal growth* during the course, and
- *at least 2* reflections should examine the *development of your team interaction skills*.

Length of reflections – at least ½ page (1.15 spacing)

***Due: Monday, June 4<sup>th</sup> at noon (submitted electronically)***

#### **Reflection prompts**

1. Recall and reflect on one moment that influenced your approach to leadership the most during the course.
2. During the course, you analyzed your strengths and areas of improvement using many different assessment tools. Recall and reflect on those strengths and areas of improvement. Include in your reflection, your plans to improve your leadership skills.
3. Recall and reflect on one occasion that you had to utilize one of your Big Five Personality traits during the course.
4. Provide an example of a leader that you felt was very task-oriented and explain your assessment. Also, provide an example of a leader that you felt was very relationship-oriented and explain your assessment.
5. Recall a decision that you had to make personally or as a team member. Describe what motivated you to make that decision.
6. We all agree that communication is a key trait for an effective leader. Reflect on a moment that effective communication was critical to a team decision or team outcome.
7. We had many team activities during this course. Reflect on a decision that required successful negotiation within a team or with other teams.
8. Reflect on an occasion during the course that team synergy was exemplified.
9. To what extent has your perceptions of leadership changed during this course and provide examples of those changes.
10. Briefly discuss 3 key points that you learned from the Disney Institute Leadership workshop and describe 2 specific examples that you observed that exemplified these key points. Perhaps you observed a situation that did not exemplify the key themes discussed – feel free to describe that situation as well.

Critical reflection using the DEAL Model:

**Describe** experience objectively: What? Where? Who? When? Why?

**Examine** experience per the prompt.

**Articulate Learning:** What did I learn? How did I learn it? Why is it important? What will I do because of it?

## Appendix B

### Photo Reflection Journal Advanced Leadership

The photo reflection journal consists of 10 guided reflection prompts on the leadership concentration. Each reflection should include a photo illustrating the reflection and a  $\frac{3}{4}$  of a page written reflection.

Of the 10 reflection prompts,

- *At least 2 reflections* should reflect on improving your *knowledge of the academic concepts* we discussed during the concentration,
- *At least 2 reflections* should examine *your personal growth* during the concentration, and
- *At least 2 reflections* should examine the *development of your team interaction skills*.

**Length of reflections – at least  $\frac{3}{4}$  of a page written with photo (line spacing 1.15)**

#### Reflection prompts

1. Recall and reflect on one moment that influenced your approach to leadership.
2. Recall a decision that you had to make personally or as a team member. Describe what motivated you to make that decision.
3. We all agree that communication is a key trait for an effective leader. Reflect on a moment that effective communication was critical to a team decision or team outcome.
4. – 8. Choose and briefly discuss 5 key qualities from *The 21 Indispensable Qualities of a Leader* that you learned and reflect on whether you have this quality or comment on how you want to work on this quality. (each quality discussed should be an individual prompt)
9. Being an ethical person is a cornerstone to good leadership. Reflect on what you learned about ethical leaders and what you can utilize in your leadership.
10. To what extent has your perceptions of leadership changed during your coursework and provide examples of those changes.

Critical reflection using the DEAL Model:

**Describe** experience objectively: What? Where? Who? When? Why?

**Examine** experience per the prompt.

**Articulate Learning:** What did I learn? How did I learn it? Why is it important? What will I do because of it?

***Photo Reflection Journal due by April 22<sup>nd</sup>.***

## Appendix C

### INQ 300: Photo Reflection Journal

The photo reflection journal consists of 10 guided reflection prompts on the course. Each reflection should include a photo illustrating the reflection and a  $\frac{3}{4}$  of a page written reflection.

Of the 10 reflection prompts,

- *At least 2 reflections* should reflect on improving your *knowledge of the academic concepts* we discussed during the course,
- *At least 2 reflections* should examine *your personal growth* during the course, and
- *At least 2 reflections* should examine your *civic perspective*.

**Length of reflections – at least  $\frac{3}{4}$  of a page written with photo**

#### Reflection Prompts:

1. Reflect on what you think makes life fulfilling. Comment on the need of material wealth.
2. Recall and reflect on 2 concepts you learned in previous INQ courses that you think will help you in this capstone course.
3. Does a person's attitude contribute to a successful person? Include in your reflection a person you think has a personal attitude you would want to see reflected in others. What about their attitude makes it worth seeing in others?
4. In Maxwell's book, he discusses the Law of Awareness. Reflect on what you would like to do in life. Have you discovered your passion?
5. According to Maxwell in his discussion of the Law of the Ladder, he says we should follow the Golden Rule - People Matter. Reflect on a volunteer experience in your life - what was the experience? Did you learn from it? Was it a positive experience?
6. We watched a short video in class on Wednesday about the FISH philosophy. Reflect on what you learned and discuss your take away to apply to your life.
7. Before the age of television and computers, people entertained themselves largely by reading, telling stories, playing music, chatting and doing things outside. If you had to stop watching TV and stop using the internet for one month, how would you fill your time? Would you miss TV terribly, or would you welcome the break?
8. Dr. Martin Luther King, Jr. once said, "Everyone has the power for greatness, not for fame, but greatness, because greatness is determined by service." Do you agree that everyone has the potential for greatness? Maybe you think serving others isn't what makes someone great; if that's the case, what do you think are the qualifying features of greatness?
9. Suppose you win \$10 million in the lottery, but there's a catch: You have to donate half of the money to charity. What charity would you choose? What would you do with the money you got to keep?
10. YOU'RE ALMOST THERE!

What are you looking forward to this week, this month, or this summer? Once you graduate from college? Write about what you're looking forward to in the short term and in the long term.



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## **EVALUATION OF FIRST YEAR EXPERIENCE PROGRAM AT GEORGIA SOUTHERN UNIVERSITY**

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### **ABSTRACT**

To increase the retention rate, Georgia Southern University launched the First-Year Experience (FYE) program which introduced two mandatory courses in 2008 (FYE 1220: First-Year Seminar, and FYE 1410: Global Citizens). This study evaluates the impact of these courses on academic performance of students majoring in information technology (IT). The result indicates that the mandatory courses are more associated with grade point average (GPA) or academic success than other courses.

### **INTRODUCTION**

At Georgia Southern University, about 20% of freshmen left school at the end of the first year, and less than half eventually graduate. The financial costs of college dropout to individuals, states, and the federal government are tremendous (Grumke, 2011). The intangible costs to the students' lives are immeasurable (Damast, 2012). Universities worldwide invested tremendous amount of effort in implementing prevention programs, such as peer mentoring (Terrion & Leonard, 2007), curriculum development (Taylor, 2005), one-on-one counseling (Kadar, 2001), intrusive advising (Erwin, 1997), workshops or seminars (Raymondo, 2003).

### **INTEGRATION THEORY ON RETENTION RATE**

Researchers claim that retention rate is determined by how well students integrated into school environment socially and academically (Wolniak, Mayhew, & Engberg, 2012; Tinto & Cullen, 1973, Pascarella & Terenzini, 1983). Figure 1 is Tinto's integration model. Many empirical studies supported the integration theory (Pascarella & Terenzini, 1983; Caison, 2007).

### **THEORITICAL FRAMEWORK OF THIS RESEARCH**

Our theoretical framework is based on Tinto's integration theory. This study proposes that two mandatory courses facilitate social and academic integration of students into school and community, and ultimately deliver positively impact on academic performance. Figure 2 illustrates the proposed framework.

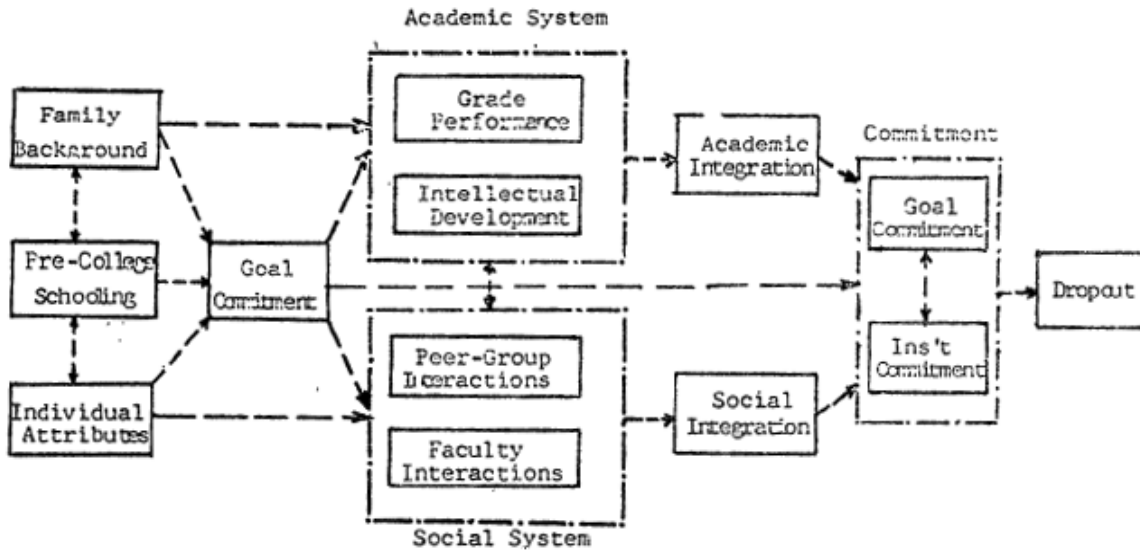


Figure 1: A Conceptual Schema of the College Dropout Process  
 Source: Tinto & Cullen, 1973:42.

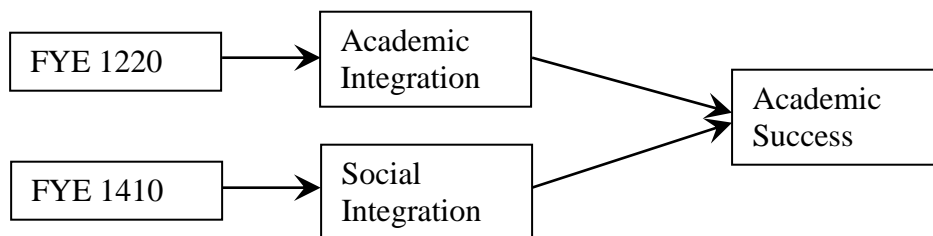


Figure 2: Proposed Theoretical Framework

## TWO COURSES FOCUSE ON INTEGRATION

In an effort to increase the retention rate, Georgia Southern University launched FYE program which includes two mandatory courses (FYE 1220: First-Year Seminar, and FYE 1410: Global Citizens), conversations with professors, early alert/midterm grades, intrusive academic advising, and limited number of withdrawals. This study focuses on two mandatory courses. FYE 1220 is designed to facilitate academic integration, that is, to help students integrated into the university environment. FYE 1410 is designed for social integration which helps students socially engaged in local and global communities. According to Tinto's integration theory, these two courses should provide positive impact on academic success through facilitating social and academic integration.

FYE 1220 First-Year Seminar is a two-credit-hour seminar that serves as an academic, theme-based introduction to college-level inquiry and extends the orientation process into a student's first semester at Georgia Southern.

Catalog Description:

Thematic seminar designed to promote information literacy skills and support students' cognitive and affective integration into the university community. Required during the first semester for all students new to the university (except for transfer students with 30 hours or more); students may not withdraw.

FYE 1410 Global Citizens is a one-credit hour course and is recommended to be taken in second semester after taking FYE 1220. Students will identify major themes across diverse societies in their historical and cultural contexts and will apply this knowledge through engagement in local and global communities.

Catalog Description:

Graduates in all fields face many challenges in today's world that require the ability to think and engage globally. Doing so requires recognizing that different cultural perspectives influence the understanding of world issues. In this seminar, students explain factors that contribute to their cultural perspective, apply multiple cultural perspectives to global issues, and then apply this knowledge through engagement with local communities or problems. Faculty from across the university design courses drawing on examples from their disciplines, and students are encouraged to select sections offered by faculty in their fields or potential fields. In preparation for subsequent coursework as upper-class students, first-year students enroll in this course in their second semester. Prerequisite(s): FYE 1220

### **OBJECTIVE OF THE STUDY**

This study is to evaluate the impact of two mandatory courses on academic success of students majoring in information technology. Academic success is measured by GPA. The level of impact is measured by degree of correlation between course performance and GPA. The hypotheses of this research are:

- The correlation between FYE 1220 grade with GPA is higher than the correlations of other course grades with GPA.
- The correlation between FYE 1410 grade with GPA is higher than the correlations of other course grades with GPA.

### **DESCRIPTIONS OF OTHER FOUR FIRST-YEAR COURSES**

Four first-year courses are selected to make the comparison. ENGL 1101 and MATH 1111 are general study courses. IT1130 and IT1430 are freshmen level IT courses.

#### **ENGL 1101 Composition I:**

A composition course focusing on skills required for effective writing in a variety of contexts, with emphasis on exposition, analysis, and argumentation, and also including introductory use of a variety of research skills.

### **MATH 1111 College Algebra**

A functional approach to algebra that incorporates mathematical modeling of real data, business applications and use of appropriate technology. Emphasis will be placed on the study of linear, quadratic, piece-wise defined, rational, polynomial, exponential and logarithmic functions. Credit cannot be earned toward graduation for MATH 1101 if credit is earned for MATH 1111. Prerequisite(s): Two years of high school algebra or equivalent.

### **IT 1130 Introduction to Information Technology**

An introduction to IT as an academic discipline and the structure of the BS IT degree at Georgia Southern. It also provides students with an introduction to the range of applications of Information Technology, partly through an introduction to the second disciplines available to them. Finally, it introduces students to some of the techniques that they will need for later courses, in particular databases and SQL. Prerequisite(s): Familiarity with productivity tools.

### **IT 1430 Web Page Development**

A thorough introduction to the languages used to create web pages. Throughout it stresses the importance of good coding style. The course also introduces students to the principles of good human computer interface design, including design for people with disabilities. Finally, the course introduces students to object-oriented design. Prerequisite(s): Familiarity with productivity tools.

## **DATA COLLECTION**

A query similar to the example below is executed for each course with difference course= condition in WHERE clause. Two mandatory courses (FYE 1220 and FYE 1410) were launched in fall 2008, thus term >=200808 is specified in WHERE clause. Total 6 courses with 6 sets of data were extracted from the university data warehouse.

```
SELECT gpa, courseGrade
FROM main
WHERE major='IT' and course = 'FYE 1220' AND term >=200808
```

## **DATA ANALYSIS**

This study uses Pearson correlation to test dependency between course grade and GPA. The correlations of six courses are listed in Table 1.

Table 1: Correlation between Course Grade and GPA.

Course	Correlation with GPA	Sample Size
FYE1410	0.84	108
FYE1220	0.69	392
IT1430	0.63	411
IT1130	0.62	512
ENGLISH 1101	0.58	468
MATH 1111	0.58	455

## DISCUSSION

FYE1410 and FYE1220 have higher correlations with GPA than other four courses. The statistic results confirmed the hypotheses of this study. It indicates that FYE program is successful by introducing two mandatory courses. This study further validated Tinto's integration theory, that is, academic integration effect of FYE 1220 and social integration effect of FYE 1410 leads to higher academic performance.

Two IT courses have higher correlations with GPA than general study courses do. Although introduction courses are important for freshmen to stick with a program, a large percentage of undergraduate instructors uses graduate teaching assistants to teach lower level introduction courses. Moreover, the graduate teaching assistants often receive little preparation before going solo (Parrett, 1987). To increase retention rate, the effort may have to focus on training graduation teaching assistants.

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## **Creating a Business Intelligence and Analytics Schedule of Courses**

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### **Abstract**

Every University a process for the creation of a new program. Part of that process included defining the courses required by the program. The goals of the process described in this paper include: defining a body of knowledge for Business Intelligence and Analytics, converting that body of knowledge into a set of courses and limiting the additional faculty support need to teach the new program, by using as many existing courses as possible.

Business Intelligence and Analytics (BIA) as a discipline is made up of several related activities: data mining, online analytical processing, querying and reporting, statistical and quantitative analysis, exploratory and predictive models, and fact-based management to drive decisions and actions. These activities are found the Management Science, MIS and Statistics.

### **PART I: DESCRIPTION OF MAJOR**

The proposed major in Business Intelligence and Analytics is a natural extension of the existing majors in the College of Business. Most of the resources needed for the major are already in place. Existing faculty have experience in this discipline. No other school in this state offers such a degree, and the development of the major would permit state residents to study Business Intelligence and Analytics without needing to leave the state and pay higher fees and tuition. Additionally, students from nearby states who desire a high paying job may decide to enroll in the major.

#### **A. Degree Objectives**

The objectives are to prepare individuals for careers in Business Intelligence and Analytics. They will:

1. Be conversant in the BIA terminology and language;
2. Understand the information systems, analytic techniques, and the development of business models they will need to drive decision-making;
3. Demonstrate critical thinking skills and independent decision making based on relevant theory and analysis of empirical facts;
4. Communicate successfully in writing and orally, at both the individual and large-group level; and

#### **B. Program Identification**



The following is the appropriate program identification as provided in the Classifications of Instructional Programs developed and published by the U.S. Department of Education Center for Educational Statistics:

**CIP Codes: 52.1301, 52.1302, 52.0207, 52.1402, 52.1299**

**Title:** Management Science, Business Statistics, Customer Service Management, Marketing Research and Management Information Systems and Services

**Definition:** (Note: The uniqueness of this program requires cross-referencing several general CIP Codes. If only one can be used the first, 52.1299, is best: Any instructional program in Management Information Systems and Services, Other.)

### C. **Degree Features**

The major in Business Intelligence and Analytics will be the only such program in the State provided by any public or private institution. The degree will consist of 120 undergraduate credit hours designed to be completed over a four year period. The catalog description of the major will read:

***Business Intelligence and Analytics Major*** - A minimum of 36 credit hours, to include: Yet to be selected statistics course, MIS 340, MIS 360 (new Introduction to BIA course), MGT 420, MIS 444, MIS 460 (new BIA II course), MIS 476 (new BIA project course) with a focus in ACC, ECN, FIN, MGT, MKT, or MIS. Each focus areas require 9 credit hours selected from the following courses. MKT three of the following MKT courses: MKT 231, MKT 437, MKT 442 or MKT 440.

MIS three of the following MIS courses: MIS 300, MIS 310, MIS 412, or MIS 465

FIN three of the following finance and/or economics courses: FIN 343, FIN 425, ECN 423 or FIN 431

The focus areas in ACC, MGT and ECN will be described as faculty in these areas select 3 or more courses.

Students will take MGT 460 as a capstone

Descriptions of the new courses are provided in Appendix A.

### **Admission and Performance Standards**

All students must meet the standard University admission requirements and those of the College of Business. All students must maintain their performance in accordance with the policies of the University and the College of Business.

### **Degree Requirements**

Appendix B contains the Four Year Curriculum Plan Template for the BBA – Business Intelligence and Analytics degree.

#### **D. Degree Outcomes**

The following outcome measures have been established for students seeking a major in Business Intelligence and Analytics:

1. Eighty percent or more of all students admitted will successfully complete the program within five years.
2. Within six months of successful completion of the major, 90% of graduates will be employed in the field of Business Intelligence and Analytics or related areas.

#### **E. Degree Delivery**

All coursework will be offered on campus.

### **PART II: DEGREE NEED AND JUSTIFICATION**

#### **A. Relationship to Institutional Goals/Objectives**

The addition of this major in Business Intelligence and Analytics would benefit the citizens of state and the surrounding region by providing additional educational options in the area of Business Intelligence and Analytics. The Mission Statements of both the University and the College of Business commit the institution to be a contributor to the region's overall economic development. State private and public employers seek managers with training and/or experience in big data. The major in Business Intelligence and Analytics will prepare graduates to better serve these needs.

#### **B Existing Degrees**

There are no other schools in the state that offer either a major or minor in Business Intelligence and Analytics. Students with an interest in this field must travel out of state to seek their education at greater expense. Currently, a student desiring a baccalaureate degree in Business Intelligence and Analytics will have to travel to Pennsylvania, Texas, Arkansas, Arizona or Colorado. Attending an out-of-state school would require a student to relocate and pay higher levels of tuition and fees. The addition of the major in Business Intelligence and Analytics would create a cost-effective alternative for all the state, and would be attractive to students from nearby states.

#### **C. Degree Planning and Development**

The College of Business is accredited by the AACSB and currently offers majors in Accounting, Economics, Finance, International Business, Management, Management Information Systems, Marketing, and Risk Management and

Insurance. The proposed major in Business Intelligence and Analytics complements the existing offerings and provides a new dimension to the offerings. The faculty of the College has the expertise to plan and develop the Business Intelligence and Analytics major so that it makes the best use of existing resources and courses.

#### **D. Clientele and Need**

The major in Business Intelligence and Analytics is designed to prepare students for career opportunities in business intelligence and business analytics. Business intelligence and analytics in a related field of big data analytics have become increasingly important over the past two decades.

#### **E. Employment Opportunities**

The US Bureau of Labor Statistics estimates that in 2010 in the United States there were 28,200 managers working in this area. The mean annual wages for these workers is \$100,660.

An IBM tech trends report identified business analytics as one of the four major technology trends in the 2010s. A McKinsey Global Institute report predicted by 2018 the United States will face a shortage of 140,000 to 190,000 people with deep analytical skills and a shortfall of 1.5 million data savvy managers with the ability to analyze big data in making effective decisions. (Manyika, 2011)

Writing for *Business Week*, Spencer E. Ante stated, “Evangelos Simoudis, managing director of the venture capital firm Trident Capital, said that 12 of the 50 companies in his firm’s portfolio are focused on the analytics market. . . . Simoudis believes the demand for these jobs will only grow thanks to several big trends. One is the sheer data explosion. When Simoudis was working in the software business in the 1980s, he said data warehouses use to handle two terabytes of data. Today, just one small online ad network is generating 100 terabytes of data, while social network Facebook is spewing out 1.5 petabytes of data a year, or 1,500 terabytes. All those status updates and party photos consume massive amounts of data.

The second trend is that decision making has become much more performance based. Intuition is out. Metrics are in, especially in a tough economy where every dollar counts. Lastly, there has been a democratization of data. The rise of the Web and dashboard technologies is giving more and more people the ability to access data. And they want it.” (Macmillan, 2009)

#### **F. Degree Impact**

The major in Business Intelligence and Analytics will augment the existing programs in the College of Business and provide students with additional

educational choices. These courses could also be appropriate as electives for other majors outside of the College of business, such as Mathematics and Integrated Science & Technology in the College of Science and Computer Science in the College of Information Technology and Engineering. The existence of the major should attract students to Marshall University by creating a viable area of study that is not available at many institutions in the United States.

**G. Cooperative Agreements**

There are no cooperative agreements in place at this time.

**H. Alternatives to Development of the Major**

There are no alternatives to the development of this major. There are no Business Intelligence and Analytics majors offered at West Virginia colleges or at colleges in any of the contiguous states. Students wishing to pursue this field of study must leave the area at considerable personal cost. Marshall University and West Virginia should capitalize on this opportunity and exert a positive influence on the economic development and environment of the state.

## **PART III: DEGREE IMPLEMENTATION AND PROJECTED RESOURCE REQUIREMENTS**

### **A. Degree Administration**

Program administration will be provided by the Head of the Division of Management, Marketing and MIS in the College of Business. The Head will organize, administer, review, develop, and assure program effectiveness through on-going program assessment. The Head will also coordinate activities with other colleges offering courses. The faculty of the division will be responsible for the development and delivery of the courses.

### **B. Degree Projections**

Initial enrollment is presently projected to grow to 20 students per class. Assuming a 10% drop rate in both the freshman and sophomore years, the total number of majors would grow to 74 students with 34 actively involved in major-specific courses at any time. This is a conservative estimate and does not include possible students from other colleges. The five year projection of enrollment is presented in Appendix C. Details of the projections are presented in Appendix D.

### **C. Faculty Instructional Requirements**

The major in Business Intelligence and Analytics consists of one specified lower level course, six specified upper level courses, and three upper level electives. Several of these must be taught by faculty specializing in Business Intelligence and Analytics. By adjusting the way current courses are being presented this major should not require any additional faculty resources. The addition of a dedicated computer lab with dedicated servers to support the storage and analysis of large data sets will be required in the future.

### **D. Library Resources and Instructional Materials**

Library resources currently offered at the University are sufficient. No new or additional library resources will be necessary at this time.

### **E. Support Service Requirements**

No additional support services are required.

### **F. Facilities Requirements**

None

**G. Operating Resource Requirements**

None.

**H. Source of Operating Resources**

Faculty, personnel, and facility resources are the responsibility of the university. Operational funds will be derived from tuition and fees.

**PART IV: OFFERING EXISTING PROGRAMS AT NEW LOCATIONS**

Not applicable.

**PART V: DEGREE EVALUATION**

**A. Evaluation Procedures**

Evaluation is a critical component to the success of any program. Marshall University has a systematic and on-going evaluation process. All university departments must submit an annual assessment and program evaluation through the Office of Program Review and Assessment. The College of Business also conducts a continuous review process known as Assurance of Learning (AOL). The AOL process monitors the material presented in the courses and the success of students in mastering this material. Feedback is given to each discipline concerning the success of their courses, and faculty members make the changes necessary to improve the quality of instruction.

Student feedback is sought through semester student evaluations and questionnaires given to new graduates. The evaluations each semester provide information concerning the perceptions of the students as they are in the educational process while the end-of-program questionnaire allows students to give detailed comments about the entire program and its effectiveness. These inputs from students are used to adjust the course material and the way it is presented.

**B. Accreditation Status**

The College of Business is accredited by the Association to Advance Collegiate Schools of Business International (AACSB). All programs within the college are subject to continuous and rigorous review to assure that they meet the highest standards and provide quality educational opportunities for the students. The major in Business Intelligence and Analytics will dovetail with the existing degree in Management, which has already passed AACSB review. The

experience of the college, division, and faculty will ensure that the major in Business Intelligence and Analytics will meet and surpass AACSB accreditation standards.

#### **PART VI: TERMINATION OF A PROGRAM**

All program termination procedures will be guided by Marshall University policies on program termination located in the undergraduate student handbook and Marshall University's Greenbook. Any decision to terminate this program would require that sufficient coursework be taught to complete the degree for all accepted students, or arrangements be made with another institution offering a like degree to accept all students enrolled.

#### **PART VII: GUIDELINES FOR COOPERATIVE DOCTORAL PROGRAMS**

Not applicable.

## APPENDIX A

### BBA – BUSINESS INTELLIGENCE AND ANALYTICS DESCRIPTION OF COURSES

#### **1 REQUIRED LOWER LEVEL COURSES (3 HOURS)**

**Statistics** **3 hrs**  
A yet to selected statistics course..

#### **6 REQUIRED UPPER LEVEL COURSES (18 HOURS)**

**MIS 360 Introduction to Business Intelligence and Analytics** **3 hrs**  
This is a new course under development and the course title, number designator and description have not been finalized.

**MIS 340 Introduction to Database Management Systems.** **3 hrs**  
Introduction to enterprise data administration emphasizing database environment and architecture, relational model and languages, database requirements, and modeling. Introduction to the use of a database management system.

**MGT 420 Operations Management.** **3 hrs**  
Management of operation systems including system design, implementation and control. Analysis of the system in the areas of product, process, material quality, and facilities management. Topics include breakeven analysis, inventory models, transportation models, network analysis. (PR: MGT 218, MTH 203)

**MIS 444 Advanced Database Management Systems** **3 hrs**  
Enterprise database administration; issues surrounding database implementation, security, ethics, distributed databases, and advanced language features using a database management system. (PR: MIS 340)

**MIS 460 Business Intelligence and Analytics II** **3 hrs**  
This is a new course under development and the course title, number designator and description have not been finalized.

**MIS 476 Business Intelligence and Analytics Project** **ask** **3 hrs**  
This is a new course under development and the course title, number designator and description have not been finalized.

#### **3 COURSE ELECTIVES FROM ONE AREA OF CONCENTRATION (9 HOURS)**

**Finance and Economics Concentration - choose three of the following courses:**

**FIN 343 Intermediate Financial Management** **3 hrs**



Application of financial principles to corporate business problems. Computer analysis will be utilized where appropriate. (PR: FIN 323)

**FIN 425 Portfolio Analysis and Management. 3 hrs.**

Analytical procedures for valuing various financial securities and techniques for the creation and maintenance of portfolios. (PR: FIN 370)

**ECN 423 Introduction to Econometrics. 3 hrs..**

Combines economic theory with real data to obtain quantitative results for purposes of explanation and prediction. The development of useful economic models applicable to present day world problems. (PR: ECN 250, ECN 253, MGT 218, MTH 203)

**FIN 431 Futures and Options 3 hrs**

This is a new course under development and the course title, number designator and description have not been finalized.

**MIS Concentration - choose three of the following courses:**

**MIS 300 Introduction to Business Programming. 3 hrs.**

Introduction to programming in a business context, emphasizing problem solving using basic programming logic and data structures, interface concepts, file and database access, and selection and use of development tools. (PR: MIS 290)

**MIS 310 Business System Analysis and Design. 3 hrs.**

The course covers business application systems development, behavioral considerations in the development process, feasibility assessment, requirement analysis, and communication skills. Emphasis on prototyping and fourth generation languages.

**MIS 412 Enterprise Systems. 3 hrs.**

A study of cross-functional and process-oriented information systems. Topics to include business process management, supply-chain, and relationship management systems. (PR: MIS 290 or permission of COB advising office)

**MIS 465 Business Decision Support Systems. 3 hrs.**

A study of decision support systems (DSS) in terms of building and providing end-user support for managerial decision making. Advanced topics will include computer interface design and artificial intelligence.

**Marketing Concentration - choose three of the following courses:**

**MKT 231 Principles of Selling. 3 hrs.**

Elements of professional personal selling from prospecting through follow-up designed for individuals preparing for a career in sales/marketing and those desiring skills to influence, persuade, or lead others.

**MKT 437 Consumer Behavior. 3 hrs.**



APPENDIX B

BBA – BUSINESS INTELLIGENCE AND ANALYTICS (BIA)  
FOUR YEAR CURRICULUM PLAN TEMPLATE

<b>Year One</b>				
<b>Fall Semester</b>			<b>Spring Semester</b>	
MIS200 Business Computer Applications	3 hours		ECN250 Principles of Microeconomics	3 hours
Composition: ENG101 Composition (or equivalent)	3 hours		Communication: CMM207 Bus & Prof Communication	3 hours
FYS100: FYS100 First Year Seminar	3 hours		CT Designated Course	3 hours
Social Science: PSY 201 Introduction to Psychology	3 hours		GEO101 Physical Geography	4 hours
Mathematics: MTH130 (3 hrs) or MTH127 (5 hrs)	3-5 hours		Humanities:	3 hours
<b>Hours: 15-17 hours</b>			<b>Hours: 16 hours</b>	
<b>Year Two</b>				
<b>Fall Semester</b>			<b>Spring Semester</b>	
ACC215 Principles of Accounting	3 hours		ACC216 Principles of Accounting	3 hours
ECN253 Principles of Macroeconomics	3 hours		ENG204 Writing for the Workplace	3 hours
Composition: ENG201 (or equivalent, "C" or better)	3 hours		LE207 Legal Environment of Business	3 hours
Physical or Natural Science GLY 200/210L			MGT218 Management Statistics	3 hours
Physical Geology and Lab	4 hours		CT Designated Course	3 hours
CMM Studies Elective	3 hours			
<b>Hours: 16 hours</b>			<b>Hours: 15 hours</b>	
<b>Year Three</b>				
<b>Fall Semester</b>			<b>Spring Semester</b>	
MGT 219 Business Stats II	3 hours		FIN323 Principles of Finance	3 hours
MGT320 Principles of Management	3 hours		MIS 340 Database Systems	3 hours
MIS290 Principles Management Information Systems	3 hours		<b>MIS 360 Introduction to BIA</b>	<b>3 hours</b>
MKT340 Principles of Marketing	3 hours		BIA Elective	3 hours
LE308 Commercial Law	3 hours		Fine Arts	3 hours
<b>Hours: 15 hours</b>			<b>Hours: 15 hours</b>	
<b>Year Four</b>				
<b>Fall Semester</b>			<b>Spring Semester</b>	
MIS 444 Advanced Database Mgt Sys	3 hours		<b>MIS 476 BIA Project</b>	<b>3 hour</b>
LCOB International elective	3 hours		Writing Intensive : MGT460	3 hours
BIA Elective	3 hours		Strategic Management	3 hours
<b>MIS 460 BIA II</b>	<b>3 hours</b>		BIA Elective	3 hours
MGT420 Operations Management	3 hours		Free electives	4-6 hours
<b>Hours: 15 hours</b>			<b>Hours: 11-13 hours</b>	
<b>Other Requirements:</b>				
Minimum Number of Hours to Graduate: 120				
Minimum GPA to Graduate: 2.0 Marshall, College, Major				
Other: The total number of free electives depends on the number of hours the student completes in mathematics and if the student double-counts any requirements.				

APPENDIX C

BBA – BUSINESS INTELLIGENCE AND ANALYTICS  
 FIVE-YEAR PROJECTION OF ENROLLMENT

	<b>First Year (2014)</b>	<b>Second Year (2015)</b>	<b>Third Year (2016)</b>	<b>Fourth Year (2017)</b>	<b>Fifth Year (2018)</b>
<b>Number of Students Served through Course Offerings of the Program:</b>					
<b>Headcount</b>	<u>40</u>	<u>40</u>	<u>48</u>	<u>61</u>	<u>66</u>
<b>FTE</b>	<u>40</u>	<u>40</u>	<u>64</u>	<u>95</u>	<u>105</u>
<b>Number of Student Credit Hours Generated by Courses within the Program (entire academic year):</b>					
	<u>120</u>	<u>120</u>	<u>192</u>	<u>285</u>	<u>315</u>
<b>Number of Majors:</b>					
<b>Headcount</b>	<u>10</u>	<u>24</u>	<u>37</u>	<u>55</u>	<u>64</u>
<b>FTE majors</b>	<u>10</u>	<u>24</u>	<u>37</u>	<u>55</u>	<u>64</u>
<b>Number of Student Credit Hours Generated by Majors in the Program (entire academic year):</b>					
	<u>300</u>	<u>720</u>	<u>1,110</u>	<u>1,650</u>	<u>1,920</u>
<b>Number of Degrees to be Granted (annual total):</b>					
	<u>0</u>	<u>0</u>	<u>0</u>	<u>8</u>	<u>13</u>

APPENDIX D

BBA – BUSINESS INTELLIGENCE AND ANALYTICS  
 FIVE-YEAR PROJECTION OF PROGRAM SIZE CALCULATIONS

**2014      2015      2016      2017      2018**

Headcount of BIA Majors					
Freshman	10	15	15	20	20
Sophomore		9	14	14	18
Junior			8	13	13
Senior				8	13

BIA majors in BIA Upper Level Courses					
Junior			8	13	13
Senior				8	13

BIA credit hours from BIA juniors			9	9	9
BIA credit hours from BIA seniors			6	6	6
Total			72	165	195

Total BIA hours (annual)	120	120	192	285	315
FTE (3 credit hours/course)	40	40	64	95	105

Headcount in BIA courses	40	40	48	61	66
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BIA majors	10	24	37	55	64
Credit hour per academic year	30	30	30	30	30
Total BIA major credit hours	300	720	1,110	1,650	1,920
Annualized FTE	10	24	37	55	64

APPENDIX E

BBA – BUSINESS INTELLIGENCE AND ANALYTICS  
 FIVE-YEAR PROJECTION OF OPERATING RESOURCE REQUIREMENTS

	<b>First Year (2014)</b>	<b>Second Year (2015)</b>	<b>Third Year (2016)</b>	<b>Fourth Year (2017)</b>	<b>Fifth Year (2018)</b>
<b>A. FTE POSITIONS</b>					
1. Administrators	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
2. Full-time Faculty	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
3. Adjunct Faculty	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
4. Graduate Assistants	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
5. Other Personnel:					
a. Clerical Workers	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
b. Professionals	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>

**Note: Include percentage of time of current personnel**

**B. OPERATING COSTS (Appropriated Funds Only)**

1. Personal Services:					
a. Administrators	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
b. Full-time Faculty	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
c. Adjunct Faculty	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
d. Graduate Assistants	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
e. Non-Academic Personnel:					
Clerical Workers	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Professionals	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Salaries	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>

APPENDIX E(cont)

BBA – BUSINESS INTELLIGENCE AND ANALYTICS  
 FIVE-YEAR PROJECTION OF TOTAL OPERATING RESOURCES REQUIREMENTS\*

	<b>First Year (2014)</b>	<b>Second Year (2015)</b>	<b>Third Year (2016)</b>	<b>Fourth Year (2017)</b>	<b>Fifth Year (2018)</b>
2. Current Expenses	—	—	—	—	—
3. Repairs & Alterations	—	—	—	—	—
4. Equipment:					
Educational Equip.	—	—	—	—	—
Library Books	—	—	—	—	—
5. Nonrecurring Expense	—	—	—	—	—
Office furniture and computers.					
<b>Total Costs</b>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>

**C. SOURCES**

1. General Fund Appropriations	—	—	—	—	—
(Appropriated Funds Only)					
___ Reallocation		___ New funds	(Check one)		
2. Federal Government	—	—	—	—	—
(Non-appropriated Funds Only)					
3. Private and Other	—	—	—	—	—
(specify)					
<b>Total All Sources</b>	—	—	—	—	—

**NOTE: Total costs should be equal to total sources of funding**

\*Explain Your Method for Predicting the Numbers (Use additional sheet if necessary)

# ESSENTIALS OF TABLET COMPUTING FOR MANAGERS AND EDUCATORS

Harry Katzan, Jr., Webster University

## ABSTRACT

In the area of technology, one of the most popular subjects is tablet computing. Tablet computers are now used in business, government, education, and the personal lives of practically everyone – at least, it seems that way. The success of tablets is enormous and has severely cut into the sales of personal computers. The reason is simple: the tasks performed with tablets are precisely the tasks that people would like to perform with personal computers, but they find it cumbersome to lug around a computer to do them. Tablets are mobile, because they are small and light weight. Tablets are adaptable, because the owner can download applications (called apps) that are useful to them and ignore the rest. Tablets are likeable, because they have a bright screen, a touch interface, and are inexpensive. There are news apps, weather apps, music apps, video apps, photo apps, document apps, email apps, presentation apps, calculation apps, electronic book apps, map apps, teaching apps, learning apps, game apps, Internet apps, and the list goes on-and-on. So a user can select exactly what to do with a tablet, when they want to do it. This paper covers a brief history of tablet computers, the tablet hardware, tablet operating systems, app development, and a comparison of the various categories of tablet computers. A collection of tablet computers will be demonstrated. The presentation will be particularly useful for people who do not have the time to look into the subject but would like to tap into the power of tablet computing.

## INTRODUCTION

We are inundated with information in modern society, and most of us have become used to having it at our fingertips. Actually, we depend on it to support everyday activities, ranging from business and educational reports, news, entertainment, opinions, social activities, how-to-do-it information, and access to professional and personal record keeping. In fact, we are so dependent upon instant communications and up-to-date information, that we expect information to be available at a moment's notice. Two technologies underlie our information-rich society: computers and the Internet. There is one additional characteristic. We are mobile, and what this means is that we expect to take our computing power with us. Except, perhaps, in organizational settings, most computer systems in general use are transportable, for instance notebook computers and laptops. However, there is another important consideration. What do people actually do with their transportable computers? And the answer is that they do things, for the most part, that can be done when they are away from their office setting – for example email and messaging, note taking, schedule and address book functions, video watching, music listening, photo viewing, reading books, and Internet access. Also, they take advantage of organizational networks to retrieve information from databases and to do e-commerce. What people don't do are traditional office functions that require that a person sit in one place for a long period of time, such as entering a document. So it follows that modern society was ripe for a light and easily transportable device, designed to do the mobile operations mentioned. In April 2010, Apple Computer delivered the first iPad tablet, and the world of information and Internet access has been forever changed. Briefly stated, the sales of tablet computers are up, the sales of personal computers are down, and more people are doing what they want to do when they want to do it. Tablet computers aren't exactly new to the world of technology, but the power and scope of the modern tablet is a game-changing phenomenon.



## A BRIEF LOOK AT A GENERIC TABLET COMPUTER

A generic tablet computer is a flat-panel computing device with a touch-screen on the upper layer and the electronics below. It is a one-piece device, which means you can do most applications with just the tablet. The screen is touch sensitive in the sense that if you want to run an application, you just touch an icon that represents the application (hereafter called just an *app*) and the tablet operating system calls that program into action. Where does that app come from? Either it is pre-loaded into the tablet or the user can download it from an app store. Take the weather app as an example. Ordinarily, you would download a small program, typically less than 200 megabytes, into the static storage unit of the underlying computer. Normally, it stays there. When its icon is tapped, the app is read into the tablet computer's memory, and it then reads the local weather, using the GPS device to identify the location from the app's web site, and then displays it on the screen. When an app needs temporary memory to operate, it requests a nominal amount from the operating system. When an app needs to store information for a long time, relatively speaking, static storage space is requested and obtained from the operating system. Most apps are less than 500 megabytes in size, so a lot of apps can fit into the storage unit of a small tablet, which can hold at least 16 gigabytes. The upper limit on storage space is nominally 64 gigabytes. Some of the apps that are preloaded are a browser, mail, photos, notes, and music. A large number of essential apps are free, such as news, electronic books, dictionary, maps, calculator, and so forth. Video and music app programs are typically free, but it is necessary to pay for the downloaded content. Office functions, such as document processing, presentation graphics, and spreadsheet apps are typically not-for-free and occupy slightly more storage. Built-in functions such as contacts, calendars, messages, and social features are commonly included with a tablet, but not for certain.

In most pure tablets, the underlying computer processor is selected to conserve electricity, because there is a lot of "looking time" by users with tablets, and the computing power of the processor is not a high priority. Many apps use a location feature, so GPS hardware is normally included, as well as an accelerometer so the tablet can sense its orientation.

A tablet nominally contains an on/off switch, a sound-volume switch, a rotation lock switch, a microphone connection, front and rear-facing cameras, an optional keyboard connection, and a connection for external devices. Since a tablet is commonly used as an "Internet connection" device, a Wi-Fi connection is always available, and some systems have cellular facilities. Since Wi-Fi connections are practically everywhere, the cellular hardware appears to be of lesser value to the user than originally expected. A Bluetooth connection for an external keyboard and a headset is common, but not necessary.

A typical screen will hold about twelve icons, and it is easy to run up considerably more than two or three screens worth. One would use a swipe of their fingers to move from one screen to another and use an up-or-down swipe to scroll through a document.

Some tablet apps involve the entry of information into a page. When a user taps the input bar, a virtual keyboard appears to facilitate the data entry. Physical keyboards are frequently available as optional additions for use when entering or editing documents. In this instance, either the tablet fits into a keyboard unit or the keyboard snaps onto the tablet.

There is an old saying that 80% of the people use about 20% of the features available with a computer. Tablet computers are commercial products, and features sell products. The competition is strong and there are many innovative software possibilities found in the product marketplace.

Another important characteristic of a tablet is its size. The prototypical tablet is notebook size with a screen measuring roughly 7.5 by 9.5 inches with a diagonal screen measurement of 9.5 inches. The

diagonal measurement seems low, but the screen normally has a border that accounts for the diagonal measurement. A couple of other screen measurements are 4.5 by 7.5 with a screen of 7.0 and 10.75 by 6.75 with a screen of 10.5.

The screen of a 7.5 by 9.5 unit is usually addressed in the portrait mode, as are the 7-inch screens. It is normally the case to be able to rotate the screen by 180 degrees with the contents being adjusted accordingly. Screen rotation is convenient for games and data entry through a physical keyboard. The portrait mode is convenient for reading – commonly taken to be documents and web pages – but convenience is in the mind of the beholder. Holding a 9.5 inch unit that weighs roughly 1½ pounds gets tedious after awhile, so a stand is frequently available, except when reading in a resting position. A 7-inch unit is convenient in that regard, if it is possible to adjust the type size as with eBook readers. A compromise size between 7 and 9½ screens is particularly useful as a size for convenience and flexibility.

A landscape mode tablet, such as the 10.75 by 6.75 unit mentioned above, is a useful compromise, since it is convenient to hold, and a left-right swiping modality is surprisingly efficient. By definition, a tablet incorporates a virtual keyboard, and a physical keyboard, if available, as an added feature. Most tablets are used for Internet access, music and videos, and a variety of personal operations, such as address-book, calendar, photo management, and variety of other tasks, so that a physical keyboard is not needed.

## FEATURES

The key function of a modern tablet is to execute apps and to handle housekeeping tasks for the user, and as such, it is in a distinct category from desk and laptop computers that provide an open-ended capability. Two sets of elements are of particular interest: hardware and software. From the hardware, you would expect a high definition screen with sufficient fidelity and anti-glare features to enable the tablet to be used in a variety of operational environments. Wi-Fi capability is required for Internet access, since most tablets are used for Internet access. Mobile broadband is a convenient feature, but it normally has a price attached to it. GPS navigation allows the tablet to sense its location to assist the apps that need it. The accelerometer, mentioned above, provides orientation for screen rotation and other tasks. The processor, covered later, should supply fast start-up and shutdown times and support a long battery life. The weight should be manageable for the intended tasks. Photographic features should support photos and video in various forms. External connections, such as USB, video, and Bluetooth are currently expected with a well-defined tablet. The unit should have a substantial case, usually aluminum or magnesium, since a high level of hand juggling is often experienced. A good tablet should be able to withstand a minimal amount of rough treatment – such as a short drop. Some “tough tablets” have surfaced for extreme conditions, but their widespread use is minimal.

The tablet operating system should be designed for a tablet and not another device with similar characteristics. The touch-response system should be accurate and have sufficient fidelity so the user will not have to touch more than once to initiate the execution of an app or return to a previous operation. The processor’s memory allocation capability should permit several apps to reside in memory so that unnecessary reloads are not needed, when switching between apps. There is no overwhelming need to have two or more apps run at once, but allowing multiple apps to reside in memory is a modern necessity. Software facilities should be available for downloading, experiencing, and storing the following types of information: e-books, PDF documents, songs, videos, and other publications. You should not have to download a special app, for example, in order to read a document in a common file format. Typical built-in software features should include: a web browser, email, social media, messaging, speaker and headset functions, photo management, and contact and scheduling functions.

## SETTINGS

One set of features is often overlooked, until it is needed. That is the general subject of “settings.” Here are some examples of questions that a user should ask from time to time. Do you know what apps are loaded on your table, and how much static storage space do they occupy? How do you turn on Bluetooth? How do you turn on or off the sharing of usage data with a news agency? What is the name of your Wi-Fi network connection? How do you turn off the capability of storing cookies on your tablet? How do you delete your browsing history? How many photos or videos or apps or songs are stored on your tablet? What is the ID that you used when you registered your tablet with the manufacturer? How do you change the brightness or the wallpaper on the screen? How do you disable screen rotation? How do you change your email setup specifications? How do you turn on or off the location services? How is the processor time being used? Usually, there is a settings icon on the screen to invoke the information feature of the operating system. The reason this is important is that the tablet operating system uses the settings to govern the operation of the tablet.

## PROCESSOR

The processor in most tablets is known as the ARM that stands for Advanced RISC Machine, a low-cost 32-bit processor that uses fewer transistors, is smaller in size, generates less heat, and uses less power than traditional processors found in most personal computers. An ARM processor is widely used in mobile battery-powered devices, such as smart phones and tablet computers. When the computer is waiting for input in conventional devices, the processor cycles in a wait mode until it is interrupted by an input event. The wait cycle uses electrical power and is the main reason that laptops and notebook computers have a short life between re-charges. With an ARM processor, the processor “effectively” turns off, conserving battery power. The special processor coupled with a static storage device, in lieu of disc storage, enables a tablet to have a relatively fast start-up and shutdown time.

Some hybrid tablets designed to span the gap between a tablet and a personal computer use a conventional processor. The future of hybrid tablets is uncertain at this time. This subject is covered in the operating system section.

## SCREEN INTERFACE

Touch is the basic operational mode that underlies modern tablet computing. A simple touch invokes an app that does something for the user. Navigation between screens and within documents is achieved through left-right and up-down swiping. The notion of “multi touch” is realized by swiping two or more fingers together to perform more complicated gestures that result in functions, such as exiting the current app and returning the user to the home screen. The screen itself is of interest. A touchscreen is essentially the main feature that gives a tablet computer its personality, since it contributes to its lightweight and operational convenience. To get something done, all a user need do is touch its icon and the app is read into memory and executed. The app may access the outside world to do what it does, but the touch interface gives a tablet its charm.

There are two kinds of technology used to implement a touch screen: the kind where you have to press the screen to get action and the kind where you just have to touch the screen. The pressure sensitive screen is known as a *resistive touchscreen* that responds to any sort of pressure, such as a finger, fingernail, or stylus. This type of screen, used with older PDA devices, normally requires a stylus, but possesses a high degree of accuracy. A *capacitive touchscreen*, used with modern tablets is less accurate and requires the conduction of electricity, such as with a fingertip. Modern tablets primarily employ capacitive screens

and are in widespread use. Touching, swiping, and pinching are the major operations, so that the use of a capacitive technology is a prudent design decision.

Some tablet computers permit handwriting and voice for supplying textual input and also audio output in some instances. The direct storage of handwriting, as well as other graphics, and audio input would appear to be the most useful form of non-keyboard input.

## **APPLICATIONS**

There are so many apps available for modern tablet computers that it is impossible to note all of them or categorize them in a useful fashion. Because screen space for app icons is limited, it is possible in most tablets to group the app icons into categories and assign the various categories a name, so that the user can tap on a category and get a sub-display of included icons. Here are some useful taxonomies for grouping apps:

- Productivity (Presentation graphics, Spreadsheet calculations, Word processing, Notes, Calculator, Tablet users manual, Books and documents)
- Communication (Messages, Calendar, Contacts, People, Reminders, Downloads)
- News and Weather (News apps, Weather apps, Periodicals, Newspapers)
- Entertainment (Videos, YouTube, Game center, Movies, Music, Sports, Travel)
- Social (Photos, Maps, Earth views, Visual media, Message media, Camera and photo studio)
- Operational (Browser, Mail, Settings, App store, Book store)
- Reference (Medical, Dictionary, Encyclopedia, Finance)
- Collections of Web references

There are, of course, other categories, since thousands of apps exist on the Internet.

## **TABLET OPERATING SYSTEMS**

Without the slightest doubt, the most important component of a tablet is the event driven operating system that controls the total system operation. The touch form of operation in modern tablets evolved from the smartphone that has similar characteristics. The application domain is expanded somewhat with tablets, because of extended functionality and end user expectations. The key point, however, is that a tablet is not a conventional computer, such as a desktop or a laptop. For example, extensive document processing and storage is not expected with a tablet; on the other hand, the ability to support expanded music and video offerings is a practical necessity.

Here's a snapshot of what a tablet operating system can do. When you touch or otherwise invoke an icon representing an app, the tablet operating system brings that app from storage into the computer's memory and executes it. The operations that can be performed are severely restricted, although they commonly interact with devices that contact resources external to the tablet. The exact nature of the devices that can be referenced by an app is clearly defined beforehand. For the most part, each app is unique, self-contained, and unable to interact with other apps. At the end user level, there is no file system structure that enables files, associated with an app, to be cataloged and shared with other apps. A device driver, such as for a special printer, cannot be installed, as with a conventional computer, unless it is part of an app. In a sense, the tablet environment is determined by the apps that the owner installs. Some people refer to a tablet as an "Internet appliance," and in a real sense that is absolutely correct.

## HYBRID TABLETS

One of the salient properties of a modern tablet is the distinct lack of a file system, useful for managing information. Heretofore, apps are designed to manage their own files. This doesn't mean that information can't be stored – only that files from diverse apps cannot, for the most part, be combined into a common folder. With a hybrid tablet, the underlying operating system does make a file system visible, but primarily for office documents managed on the tablet. In general, the tablet operating system manages internal and external storage dynamically, which is suitable for the application domain of a tablet computer.

## A BRIEF TABLET HISTORY

While the modern tablet is relatively new – circa 2010 – the general concept of a tablet computer has been around for some time. In 2001, a tablet PC operating system was developed that permitted certain touch features but reversing the screen in a laptop computer and interacting with a specially designed stylus. Personal digital assistants, known as PDAs, are also available for routine record keeping and communications.

The tablet with the most interesting history is the Apple Newton produced by Apple Computer from 1993-1997, and named the MessagePad. The Newton, as it is commonly known, was an amazing predictor of today's tablets in that it was a mobile handheld slate device without a physical keyboard; the user was expected to enter commands and information with a stylus. The computing power was an ARM 610 RISC processor that was mated with a special operating system called the Newton OS. The ARM processor, still used today, was selected to lower battery consumption. The Newton included screen rotation, handwriting recognition, a virtual keyboard, sketching and artistic features, connectivity via fax, various calendar and address-book functions, and personal note taking facilities.

Applications denoted by icons were the primary interaction mechanism together with sound response. Many features were built into the operating system via a large ROM to reduce the requisite amount of required RAM memory. In addition to the features mentioned, such as screen rotation and icons, the Newton OS provided facilities for printing and handling documents, a menu system, and email – features that are relevant today. Available software included programs for graphics and word processing, lists and notes, calendar and contacts, calculations and numerical conversion of various kinds, a clock, and an e-book reader. Graphic, hand printed text, and cursive handwritten text recognition. Text recognition included learning facilities that improved with use. The Internet was not in widespread use at that time and that is possibly the reason that the Newton was not an extraordinary success.

## SUMMARY

This paper should have been entitled “The Ubiquitous Metaphysics of Tablet Computing,” because the objective is to describe what lies behind the outwardly visible electronic devices popularly presented by the media and tablet manufacturers. The concepts that transcend the limits of ordinary common sense and experience are precisely that which differentiates a run-of-the-mill Internet connection device and a truly useful mobile companion. In so doing, the fundamental concepts of tablet computing are covered, along with elements of reality, existence, and causality.

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# **Technology and Innovation: The Catalyst for Educational Change**

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## **ABSTRACT**

To promote change in education, creativity and having technology are not enough. They must be actionable by always putting the learners first. Inventions are the manifestation of creative actions. It is something new. Innovation differs from invention in that innovation refers to doing and/or using something in a new way. It is directly related to educational change. This research defines the link between creativity, technology and educational innovation. Next it offers a vision on how an agile process can enhance viable options for innovative success. In business and economics, innovation is the catalyst to growth and therefore very important to the survival of the organization. In education, innovation is the catalyst to change and therefore important to future generations of learners.

## **AN AGILE PROCESS FOR EDUCATIONAL INNOVATION**

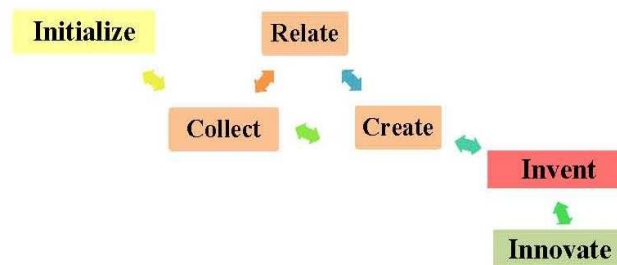
After several years of exploration, the genex framework (Carroll, 2002; B. Shneiderman, 2000; Ben Shneiderman, 2002b) evolved into the framework for mega-creativity and upon further research this study adapts the framework into the Agile Process for Educational Innovation which has five main activities:

- Initialization: Construct a base version of the idea, problem and/or system.
- Collect: Learn from previous and associated works on the topics stored in libraries, the Web, and other sources.
- Relate: Associate technologies with previous and associated works on the topics.
- Create: Explore, compose, and evaluate possible options.
- Invent: construct creative output into viable option.
- Innovate: implements viable options successfully in practice.

It builds primarily on the mega-creativity framework by extending it with an innovative perspective and includes initialization as the first activity and innovation as the last activity which is defined as an implementation of a process that users work through for themselves successfully. It requires motivation on the organizations part. Technological tools and how they are to be used

are worked through by the users (Tornatzky & Fleischer, 1992). This is important because in an educational environment we must manage the processes and ensure that they result in useful outcomes. Indeed, management includes the act of getting people and ideas together to accomplish desired goals and objectives using available resources efficiently and effectively. The problem has been that creativity and innovation activities have not been conducive to efficiencies and effectiveness in the short term.

To address the problem, the basic idea is to identify an agile process that through repeated cycles (iterative) and in smaller portions at a time (incremental) (Figure 2), allows educators to take better advantage of a variety of software tool features that promote creative and innovative efforts. The repeated cycles (iterative) and in smaller portions at a time (incremental) would be conducive to efficiencies and effectiveness because of its incremental nature, while promoting creativity and innovation short term (1 iteration) or long term over many iterations.



**Figure 1**

We can capitalize on the interdependency of current and past technological tools to gain some efficiencies and effectiveness, while promoting tools that enhance creativity and innovation. For example, we can continue to use the tools of the 1990s (word processor, spreadsheet, presentation, email), while promoting the use of software tools that incorporate collaboration, reuse, living documents features as well as quicker authoring cycles (Table 1). The strategic promotion by educators of software packages and the specific design features that promote creative moments can make the difference in an organizations ability to innovate. Therefore, agility is the key to addressing the interdependency of current and past software tools while promoting creativity and innovation in educational organizations.

Proposition 1a. Educational organizations will be most agile if they capitalize on the interdependency of current and past technological tools to support educational change.

Proposition 1b. Educational organizations will be most effective at using the agile process of educational innovation if they promote new tools and/or features that promote learning.



**Table 1**

ACTIVITIES		TASKS
<b>INITIALIZATION</b>	Construct a base version of the idea, problem and/or system.	<b>Identifying</b> and defining vision, goals and objectives at a high level
<b>Iteration Activities</b>	<b>COLLECT</b>	Learn from previous and associated works on the topics stored in libraries, the Web, and other sources. <b>Searching</b> and browsing digital libraries, the Web, and other resources. <b>Visualizing</b> data and processes to understand and discover relationships
	<b>RELATE</b>	Associate technologies with previous and associated works on the topics. <b>Connect</b> technologies with improving data and processes.
	<b>CREATE</b>	Explore, compose, and evaluate possible solutions. <b>Thinking</b> by free associations to make new combinations of ideas <b>Exploring</b> solutions—What-if tools and simulation models <b>Composing</b> artifacts and performances step-by-step <b>Reviewing</b> and replaying session histories to support reflection
<b>INVENT (PRODUCT/PROCESS)</b>	Manifestation of creative composition.	<b>Constructing</b> creative output into viable option.
<b>INNOVATE (PRODUCT/PROCESS)</b>	Implements change successfully in practice.	<b>Transitioning</b> the invention into something that is useful (motivation needed) to the educational organization.

## DISCUSSION AND CONCLUSION

The agile process offers great potential for educators to iteratively enhance the evolving creativity of the organization. At each iteration: learning, consulting exploring, composing, evaluating possible solutions are made, and new insights are added until a successful innovation is implemented. This is becoming a necessity as educators face an evolutionary shift in how we interact with software and each other. Old concepts such as collaborative editing are changing as web 2.0 continues to evolve and take hold in educational organizations.

This research capitalizes on these changes and gives educators a process that can strategically take advantage of students who are learning to think in rapidly produced, hyperlinked, searchable content chunks instead of ponderous, static, e-mailed documents. Creativity and innovation should not be caught in the paradigm of the software support tools of the 1990s (word processor, spreadsheet, presentation, email), when there is a need for collaboration, reuse, living documents, and quicker authoring cycles in the twenty-first century. The promotion of creativity can be enhanced by allowing time and assigning the task each week for investigating a technological tool.

In summary, creativity is a process that has long been seen as a mysterious (Boden, 2004; B. Shneiderman, 2000) Indeed, creative ideas are unpredictable and sometimes they even seem to be impossible. Yet they happen and are important to individuals and educational organizations. Times change, but the goal still remains the same; to enable more people to be more creative more often. The propositions were deduced from the literature and developed into an agile process that

can strategically promote innovation that is a catalyst to change. Future research should follow Shneiderman (2007) and take into consideration the opportunity to enrich the research on creativity and innovation with methods that include process research, case studies, and interviews with small numbers of users over weeks and months. As a researcher, my goal (as I move forward) is "... to capture the processes that precede breakthrough incidents and to collect evidence that supports hypotheses about how technological tools can be used to strategically promote innovation in education and be a catalyst to change that promotes student learning.

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## **THE DECISION TO IMPLEMENT OR NOT TO IMPLEMENT AN ACTIVITY-BASED COSTING SYSTEM: A MANAGERIAL PERSPECTIVE**

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### **ABSTRACT**

Activity-Based Costing (ABC) concepts and the associated tools and techniques provide a rich and varied tool box for vastly improving the management decision making process. These concepts apply to the needs of all organizations seeking to manage costs through improving activities and processes.

Despite the great interest on the part of scholars and practitioners in ABC, there is a dearth of empirical research examining the major factors that influence a firm's decision to implement or not to implement BC. The present study is designed to address certain gaps in the literature. Survey data of practitioners representing 376 firms are analyzed. Some explanations as well as limited generalizations and implications are developed.

### **INTRODUCTION**

Strategic managers are responsible for providing executive leadership, formulating a strategic vision, and administering the strategic management process. They develop the strategies, structure, and systems that will enable their organization to use its resources most effectively to create value and profit. They also establish strategic control and evaluation systems that will enable them to determine how well their strategies, corporate activities, and the organizational structure and systems are working, as well as to monitor their internal and external environments.

A wide variety of approaches and techniques have been proposed for accomplishing the control and evaluation function. They include traditional financial measures, strategic audits, stakeholder measures, benchmarking, and activity-based costing (Wheelen & Hunger, 2012).

### **REVIEW OF THE LITERATURE**

The ABC system was designed to correct the deficiencies of traditional costing systems. Advocates of activity-based costing (ABC) contend that, when properly implemented, such a system would be beneficial to managers for allocating indirect and fixed costs to individual products or product lines by focusing on the value-added activities going into a product or service. Traditional cost systems, on the other hand, were useful when most businesses had relatively undifferentiated products and services. Resources used to produce these outputs consisted mainly of direct labor and materials. Indirect or overhead expenses, such as support and administrative services and selling expenses, represented a small percentage of total costs. Costs were accumulated and reported in cost centers that pertained to a particular line, support department, or business unit.

However, as businesses expand their product lines and services and make technological changes, the percentage of overhead costs to total costs is increased. This causes serious distortions in traditional

product costs, because some products consume much less overhead than others, yet are assigned the same overhead costs.

In the mid-1980s many companies began to realize that using the information produced by traditional cost accounting systems was leading them to make less than optimal business decisions (Swenson & Flesher, 1996; Pare, 1993). As managers pursued the quest for more accurate cost information, they discovered a new tool called Activity Based Costing. They found that it helped them to better identify and quantify the total cost of production and to identify and isolate excess capacity (DeThomas, Fredenberger, & Ghosal, 1994; Cagwin & Bouwman, 2002). It provided a fair and accurate cost allocation thus allowing managers to evaluate the profitability of their products or services. Accordingly, the ABC system focuses its attention on indirect costs. The aim is to define the most appropriate way for indirect costs allocation to cost objects. When implemented properly, it provides managers with more accurate product-cost data that can be used to make more informed decisions about process improvements, pricing, and managing customer relationships. The overall goal of an ABC system is to reveal the hidden sources of profitability and embedded cost, and to serve as a catalyst for decisions to improve profitability.

As costing methods were experiencing changes so were business philosophies. In the late 1980s and early 1990s, many organizations began to change their business philosophies to process-oriented approaches. Total Quality Management (TQM) is probably the best known of these. TQM emphasizes managing processes, or the way work is done, whereas older approaches focus on post-production inspection, individual or work unit performance, budget variances, or simple efficiency. Like TQM, ABC focuses on processes by providing information on how they work and on their cost and efficiency. As organizations gained experience with TQM and ABC, many found the two were highly compatible (Kehoe, Dodson, Reeve, & Plato, 1995).

Process management approaches found uses for ABC beyond tracking costing and pricing studies. These included tools and data to assist in continuous improvement, benchmarking, cost-of-quality analysis, cycle time reduction, business process reengineering, and control and evaluation of organizational strategies. Thus ABC concepts and the associated tools and techniques are providing a rich and varied tool box for vastly improving the management decision making process.

An important trend noted in the literature is the change in the philosophy behind the design of the ABC system versus the traditional cost system. In many companies that use ABC, the user is viewed as the customer of the ABC information. Since the availability and relevance of accounting information underlies many business decisions, the mindset of the financial managers in these organizations has changed from that of generating standardized reports to providing relevant information to customers *inside* the organization. Many successful organizations use ABC information when making key decisions involving both strategic and operational issues (Swenson & Flesher, 1996; Turney, 2010).

In most cases, the Vice President of Finance or the controller has been shown to play a major role in originating the ABC proposal and spearheading its implementation. Senior management then plays a major role in deciding whether to proceed with the ABC implementation (Pohlen & La Londe 1994; Byrne 2011). A 1996 study found that management accountants tend to be more concerned with the speed in producing the monthly financial statements than in enhancing the quality of information. Although management accountants seem to be in a strong position to respond to new techniques, such as ABC, complacency or moving out of their comfort zone may represent a significant barrier to ABC implementation (Evans & Ashworth, 1996).

Despite these research efforts and the great interest on the part of practitioners in ABC, there is a dearth of empirical research in this area. A very limited number of studies have investigated the reasons for implementing or *not* implementing ABC. It is important to note that most of the previous work in this area employed samples that were too small (see, e.g., Kennedy & Affleck-Graves, 2001; Haka, Gordon, & Pinches, 1985; Dearman & Shields, 2001). This limits the power of the statistical tests and does not result in any safely generalizable results. Also, the small sample size makes empirical results sensitive to the selection of sample firms. The present study is designed to partially fill some of these gaps and shortcomings. Specifically, its purpose is to answer the following questions: (1) What factors are considered in the decision to implement or not to implement ABC? (2) Are there differences between firms that have implemented and those that have not implemented ABC with respect to these factors?

## METHODOLOGY

The data for this study were collected from two sources. The first was a questionnaire distributed to members of the Institute of Management Accountants (IMA) attending various regional conferences in six states in the U.S. Completed questionnaires were obtained from accountants representing 308 firms. To address the problem of common methods variance telephone interviews were conducted with members of the local IMA chapter in two large metropolitan areas in the U.S. These accountants were employed by 68 different companies. Therefore, 376 accountants representing their respective firms participated in the study. These firms employ a total of 87,751 persons.

A questionnaire was developed to gather data for this study. It was field tested for readability, interpretation, and completeness. Many of the items were drawn or adapted from those used in previous studies. One major flaw in these studies is the use of non-metric (i.e., categorical) scales to measure the variables. Such scales require an individual simply to agree or disagree with a statement. This limits the type of analysis that may be utilized and does not permit the use of more powerful statistical techniques to analyze the data. Interval scales, however, allow respondents to indicate the *magnitude* of differences or degree of agreement. Consequently, the actual strength of attributes or respondents' attitudes can be measured more accurately thus permitting the use of more complex statistical procedures.

Respondents were asked to indicate whether their firm was currently using ABC. Those whose firms have adopted ABC were asked to indicate to what extent each of ten factors was considered when the decision to implement it was made. Respondents whose firms had not adopted ABC were asked to indicate to what extent each of these ten factors was an impediment when the decision not to implement ABC was made. The questionnaire employed five-point Likert-type scales to measure these items.

## RESULTS

Represented in our sample are 376 firms. Among them, the median number of full-time employees is 382 (mean = 233). A total of 181 (48%) of these firms reported that they used activity-based costing. The respondents held positions such as controller, business cost manager, chief financial officer, and vice president of finance.

Concerning the factors which were considered when making the decisions to implement ABC, support from upper level management was cited by the respondents as the most critical. This was followed by the generation of detailed activity data, the additional *time* and *cost* involved in running two systems, and the additional time in generating additional reports. Other reasons include organizational politics, the initial *time* and *costs* in implementing an ABC system, and the difficulty in running two systems. Finally, the

difficulty in determining cost drivers was the least influential. Table 1 shows these factors along with their means and standard errors.

Among those who had *not* implemented ABC, the two most important factors were the lack of support from upper level management and organizational politics. These were followed by the initial *time* and *costs* in implementing an ABC system; and the additional time, difficulty, and cost required to run two systems. Other reasons that were cited include the difficulty to collect detailed activity data, the time needed to generate additional reports, and the difficulty in

**TABLE 1: FACTORS CONSIDERED IN THE DECISION TO IMPLEMENT ABC**

<b>RANK</b>	<b>FACTOR</b>	<b>MEAN<sup>a</sup></b>	<b>STANDARD ERROR</b>
1	Degree of support from upper level management	4.11	0.37
2	Degree of difficulty to collect detailed activity data	2.92	0.31
3	Additional time involved to generate additional reports	2.91	0.59
4	Additional time involved in running two systems	2.75	0.29
4	Additional cost of running two systems	2.75	0.28
6	Organizational Politics	2.66	0.55
7	Initial time involved in implementing an ABC system	2.51	0.53
8	Initial costs involved in implementing an ABC system	2.35	0.29
9	Degree of difficulty in running two systems	2.30	0.27
10	Degree of difficulty in determining cost drivers	2.21	0.24

<sup>a</sup> 1 = No influence, 5 = Great influence

Another interesting finding is that, although all of these factors were taken into consideration by those who had adopted ABC, all but one were given ratings lower than “3” (on a five-point scale). This suggests that these factors were taken into account, but almost all of them had little influence on the decision. Support from upper management, however, was the most influential factor. This contrasts with the results reported by those whose firms had not implemented ABC. All of these factors were perceived as major impediments - nine of the ten factors had means above “3”. The most important of these were the lack of support from upper management and organizational politics. This suggests that there is an exaggerated understanding of the time, costs, and difficulty involved in implementing ABC. Generally, time and costs were considered by firms that have implemented ABC, but were not seen as major impediments. On the other hand, these same factors are perceived as major obstacles by those who have adopted ABC. Indeed, with the exception of “support from upper management,” all of the factors that were considered by firms now using ABC had means below those of companies who had not implemented ABC.

The statistical analysis underscores these patterns. Additional tests were conducted to determine the

differences between the two groups. A MANOVA revealed significant differences between them (Wilks'  $\lambda = 0.7928, p < .00$ ). Overall, the two groups provided different responses. Next, to understand the underlying contributions of the variables to the significant multivariate effect, ten separate *t*-tests were performed. As presented in Table 3, the results of this series of tests show significant differences with respect to nine of the ten factors. Perhaps the most important finding is the degree of support from upper level management. Although there were significant differences between the two groups, this factor was considered to be most important by both groups.

**TABLE 2: FACTORS CONSIDERED IN THE DECISION *NOT* TO IMPLEMENT ABC**

<b>RANK</b>	<b>FACTOR</b>	<b>MEAN<sup>a</sup></b>	<b>STANDARD ERROR</b>
1	Degree of support from upper level management	4.67	0.34
2	Organizational politics	4.28	0.28
3	Initial time involved in implementing an ABC system	3.99	0.38
4	Initial costs involved in implementing an ABC system	3.72	0.40
5	Additional time involved in running two systems	3.55	0.41
6	Degree of difficulty in running two systems	3.50	0.39
7	Additional cost of running two systems	3.38	0.32
8	Degree of difficulty to collect detailed activity data	3.31	0.25
9	Additional time involved to generate additional reports	3.01	0.61
10	Degree of difficulty in determining cost drivers	2.88	0.30

<sup>a</sup> 1 = No influence, 5 = Great influence

## **DISCUSSION AND LIMITATIONS**

ABC represents a major change to a firm's information system processes since most systems are designed around the informational needs required for external reports. A greater level of detail is needed to produce ABC information. It involves the identification and tracking of activities and/or businesses processes within the firm, their associated costs, and the drivers of cost. Few, if any, employees are unaffected by this system. Without top management support, it is difficult to sustain the effort required to successfully make such a dramatic change in operational processing, and employees will begin to slip back into the more comfortable, more predictable processes of the traditional system. Thus, top management must not only be supportive of ABC, but must clearly communicate their commitment to successful implementation of ABC (Krumweide, 1998; Anderson & Young, 2001; Anderson, Hesford & Young, 2002).

Additionally, financial accountants generally play a key role in the design and implementation of accounting system changes. As earlier studies show, ABC is frequently integrated into a firm's primary financial system. Consequently, the support of key financial management (controller, CFO) is critical. Without endorsement of the benefits of ABC by this group, other members of upper level management will



likely be reluctant to support ABC, thus thwarting its implementation. This observation is consistent with numerous studies in a wide variety of areas suggesting that major organizational changes are likely to encounter great resistance and significant implementation problems unless the top executives actively support the effort.

Further comparison of firms who implemented ABC with firms who chose not to implement ABC reveals some insights into strategic considerations by the two groups. Firms that adopted ABC cited the factors of additional time and additional cost of running two systems as having a significant influence on their decision. They were also concerned about the amount of time involved to generate additional reports inherent in ABC system design and purpose. Recognition and acceptance of the benefits of ABC is implied by this group's focus on actual implementation costs in terms of dollars, time and efficiency. In contrast, firms who chose not to implement ABC ranked *initial* time and *initial* cost factors as significantly influential to their decision. Their concern with start-up costs (ranked third and fourth) suggests that this group was probably not convinced of the long-term cost benefit of ABC for their firms. The *t*-tests, however, did not show significant differences with respect to only one of the ten factors - the additional time required to generate additional reports.

This study confirms that top management must be convinced of the long-term benefits of ABC before implementation can be successful. Companies that are easily discouraged by the initial cost of implementing ABC probably perceive that the cost of installing ABC outweighs the benefit of the improved information. This lack of confidence in ABC benefits reduces upper level management commitment and support and results in a decision not to implement the system.

Certainly, the findings presented here must be viewed in the context of study limitations. A major caveat concerns the generalizability of these results. Additional research with a larger sample would be necessary to confirm these findings. Moreover, it would be useful to compare the company performance of both users and non-users of ABC. Another interesting area would be a comparison of users' and non-users' perceptions of the usefulness of information provided by this technique. Finally, additional research might explore the relationship between the use of ABC techniques and other variables such as the company's industry, market size, firm size, the number of markets in which it is operating, and whether or not it is a single product or multi-product business.

**TABLE 3: FACTORS CONSIDERED IN THE IMPLEMENTATION DECISION: T-TEST RESULTS OF DIFFERENCES BETWEEN THE TWO GROUPS**

Factor	Firms Using ABC		Firms Not Using ABC		<i>t</i>	<i>p</i>
	Mean <sup>a</sup>	Standard Error	Mean <sup>a</sup>	Standard Error		
Degree of support from upper level management	4.11	0.37	4.67	0.34	15.29	< .000
Organizational politics	2.66	0.55	4.28	0.28	36.36	< .000
Initial time involved in implementing an ABC system	2.51	0.53	3.99	0.38	31.28	< .000
Initial costs involved in implementing an ABC system	2.35	0.29	3.72	0.40	37.77	< .000
Additional time involved in running two systems	2.75	0.29	3.55	0.41	21.69	< .000
Degree of difficulty in running two systems	2.30	0.27	3.50	0.39	34.44	< .000
Additional cost of running two systems	2.75	0.28	3.38	0.32	20.25	< .000
Degree of difficulty to collect detailed activity data	2.92	0.31	3.31	0.25	14.47	< .000
Additional time involved to generate additional reports	2.91	0.59	3.01	0.61	1.61	.108
Degree of difficulty in determining cost drivers	2.21	0.24	2.88	0.30	23.80	< .000

<sup>a</sup> 1 = no influence, 5 = great influence.

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## **USING THE SWOT MATRIX TO ADDRESS SUPPLY CHAIN VULNERABILITIES: THOUGHTS ON ALIGNING STRATEGY WITH CRISIS MANAGEMENT**

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### **ABSTRACT**

The SWOT analysis is a familiar tool to most business scholars and practitioners. In this paper, we extend the use of the SWOT analysis to include the SWOT matrix as a tool for addressing supply chain vulnerabilities. Strategies for practitioners are offered.

### **INTRODUCTION**

An earthquake in Asia can eventually cause factories in the United States to temporarily shut down. Tornadoes in the Midwest United States can cause extensive structure damage, leading to new building efforts, which can cause shortages of sheet rock in the U.S. construction industry. A war in the Middle East can disrupt oil supplies, thus raising the price of food and other goods worldwide. These examples illustrate the vulnerability of today's supply chains when they are hit by a crisis.

Managing the supply chain is a difficult process, even when operations are running well. Unfortunately, unforeseen crises can hinder the smooth operation of the supply chain and consequently, supply chain risk is a growing concern (Ganguly & Guin, 2007). A crisis is a high impact, low probability event that can seriously disrupt the normal operations of the business (Coombs, 2007). For supply chain managers, a crisis is an event that can create a large-scale disruption to a company's supply resources. As a result, the company is then unable to meet the commitments it has made to its customers (Zsidisin, Ragatz, & Melanyk, 2005). Examples of crises that can disrupt the supply chain include major weather events, earthquakes, floods, transportation accidents, power outages, fires involving production and/or warehouse facilities, labor strikes, or wars.

Supply chain disruptions can also have a negative effect on stock prices. As Kumar (2009: 37) notes, "Supply chain disruptions have been found to impact negatively shareholder value by as much as 8-10% and are amplified in 'time sensitive' environments where early market introduction is critical to success." Furthermore, Hendricks & Singhal (2008) noted that supply chain disruptions can cause a shareholder value decrease of 10.28%.

The field of crisis management focuses on addressing such events. The charge of the crisis management team is to prevent those crises that may occur, and mitigate the ones that do occur (Pearson & Clair, 1998). In the past, much of the crisis management literature has addressed the negative publicity that often results from such unfortunate events. Such crises may originate from a corporate scandal, an industrial accident, or some other event that attracts a high amount of stakeholder and public interest. Indeed, many crisis management consultants are trained in the areas of communications and public relations. But the concepts of crisis management extend much further than just public relations. Crisis management deals with assessing crisis vulnerabilities, strategically planning for these vulnerabilities, addressing the crises when they do occur, and then seeking to learn from them after the crises have been resolved.

In this paper, we look at the relationship between a firm's SWOT analysis and supply chain vulnerabilities. This approach is utilized since the SWOT analysis is a strategic tool used by top management to plan for the long-range viability of the firm. We begin by examining the various levels of supply chain disruptions and their relationship to crisis events. Next, we use the SWOT analysis to identify supply chain vulnerabilities. We then develop the SWOT matrix to determine strategies for addressing disruptions to the supply chain.

## CRISIS AND THE SUPPLY CHAIN

Crisis events can disrupt the operations of the supply chain. When supply chains are interrupted, the companies affected are not able to meet their commitments to their customers. This ripple effect can eventually upset a significant segment of the supply chain.

### Levels of Potential Supply Chain Disruptions

There are at least four levels of disruptions that can impact a supply chain, ranging from minor to major.

- **Variability** – This occurrence is the normal variation in supply chain flows. It is predictable within established limits, controllable with normal practices, and does not present a serious threat to the welfare of the company. Example: the fluctuations in the arrival time of a truck delivery from the distribution center to a retail store.
- **Uncertainty** – This condition has wider variation that is sometimes unpredictable, although usually not unknown. It takes preventive or corrective action, and the company is vulnerable if actions are not taken to avoid or resolve the uncertainty. Example: the arrival time of the first shipment from a new supplier.
- **Risk** – This condition may be identifiable in advance but the timing and magnitude of its occurrence is uncertain. An eruption can cause significant disruption in supply chain flows, and requires preplanned responses to avoid serious consequences. Example: the arrival time of a ship from a new offshore supplier at a port with severe unloading capacity constraints.
- **Crisis** – This occurrence is a low probability but high impact event that is often unpredictable or unexpected. It requires prompt and exceptional skills to manage. The responses may be planned but often require extemporaneous adaptation to resolve the situation. Example: the arrival of needed inventory from an offshore supplier is delayed indefinitely because of an earthquake in the supplier's country.

Many supply chain risks can be identified ahead of time through careful analysis. Once identified, plans can be prepared to mitigate the effect of these risks if they do occur. However, if not identified or mitigated, risks can turn into crises. In addition, a crisis can arise from a natural disaster, such as a flood or fire that can be completely unexpected.

Supply chain risks can be identified through a number of means; however, in this paper we advocate the use of a familiar management tool from the strategic management discipline, the SWOT analysis. We advocate the SWOT analysis to identify crisis vulnerabilities because of its relationship with the strategic management of the firm. Oftentimes, crisis management and strategic management are carried out in separate departments (Preble, 1997). As a result, the strategic mission and its accomplishment may not consider the risks associated with various strategies. Using the SWOT analysis to identify crisis vulnerabilities can better alert strategic managers of the consequences of the firm's chosen strategies. The result is not to discourage an acceptable strategy, but to better plan for its potential shortcomings. In relation to the supply

chain, the ultimate goal is to identify supply chain vulnerabilities so that subsequent risks can be planned for.

### THE SWOT ANALYSIS

Most readers are probably already familiar with the SWOT analysis so this review will remain short. The SWOT analysis is a tool used in the strategic management process to identify the strengths, weaknesses, opportunities, and threats that involve a particular organization. The SWOT analysis can also be a tool to assess crisis vulnerabilities (Crandall, Parnell, & Spillan, 2010). Figure 1 depicts how a corresponding strength, weakness, opportunity, or threat can be aligned with a potential crisis. Note that strengths and weaknesses reside within the organization while opportunities and threats are external. Note also that strengths and opportunities are generally viewed as positive events while weaknesses and threats are perceived to be negative.

FIGURE 1 - THE SWOT ANALYSIS WITH CRISIS VULNERABILITIES

	Generally Positive Items ↓	Generally Negative Items ↓																
<b>Characteristics Inside the Company</b>  →	<b>Strengths</b>  <table border="1"> <thead> <tr> <th>Identified Strength</th> <th>Corresponding Crisis Vulnerability</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>1.</td> </tr> <tr> <td>2.</td> <td>2.</td> </tr> <tr> <td>3.</td> <td>3.</td> </tr> </tbody> </table>	Identified Strength	Corresponding Crisis Vulnerability	1.	1.	2.	2.	3.	3.	<b>Weaknesses</b>  <table border="1"> <thead> <tr> <th>Identified Weakness</th> <th>Corresponding Crisis Vulnerability</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>1.</td> </tr> <tr> <td>2.</td> <td>2.</td> </tr> <tr> <td>3.</td> <td>3.</td> </tr> </tbody> </table>	Identified Weakness	Corresponding Crisis Vulnerability	1.	1.	2.	2.	3.	3.
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<b>External Forces Outside the Company</b>  →	<b>Opportunities</b>  <table border="1"> <thead> <tr> <th>Identified Opportunity</th> <th>Corresponding Crisis Vulnerability</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>1.</td> </tr> <tr> <td>2.</td> <td>2.</td> </tr> <tr> <td>3.</td> <td>3.</td> </tr> </tbody> </table>	Identified Opportunity	Corresponding Crisis Vulnerability	1.	1.	2.	2.	3.	3.	<b>Threats</b>  <table border="1"> <thead> <tr> <th>Identified Threat</th> <th>Corresponding Crisis Vulnerability</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>1.</td> </tr> <tr> <td>2.</td> <td>2.</td> </tr> <tr> <td>3.</td> <td>3.</td> </tr> </tbody> </table>	Identified Threat	Corresponding Crisis Vulnerability	1.	1.	2.	2.	3.	3.
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#### Organizational Strengths

Organizational strengths are traits or practices that are done well. They are internal to the firm. For example, the ability to consistently operate with little work-in-process inventory (WIP) can be considered a strength. Less WIP saves cash tied up in inventory, which can also lead to a

competitive advantage. Organizational strengths are desirable, but ironically, they can also be linked with identifiable crisis threats that management needs to be aware of (Crandall, Parnell, & Spillan, 2010). Figure 2 provides a list of strengths that are related to supply chain management, along with their corresponding potential for crises.

**FIGURE 2 – INTERNAL ORGANIZATIONAL STRENGTHS**

Identified Strength	Corresponding Crisis Vulnerability
<i>An overall strength of many organizations is their use of JIT/Lean manufacturing processes. This practice results in:</i>	
1. Carrying smaller inventories.	1. Lack of buffers can create inventory shortages which can halt production.
2. Using single sourcing for many inventory items.	2. Supplier may be incapable of making a delivery due to encountering its own crisis.
3. Utilizing daily deliveries in order to keep shop-floor inventories low.	3. Interruption in delivery can lead to shortages and possible production line shutdown.
4. Utilizing a manufacturing facility that is highly automated.	4. Equipment breakdown or a technology glitch can stop the production process causing a ripple effect throughout the supply chain.

**Carrying smaller inventories.** One of the main strengths in today’s companies and supply chain partners is the application of JIT/Lean manufacturing practices. However, this strength lends itself to a number of potential crises. “Specifically, today’s lean supply chains are becoming increasingly – ‘fragile’ – that is, less able to deal with shocks and disruptions that can have a significant, if not catastrophic, impact on the firm” (Zsidisin, Ragatz, & Melnyk, 2005: 46). Because companies are carrying less inventory with little buffers, interruptions in the supply chain due to a crisis event can lead to production coming to a standstill.

**Single sourcing.** Single sourcing is another practice in these lean styles of management. Unfortunately, when the main vendor is hit with a crisis, the companies it supplies will be impacted as well. The same is true with vendors who supply daily deliveries of product. An interruption in the delivery schedule can cause production to grind to a standstill. In a dramatic example of the impact of a crisis on a single supplier, consider the fire that took out the main production facilities of Philips Electronics in early 2000. Philips supplies radio-frequency chips (RFCs) to cellular phone makers. The crisis caused a \$400 million revenue loss for the telecommunications company, Ericsson, and eventually led to their leaving the cell phone industry altogether (Rice & Caniato, 2003).

**Daily deliveries.** Daily deliveries and even multiple daily deliveries are utilized in some lean operating systems. However, daily deliveries also imply that there is little extra reserve stock in case of an interruption in a delivery. Even a minor crisis can cause a stoppage or delay in deliveries, which could lead to the shutdown of the production line in a lean system.

**Automation.** Another strength many companies strive for is a movement towards automation in the manufacturing environment. Automation helps buffer the impact of wage increases among workers, especially when new contracts are negotiated in union environments. Automation also cuts workplace accidents and injuries and can be utilized in areas where precision specifications are necessary, such as in the painting of cars or in welding processes. However, as the machinery and technology become more complex, the potential for equipment breakdown increases. When labor cannot be substituted for capital, breakdowns become more serious as the production process will be totally dependent on the technology working correctly.

Service environments can often continue operations when there is a breakdown in technology. For example, if cash registers were to cease operating in a retail store, cash could still be collected and change rendered, at least on a temporary basis. A restaurant can continue to operate, even if an oven breaks down or a fryer goes on the blink. Service time may be slower, but the restaurant will still operate. On the other hand, a highly automated factory that makes tangible products cannot continue production if a major machine breaks down. This can create a problem as well when the suppliers are highly automated. Their ability to deliver products through the supply chain will also be compromised in the event of equipment breakdown. This situation can create a ripple effect throughout the whole supply chain, causing production to slow down or halt.

As an example, consider the impact of Hurricane Ike on the highly automated refinery industry in the Gulf of Mexico. The Gulf of Mexico supplies about 20% of the nation's oil producing capacity (Lee & Thurman, 2008). When the storm hit in August 2008, refineries "shut in" operations to minimize damage to oil producing facilities. After the storm passed, production slowly resumed, but not fast enough to offset gas shortages in major cities such as Nashville, TN, Atlanta, GA, and Charlotte, NC. The shortages were made worse by panic buying and high prices.

### **Organizational Weaknesses**

As we would expect, an examination of the organization's weaknesses can reveal potential crises. Figure 3 reveals several two common weaknesses and their corresponding crises potential.



**FIGURE 3 - INTERNAL ORGANIZATIONAL WEAKNESSES**

Identified Weakness	Corresponding Crisis Vulnerability
1. Labor contract is due for renegotiation.	1. A strike could cause production lines to stop operating if replacement workers are not used. If replacement workers are used, additional resentment between union members and management will result.
2. Equipment and facilities are in need of upgrading.	2. Equipment breakdowns can cause slowdowns or stoppages in production.

**Labor contract is due for renegotiations.** A separate, yet related problem occurs when the union contract is up for negotiations. If management and the union cannot agree on the terms of the contract, then two options are available: the union members can continue to work under the provisions of the existing contract, or, they can opt to go on strike. In the event of a strike, the company is faced with a grave decision; should it continue to operate and use replacement workers (what the union calls “scabs”), or shut down operations and lose revenue? The former option will continue to bring in a revenue stream for the company, but will create bad feelings with the union. The latter option will be a lose-lose situation, as both the union and the company forfeit their revenue streams. However, with no replacement workers, there may be more of an urgency to expedite the contract negotiation process.

**Equipment/facilities need upgrading.** Figure 3 identifies a second potential organizational weakness, the need to upgrade existing equipment and facilities. Operating with older equipment and facilities can offer an advantage; it reduces expenses and cash outlays (in the short-run) so that the company’s bottom line looks attractive, and hence more inviting to those on Wall Street. However, the long-term ramifications can be devastating. Industrial accidents, workplace injuries, and lost production time can result when malfunctions occur.

**External Opportunities**

Opportunities are avenues available to management to increase revenue in some manner. These originate from outside the organization and are generally looked at in a positive manner. Figure 4 identifies three common opportunities for a manufacturing company in relation to its supply chain.

**FIGURE 4 – EXTERNAL OPPORTUNITIES**

Identified Opportunities	Corresponding Crisis Vulnerability
1. Upward fluctuations in demand due to a large order from a new customer, or a general recovery in the economy.	1. The required capacity in terms of human resources and physical plant may not be available.
2. Opportunity exists to offshore part or all of the production process to another country.	2. Will create negative feelings with domestic workers who lose their jobs.  Quality problems may result from the foreign company which can create customer ill-will and negative publicity.
3. Opportunity exists to reshore manufacturing processes from an offshore location to a domestic location.	3. Sophisticated labor skills needed at domestic plants may not be available thus creating a human resource capacity crisis.
4. Opportunity exists to broaden the product line, thus increasing market share.	4. A broader product line can increase the complexity of the supply chain.

**Upward demand for product.** While opportunities are generally considered favorable options for the company, they can bring associated crises. Usually, opportunities are based on an expected increase in demand for a product. While this is a desirable occurrence, it can result in problems if the company’s production capacity is not able to suddenly fulfill its obligations. Consider that many companies lay off and downsize their operations when the economy is contracting. However, a large order from a new customer or a strong rebound in the economy can create a capacity problem if the company cannot rehire and retool its facilities quickly.

**Outsourcing/offshoring.** One of the most widespread trends in the manufacturing sector has been to outsource certain aspects of operations to an overseas vendor. The obvious advantage to this strategy is lower labor costs. However, problems can arise if the contracted company does not make the product as specified, or if the product contains defects. In recent years, much attention has been drawn to the quality of products made in China, including toys tainted with lead paint (Crandall et al., 2010). Product liability risk must be considered when offshoring and has led to the infamous adage, “Made in China, Sued in the U.S.” (Markham, 2011: 4).

While product liability crises can certainly occur with a domestic supplier, the situation is exasperated when the outsourcing decision resulted in a loss of domestic jobs. Such a situation leaves displaced workers and labor unions feeling betrayed.

**Reshoring.** A third opportunity that may exist for some companies is the chance to reshore some of their processes that are currently offshored. A recent study by The Boston Consulting Group indicates that a “manufacturing renaissance” is about to take place over the next five

years (Coy, 2011). The reasons for the return of manufacturing include wage inflation in China, rising oil prices, and natural disasters in Asia that interrupt supply routes of key components to the rest of the world (Johnston, 2012). While the influx of new jobs to the U.S. is encouraging, it does create a potential human resource crisis; skilled labor needed to operate the sophisticated machinery in modern manufacturing plants is currently scarce (Huss, 2012).

**Broaden the product line.** From a marketing perspective, adding variety to the product line is usually a desirable option because of its ability to gain market share. However, it can also increase the complexity of the supply chain and create more uncertainties in demand. With the added complexity and increased components in the system, the supply chain becomes more vulnerable to disruptions (Silva & Reddy, 2011).

**External Threats**

An external threat exists outside of the organization, but is within the domain of that organization’s supply chain. Threats are negative in their impact and usually result in an interruption or damage to the supply chain. Figure 5 identifies potential external threats that can disrupt the supply chain.

**FIGURE 5 – EXTERNAL THREATS**

<b>Identified Threats</b>	<b>Corresponding Crisis Vulnerability</b>
1. Extended supply chains have more vulnerability points.	1. A number of transfer points exist where the supply chain may be interrupted.
2. Severe weather, earthquakes, widespread power outages or other natural disasters.	2. Suppliers may not be able to fulfill their orders, thus causing delays and cancellations in deliveries.
3. Labor strike at a supplier or manufacturer.	3. Deliveries may be delayed or cancelled.
4. War; or the threat of a war.	4. Transport of goods may not be possible in areas where the war is taking place.

**Extended supply chains.** In recent years, most supply chains have extended around the world; as a result, the risks of disruption have increased. The need to move goods over longer distances and the introduction of more transfer points in the transportation process increase the likelihood there will be a missed connection or in-route delay. Crone (2006) suggests ocean port congestion, inadequate surface-transportation infrastructure, escalating transportation costs, and supply chain security issues have increased risks in global supply chains.

A lack of information technology compatibility and process differences – both manufacturing and administrative – can frustrate effective communication and good flow. Furthermore, there is an absence of centralized management in most extended supply chains; consequently, it is

sometimes difficult to resolve otherwise minor points of contention (Crandall, 2009). While globalization may result in an overall lower cost of goods, it introduces threats that should be identified, quantified, assigned a probability and included in supply contingency planning (Barry 2004).

The complications of extended supply chains can also be seen in the food production industries, especially when there are outbreaks of E-coli that result in illness and deaths. Identifying the source of the problem can be difficult (Gessner, Volonino & Fish, 2007). As a result, traceability is an important requirement in food supply chains and the government will likely increase its requirements in this area because of the potential threat to human life.

**Natural disasters.** Natural disasters are a major threat to supply chains. Perhaps the most visible example in recent years was the disaster trilogy that occurred in Japan during March of 2011. The earthquake, tsunami, and nuclear meltdown at the Fukushima Nuclear Power Plant left the country reeling in human suffering with thousands dead and even more homeless. The impact on supply chains was massive, causing disruptions in the automobile industry in need of electrical components and shades of paint (Shappell, 2012).

The supply chain was both extended, and yet concentrated in one geographic area of vulnerability. In terms of the extended supply chain, components made in Japan were needed all over the world. However, in terms of concentration, many companies had single-sourced their suppliers in this region, which left them open to vulnerability since no backup was readily available for certain types of goods. For example, Japan is the world's largest producer of silicon wafers used in semiconductor chips and supplies these components to other manufacturing plants in Asia, North American and Europe (Civichino, 2011).

Supply chain disruptions can reduce revenue, decrease market share, and threaten production and distribution activities (Healings, 2012). Ultimately, these external threats such as a natural disaster can inflict significant damage not only on the supply chain, but a company's quarterly or 10-K annual financial report. As a result of the earthquake and tsunami in Japan, companies have disclosed they missed earnings targets in 2011 (Dempsey, 2012).

**Labor strikes.** Labor strikes at a manufacturer or supplier can interrupt the supply chain. Aircraft giant, Boeing, endured a major strike with its 27,000 union machinists in 2008. The 57-day strike caused supply chain ripples throughout the aerospace industry and delayed the delivery of at least 70 aircraft (Lunsford, 2008). To buffer against future interruptions in the delivery of its product, Boeing has moved some of its production for the 787 Dreamliner to South Carolina, where the workers are not unionized (Ostrower, 2012). Component suppliers to Boeing face a risk when the company is hit with a strike. Even the prospect of a strike is "one of the more significant risks not just for Boeing but for the entire (aerospace) supply chain in 2012" (Kesmodel, Cameron, & Trottman, 2011: A1).

**War or the threat of war.** A war can certainly disrupt supply chains in the region of the theater. However, indirect effects can also be felt via increased border security checks and disruptions to shipping and airline routes. In addition, the potential for terrorist attacks may be heightened (Aldred, 2003). Certainly, oil flow and consequently, barrel prices will be affected by the presence of war in an oil-laden region.

## USING THE SWOT MATRIX TO ADDRESS SUPPLY CHAIN VULNERABILITIES

The SWOT matrix is a tool that helps top management align the organization's strengths, weaknesses, opportunities, and threats with its long-range strategic planning. In essence, it

extends the SWOT analysis by using it as a means for generating strategic alternatives for the firm (Parnell, 2008). The tool was originally referred to as the TOWS matrix in its first inception by Wehrich (1982). The matrix involves taking the elements of the SWOT analysis and aligning them with potential strategy alternatives. In this paper, we have created a SWOT matrix that addresses supply chain vulnerabilities based on the SWOT items discussed in the previous sections. Figure 6 depicts the SWOT matrix.

**Insert Figure 6 about Here**

The matrix lists the various vulnerabilities that are associated with each of the SWOT items. These vulnerabilities were originally listed in figures 2–5 above. The strategic alternatives that have been generated are listed in the lower right section of the matrix. Each alternative has been labeled with its associated vulnerability in parentheses. The alternatives are discussed next.

**FIGURE 6 – USING THE SWOT MATRIX TO ADDRESS SUPPLY CHAIN VULNERABILITIES**

<p><b>In this Matrix, the vulnerabilities to each facet of the SWOT analysis are listed.</b></p> <p><b>The strategies address each of the vulnerabilities raised.</b></p>	<p><b>Opportunity Vulnerabilities (OVs)</b></p> <ol style="list-style-type: none"> <li>1. The required capacity in terms of human resources and physical plant may not be available.</li> <li>2. Will create negative feelings with domestic workers who lose their jobs. Quality problems may result from the foreign company which can create customer ill-will and negative publicity.</li> <li>3. Sophisticated labor skills needed at domestic plants may not be available thus creating a human resource capacity crisis.</li> <li>4. A broader product line can increase the complexity of the supply chain.</li> </ol>	<p><b>Threat Vulnerabilities (TVs)</b></p> <ol style="list-style-type: none"> <li>1. A number of transfer points exist where the supply chain may be interrupted.</li> <li>2. Suppliers may not be able to fulfill their orders, thus causing delays and cancellations in deliveries.</li> <li>3. Deliveries may be delayed or cancelled.</li> <li>4. Transport of goods may not be possible in areas where the war is taking place.</li> </ol>
<p><b>Strength Vulnerabilities (SVs)</b></p> <ol style="list-style-type: none"> <li>1. Lack of buffers can create inventory shortages which can halt production.</li> <li>2. Supplier may be incapable of making a delivery due to encountering its own crisis.</li> <li>3. Interruption in delivery can lead to shortages and possible production line shutdown.</li> <li>4. Equipment breakdown or a technology glitch can stop the production process causing a ripple effect throughout the supply chain.</li> </ol>	<p><b>Strategies for Addressing Supply Chain Vulnerabilities</b></p> <ol style="list-style-type: none"> <li>1. Implement double sourcing, multiple sourcing, primary sourcing with backup in place. (SV1,2,3)</li> <li>2. Keep preventative maintenance and equipment upgrades on schedule. (SV4, WV2)</li> <li>3. Consider longer contracts when negotiating with labor unions. (WV1)</li> <li>4. Consider the total cost of ownership before outsourcing or offshoring. (OV2)</li> <li>5. Ramp up capacity ahead of time if reshoring. (OV1,3)</li> <li>6. Consider shortening and simplifying the supply chain. (TV1)</li> <li>7. Introduce buffers to absorb disruptions. (SV1,2,3; TV2,3,4)</li> </ol>	
<p><b>Weakness Vulnerabilities (WVs)</b></p> <ol style="list-style-type: none"> <li>1. A strike could cause production lines to stop operating if replacement workers are not used. If replacement workers are used, additional resentment between union members and management will result.</li> <li>2. Equipment breakdowns can cause slowdowns or stoppages in production.</li> </ol>		

### **Alternative 1 - Implement double sourcing, multiple sourcing, primary sourcing with backup in place.**

Although it has been in vogue to single-source as much as possible, such an arrangement leaves a company in a peril when its supplier runs into problems. Cisco, the San Jose, California-based provider of networking and communication systems is unique in that 95 percent of its production is outsourced (Harrington & O'Connor, 2009). Since most of its supply chain is global in nature, the company has adopted a program to gradually depart from single sourcing in favor of multiple sourcing. Such planning was important when on May 12, 2008, a 7.9 magnitude earthquake struck the Sichuan province of China, an area that is at the heart of Cisco's supply chain for that region of Asia.

### **Alternative 2 – Keep preventative maintenance and equipment upgrades on schedule.**

For the company that is a major producer in its industry supply chain, it is important to not disrupt its own production due to an unnecessary or unplanned equipment malfunction. While production managers have known for years of the importance of preventative maintenance, there are still temptations to let equipment operate longer than it should without spending extra dollars on upgrades or other maintenance. However, a major equipment breakdown can stop production altogether, an occurrence that does not profit any party in the supply chain.

For some companies in the supply chain, an equipment breakdown can be more than just an interruption of supply, it can be deadly. On April 2, 2010, an explosion and fire erupted at the Tesoro Corporation, a refining company in Washington State. The explosion killed seven workers. The incident was investigated by the Washington Department of Labor and Industries and resulted in the issuing of 44 citations and a \$2.38 million fine for safety and health violations (Washington state fines Tesoro, 2010). The department noted a number of problems in the postponement of maintenance procedures including:

- Continuing to operate equipment that was failing and should have been replaced
- Purposely postponing maintenance
- Inadequately testing for potential damage to equipment, including the heat exchanger that exploded
- Failing to protect workers from injury and death.

A major problem in refining and extractive industries (such as coal mining) is the lack of effective enforcement of existing regulations. The result can be an awkward situation in which companies challenge citations from regulatory agencies, in some cases, for years (Regulatory flaws, 2011). During the appeal process, the company is not required to make any equipment changes. In some cases, the company would rather pay a fine than make an equipment upgrade since this option may actually be more cost effective.

### **Alternative 3 - Consider longer contracts when negotiating with labor unions.**

Manufacturers that have employees represented by a union are prone to interruptions when the labor contract is up for renegotiation. While three year contracts are considered the norm in many industries, some companies are negotiating longer contracts in order to provide more stability to both management and labor.

Boeing has endured five strikes since 1977 (Ostrower, 2012) from its union, the International Association of Machinists (IAM). Since the relationship has been volatile, Boeing has been seeking to make labor peace in more recent years as a strike is extremely costly for both the

union and the company. In its most recent negotiations with the IAM back in November 2011, Boeing reached a 5 year contract agreement (Goold, 2012). The longer length of the contract takes away pressure from both sides, management and labor, and allows them to do what they do best, make commercial aircraft without the worries of an impending interruption due to a strike.

#### **Alternative 4 - Consider the total cost of ownership before outsourcing or offshoring.**

Although many companies have moved some or all production of their products overseas, the dollar costs of offshoring have not always been calculated correctly. Harry Moser, a key player in what is now called the reshoring movement, maintains that the costs of global outsourcing should follow a total cost of ownership model (Markham, 2011). This model includes calculating all costs associated with manufacturing the product, including risk factors such as the stability of the country, the loss of business due to poor quality, the economic stability of the overseas supplier, and loss due to lack of innovation. More traditional costs are also included such as transportation and holding costs, damage to product while en route, and duty fees.

The convergence of labor rates in the United States and other countries, such as China must also be considered. Over time, the cost gap between a product produced in the United States and one produced in China has narrowed (Sprovieri, 2011). As managers become more aware of the logistic costs of moving production overseas, additional pressure may be put on them to bring production back to the home country.

#### **Alternative 5 - Ramp up capacity ahead of time if reshoring.**

While reshoring is an exciting alternative to consider, it needs to be planned in advance. Two keys that are necessary for a successful reshoring venture are automation and a skilled workforce. As one business writer states, “Automation also requires a skilled workforce. The days of the dirty factory, with mind-numbing repetitive tasks requiring minimal training, are over. Today’s factory worker must be knowledgeable, committed to quality, and skilled in multiple disciplines” (Huss, 2012: 48).

Reshoring may not necessarily be applicable to the entire production process. As Johnston (2012: 28) points out, “blindly reshoring the entire manufacturing footprint is likely not the right answer.” Instead, producing products in Asia that are sold in that region may still be feasible while products sold in the U.S. (or home country) could be manufactured in the U.S.

#### **Alternative 6 - Consider shortening and simplifying the supply chain.**

Reshoring illustrates how moving the manufacturing process closer to where the customer resides helps to simplify the supply chain. Simplification occurs on at least two fronts. First, the distance from manufacturer to customer is shortened, thus simplifying the transportation process. Second, the number of contact points that can interrupt the supply chain are decreased as well. For example, reshoring eliminates the need to cross international borders, which reduces the administrative tasks of moving the product through customs. It also bypasses busy international ports, a contact point that can be subject to labor strikes, a crisis that interrupts the flow of goods.

#### **Alternative 7 - Introduce buffers to absorb disruptions.**

For short-term disruptions, adding buffers in the supply chain may be feasible to absorb the fluctuations in flows. Companies may use extra inventory as a buffer against late deliveries, or extra capacity as a buffer against unexpected demand. They incur the added expense to avoid



even greater expenses if the disruption occurs. Companies need flexibility to handle the fluctuations in demand and supply they may encounter.

## CONCLUSION

As Reese (2007: 42) put it, "For better or worse, in this age of lean, expended and outsourced operations, 'disaster-proofing' your supply chain isn't an option, it's an obligation." The SWOT matrix was presented as a way of strategically approaching the task of planning for unexpected interruptions in the supply chain.

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# **CULTURAL FACTORS AND PROJECT MANAGEMENT SUCCESS: A MULTINATIONAL STUDY FOR THE US, GERMANY AND JAPAN**

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## **ABSTRACT**

In an increasingly global economy, international projects are expected to play an ever more important role. In such large-scale global or international projects, members from different countries and cultural backgrounds have to cooperate to generate success. Nevertheless, these recommendations rarely consider cultural aspects. At the same time, both literature and management practice rarely shed light on the perspective and experiences of project managers involved in this area.

This study aims at contributing to close gaps in (1) knowledge about the importance of such projects and (2) about the implication of such complex, often cross-cultural settings on project success. A multinational empirical investigation with real-life project managers was set up in the US, Germany and Japan in order to provide guidance to these two sets of research questions. An internet based survey resulted in 768 usable questionnaires from these countries.

Asked about the relevance of international projects, as expected 668 (87.88%) of the participants stated, that international projects had a high importance for the company. and 567 (74.61%) found that the number of international projects is increasing. Type of company and industry had none or a small impact on the project success. It was also shown that for the sample, time and budget over-runs as a measure of (negative) success in fact do correlate.

The results showed an intermediate correlation of the project members' nationality and the project success. Furthermore, the nationality of the team members had an even larger impact on the project success than the nationality of the individual respondent. This leads to the conclusion that the nationality of the majority of the project members had a stronger impact on the project success than the nationality of the individual respondent.

When working with a project team mainly coming from the USA, e.g. the time/budget over-runs were least compared to the other two nationalities (US-American with US-American team: Time: 14.78, Budget: 15.43; German with US-American team: Time: 17.29, Budget: 13.29; Japanese with US-American team: Time: 20 Budget: 18.4). In contrast the time/budget over-runs among project teams mainly consisting of Japanese were twice or threefold higher (US-American with Japanese team: Time: 49.13, Budget: 46.52; German with Japanese team: Time: 48.15 Budget: 58.15). There is an even greater delay in time and budget within a homogenous Japanese team structure (Japanese with Japanese team: Time: 59.52, Budget: 59.76).

When examining the relationship of project success and the single culture, explicit differences occurred among the three countries Germany, Japan and the USA. According to the answers of the respondents it seems that the Japanese hardly achieve a time/budget under-run. In comparison the German and the US-American teams are more likely to achieve better results. In addition the US-American teams realized less time/budget overruns than the Germans and especially the Japanese.

Whilst cultural factors clearly have an influence on project success, further research should be done. A further development towards even more global value-chains and markets will also generate new research needs. Further focus on the topics raised in this promises to improve competitive advantage for companies that are involved in international projects. As a result, labour and capital productivity on projects will increase dramatically, as a more comprehensive cultural framework for projects can be developed in the future.

# **CULTURAL FACTORS AND PROJECT MANAGEMENT SUCCESS: A MULTINATIONAL STUDY FOR THE US, GERMANY AND JAPAN**

## **Introduction**

With globalization being a major trend, the management of intercultural projects should become increasingly critical. In those large-scale global or international projects, members from different countries and cultural backgrounds have to cooperate to generate the necessary outcome (Kerzner, 2004). Today's literature provides numerous methods for the realization of such projects. Nevertheless, these recommendations rarely consider cultural aspects. Also in practice, in many cases project managers do not receive proper preparation for their international deployment (Hoffmann, Schoper and Fitzsimmons, 2004). At the same time, both literature and management practice rarely shed light on the perspective and experiences of project managers involved in this area.

The objective of this paper is to contribute to this – potentially – emerging field and to help close some of the mentioned gaps. In essence, the authors want to come up with answers to the questions whether (1) the globalization of markets leads to a high(er) number of intercultural projects and whether (2) some cultural factors can be identified that affect project success in such a complex environment involving project managers from different cultures. A multinational empirical investigation with real-life project managers shall provide guidance to these two sets of research questions.

As “statistics show that over half of international projects either fail, fail to be completed, or do not deliver the results that were promised” (Lientz and Rea, 2003, p. 4), such a study seems timely – and a focus on project success factors has been chosen accordingly. The authors take this clue and for the purpose of this study define project success as related to time/budget over-/under-runs.

## **Literature Research**

The review of literature focuses on the proliferation of larger projects, related methodologies and the impact of a country's culture on such projects. As a starting point, the authors refer to the vast literature on globalization and focus on the fact that the establishment of trade relations for export or import, common joint ventures, or acquisition of interests are oftentimes carried out in the form of a project (Kiesel 2004). Cultural aspects play into this multinational process and need to be analysed accordingly.

## **Definition and Fields of Culture**

In each country different elements have been named as relevant factors for company success. One can assume that actions that are implemented to lead to company success differ as well (Deresky 2007). The comparison of the results leads towards a major issue of multicultural project managing.

Etymologically the term “culture” can be derived from the Latin word “cultura”, which means “growing” or “cultivation” (Haecker, Stapf and Dorsch, 2003, p. 417). The meaning of “culture” can differ a lot depending on which aspect of life the definition focuses on, but literature provides several key elements:

- Universality - Culture, respectively its defining elements, are shared by and passed on from members of society (McCarthy, 1989).
- Time - Culture is acquired and transferred from generation to generation (Hofstede, 1997).
- Symbols - Culture is reflected in symbols; in tangible culture such as products and goods, as well as intangible culture, e.g. ways of thinking, behavior, values (Geertz, 2003).
- Orientation - The main function of culture for its members is to give orientation. It is indirectly steering them by collective programming (Hofstede, 2001).
- Change - Members of culture are not only being part of it but also forming culture. While being geared by values which were available in previous generations they change the same by interpreting and living them their own way (Inglehart and Maeurer, 1989).

Trompenaars and Hampden-Turner (1997) content that culture is not bound to national borders. For them, a certain culture develops when there is a group of people sharing the same values and ethical views, and they specifically differentiate between national culture and corporate culture. Taking this approach to the next step, different levels of can also be found inside a sufficiently large company.

Most of the time organizational cultures have a direct influence on projects (Project Management Institute, 2004), and projects tend to develop their own culture that makes them unique – and at the same time makes them evolve together with the organisational culture. In that context project culture can be comprehended as an accumulation of conventions, values and also related rules of a project (Gareis, 2007). In particular, in international projects project culture serves as a joint base that all project members share.

## **Definition and Management of Projects**

There are manifold definitions of a project, but what they all share is a set of characteristics that clearly distinguish projects from on-going, operational work. According to the German Institute for Standardization’s DIN 69901 Standard, a project is defined as an “enterprise that is characterized by unique conditions such as a particular target setting, restricted resources, separation from other ventures and specific organization” (Koreimann, 2002, p. 11). As a result, in order to identify a project in practice, it makes sense to examine the applicability of certain characteristics. Literature provides a wide range of such criteria, the major ones being:

- Clear objective - The results of the contents to be achieved are clearly specified (Meier, 1998). Project tasks are coupled with assignments or customer requirement specifications which define significance, objective and purpose of a project (Salzgeber, 2001).
- Novelty connected to uncertainty and risk - Projects are intentions which are implemented in this form for the first time, so that its core tasks cannot be

overwhelmed by routine actions. Thus, every project is afflicted with a certain risk, while it is never possible to anticipate, if the set objectives can be reached. Hence, the probability of failure by project tasks is larger than for routine activities (Kraus and Westermann, 1998).

- Temporal limitation - Projects are temporal tasks with a clear defined start (project start, kick-off) and end (closing). Projects start with the awarding of the project contract and end with the objective achievement. In cases the project objective appears no longer to be accomplishable projects end with an interruption (Salzgeber, 2001).
- Range overlapping - Due to the interdisciplinary character of projects, their planning usually involves several departments (Fuchs, 1999).
- Complexity - By reason of their high degree of novelty, their number of project participants, or risk they bear, projects can be described as complex intentions (Birker 1999).
- Limited resources - Typically, the resources of an enterprise are limited. Therefore, a constant competition for available means as well as qualified personnel arises between project and line tasks (Kraus and Westermann, 1998).

Taking these characteristics into a multinational environment, Kiesel (2004, p. 8) broadly defines an international project as a project, "in which people from different culture areas are participating directly or indirectly." An international project is therefore a project which involves multiple locations, organizations, entities and business units (Lientz and Rea, 2003).

Project management is that kind of management, which is needed in order to lead a project in a specific way, a specific time and with specific resources to a specific result (Stevens, 2002). As a result the definition of the Project Management Institute is: "Project management is the application of knowledge, skills, tools and techniques to project activities to meet project requirements. Project management is accomplished through the application and integration of the project management processes of initiating, planning, executing, monitoring and controlling, and closing" (Project Management Institute, 2004, p. 8). Literature confirms that this approach actually positively affects the success quota of projects (Schelle ,1996), as a it helps the attempt to react faster to the change in its environment without the necessary requirement of a complete new organization.

There are large numbers of possible methodologies which are available for project managers in the market. The choice of the methodology depends on the industry where the project is implemented. This is due to the fact that in every industry the projects have differences in life cycles, market sectors, products and technologies (Charvat 2003). However, generally accepted and standardized approaches still have their place, among them local guidelines by professional organisations such as the Project Management Institute (2001) launched by the Project Management Institute and often seen as a benchmark (Charvat, 2003), or the Guidebook of Project and Program Management for Enterprise Innovation published by the Project Management Association of Japan (2003) in local language. Given that in the experience of the two authors, Europe refers to the overall Project Management Institute guidelines, this set already gives an overview of approaches used in America, Europe and (parts of) Asia. Two languages thus allow covering three cultural fields.



## Differences among countries

Based on both the notion of Triad markets and their own work experience, the authors selected the USA, Germany and Japan as study fields. The reason for this selection is that these countries represent different continents – America, Asia and Europe – being a major contributor to of the world economy. Furthermore, these countries are very different in their culture. This can be easily recognized by comparing the dimensions of Hofstede and Hofstede (2006) as shown in figure 1.

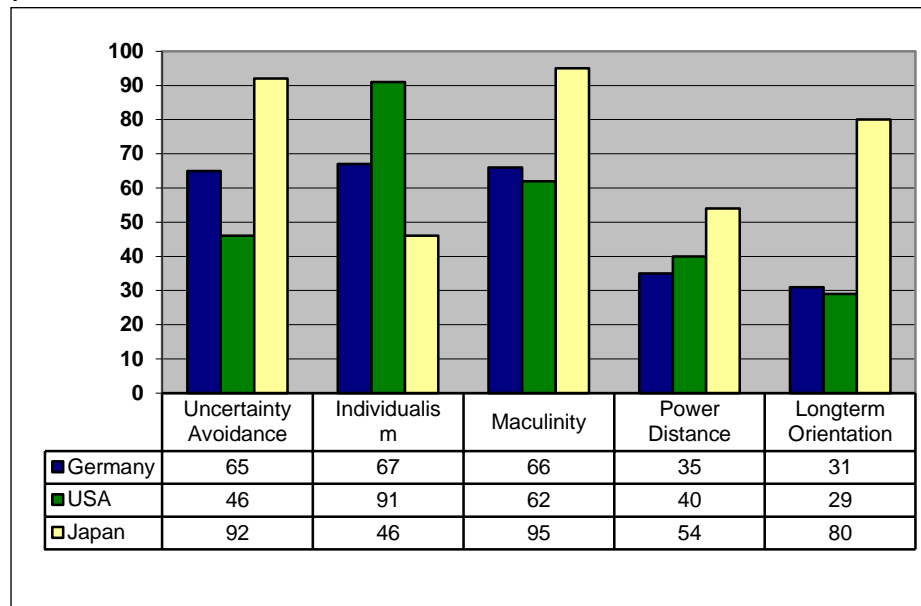


Figure1: Comparison USA – Germany – Japan (Hofstede and Hofstede, 2006)

As to the specific area of research at hand, it is relevant to verify which cultural values influence project management and to provide configuration recommendations for the selected three countries. Literature provides some clues by providing “conflict management” overviews (Swierczek, 1994, p. 42):

Conflict Issues	USA	Japan	Germany
<b>Identity</b>	Emphasis on "I"	Emphasis on "we"	Emphasis on "I"
<b>Face</b>	Self face	Others-face high concern	Self face
<b>Motivation</b>	Autonomy	Association	Self-accomplishment and service to society
<b>Conflict emphasis</b>	Direct	Indirect	Direct
<b>Style</b>	Controlling or confrontational	Obliging or avoiding	Controlling or confrontational
<b>Strategy</b>	Competitive strategies	Collaborative strategies	Competitive strategies
<b>Communication</b>	Direct speech/fact	Indirect speech/allusions	Direct speech/fact

<b>Nonverbal</b>	Obvious and direct emotional expressions and reactions	Indirect emotional expressions and reactions	Obvious and direct emotional expressions and reactions
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Figure 2: Overview of US and Japanese conflict resolution

This overview provides the background for a research study targeted at the field of international project management in or across different cultures. The authors undertake to study this area in a broad sense and try to tackle the above mentioned two major questions.

### Study and Findings

Based on the literature research it was derived that the USA, Germany and Japan should differ significantly in certain cultural aspects. To tackle both the gap in the literature with regard to multicultural project management methodologies, and the resulting need for taking strategically relevant action, a study was performed on the selected three countries.

The major research fields were whether (1) the globalization of markets leads to a high(er) number of intercultural projects and whether (2) some cultural factors can be identified that affect project success. In order to practically define project success, we face a major obstacle, as in fact Kellner (2001, p. 15) notes that in practice, “projects were regarded as success, although no product was finished, although the costs were astronomical, although the team constantly lay in the controversy, although clients and the project managers considered themselves mutually with threats and revenge oaths. Where did success lie? The answer: much learned.”

Interpretation possibilities lying between the failure of a project and success are numerous. Many authors have tried to clearly define project success. However, these definitions miss accuracy and practice relevance. If such a definition speaks of any deviation is defined regarding date, budget or quality as unquestionable failure of the project, then it is a little close-to-reality. It is questionable to deny success to a project, which shows deviations within acceptable limit values. The difficulty consists of specifying these limit values.

Largely in line with Brunschede (2000), for this research it was decided that the term “project success” reflects time/budget over/under-run, i.e. differences in project success are measured using the category “time/budget over/under-run”. Also the word “culture” is representative only for the three nations Germany, Japan and USA as only those three nations are object of this study.

## Research Study Design

For an internet survey, individuals with more than one year of experience in national and international project management were sampled in the target countries. The survey used a 6 point Likert scale and closed questions to collect the data. It was available in English and Japanese language, the latter validated by several translation and back-translation loops. The participants were chosen at random. The selection criteria were their personal experiences in the field of international project management.

The survey was accessible among experts in the field of project management and inter-cultural management from different companies. Those persons were contact directly by e-mail, resulting in 650 potential respondents. Further on an article providing information about the research topic including the URL to the web-based questionnaire was provided in different internet forums related to project management. Also several associations published the article including the link in their monthly newsletters. In summary, the article was pliable for more than 156,500 persons (calculating the member counts and the direct e-mails). With the high amount of potential respondents the probability of qualified responses could be increased.

The survey was active for circa two months, as it had been open for 1626 hours and 37 minutes. In total 1.036 filled out questionnaires were submitted. According to the sampling criteria mentioned above, 768 out of 1.036 were considered as valid and usable. The source data were downloaded and formatted in a Microsoft Excel spreadsheet. For further analyses, the database was exported SPSS.

Among the respondents, Germans presented the largest group with 364 respondents (47.4%). The second largest group was the Japanese with 179 participants (23.3%). The third major group was represented by the USA with 162 respondents (21.1%). The other nationalities with 63 participants (8.2%) completed the picture. They were used only if they participated in clearly assigned projects.

## Multinational Projects

Asked about the relevance of international projects, as expected 668 (87.88%) of the participants stated, that international projects had a high importance for the company. Only 68 (8.95%) reported, that international projects had low importance for the company and just 24 (3.16%) stated, that there is no importance.

Along the same pattern, nearly three-fourths of the participants 567 (74.61%) stated that the number of international projects is increasing. Just 176 (23.16) respondents reported, that there is a neutral trend towards the number of international projects and 17 (2.24%) participants felt, that the importance of international projects is decreasing.

## Project Success

As outlined, project success for this study has been defined as (lack of) time/budget (over-/ under-runs. The following paragraphs outline the related characteristics in this sample, starting with an analysis by nationality of the respondent.

		Please specify the Time over/ under-run	Please specify the Budget over/ under-run
Nationality	Correlation Coefficient	.246**	.294**
	Sig. (2-tailed)	0	0
	N	518	518
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 1: Respondent Nationality

Table 1 shows the relationship between the respondent's nationalities versus time/budget over-/under- run. A small association between the variables can be found. The variables are statistically significant ( $p = .249/.294$ ,  $p = .000/.000$ ,  $n = 518$ ). The  $H_0$  is rejected.

Respondents were drawn from companies with varying levels of operations for which they did their last international project. At the higher end, 434 (57.33%) of the participants represented global companies. Further, 238 (31.44%) respondents were drawn from international companies. Another 61 (8.06%) came from national companies. The remaining 24 (3.17%) responded, that they do not know or did not want to answer. It can be pointed out, that nearly 90% of the respondents participated in a company which is operating in a global respectively in an international environment.

		Please specify the Time over/ under-run	Please specify the Budget over/ under-run
Type of Company for which you did your last International Project	Correlation Coefficient	-0.025	-0.03
	Sig. (2-tailed)	0.572	0.489
	N	518	518

Table 2: Company Type

Table 2 shows the relationship between the type of the company and time/budget over-/ under-run. There is a small negative association between the variables, but there is no linear relationship and the variables are not statistically significant ( $\rho = -.025/-.030$ ,  $p = .572/.489$ ,  $n = 518$ ). Therefore the  $H_0$  is not rejected. This finding is interesting, given that one would assume that the related complexity of the organisations could have an influence on project success.

The data show different results when checking for the type of industry for which the respondent did the last International Project. Respondents companies represented a diverse range of industries. At 19.95 % and 18.50 % respectively, automotive and IT were the industries best represented. The remaining 60% were split into 14 different industries, such as Telecommunication (9.58%), Consulting (8.40%), Engineering (6.96%), Consumption Goods (6.56%), Banking/Finance (6.43%), etc.

		Please specify the Time over/ under-run	Please specify the Budget over/ under-run
<b>In what Industry is this company active for which you did your last International Project</b>	Correlation Coefficient	.096*	.084*
	Sig. (2-tailed)	0.028	0.05
	N	518	518
*. Correlation is significant at the 0.05 level (2-tailed).			

Table 3: Industry

Table 3 shows the relationship between the type of industry and time/budget over/underrun. There is a very small association between the variables. This expresses that no linear relationship among those variables exist ( $\rho = .096/.084$ ). Based on the p-value ( $p = .028/.050$ ), this relationship is statistically significant,  $H_0$  is rejected. Hence, there is a statistically significant relationship between the kind of industry which the particular subject belongs to and time/budget over-/under-run – different from the above findings for the company type.

Taking a different perspective, the answers have been analysed by country from which the majority of the project members come from. With respect to the nationality of most of the team members, 180 (31.03%) participants worked together with main project members from Germany. 161 (27.76%) respondents worked together mainly with project members from the USA and 138 (23.79%) with members from Japan mainly. The picture is completed by 101 (17.41) participants who worked together with main project members from several nationalities “others”.

		Please specify the Time over/ under-run	Please specify the Budget over/ under-run
<b>The majority of the project members come from which country</b>	Correlation Coefficient	.417**	.449**
	Sig. (2-tailed)	0	0
	N	440	440
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 4: Project Members Nationality

Table 4 shows the relationship between the nationality of the project members and time/budget over/underrun. In this case there is a medium positive association between the variables which is statistically significant. The  $H_0$  is rejected.

Furthermore, detailed data analysis shows that the cultural background of the members in a project team has a stronger influence than the nationality of the individual who has completed the questionnaire as shown in Table 1. It can thus be recommended to base evaluations on “nationality of the majority of the project members” and not the individual respondents’ nationality, as the project team nationality had a greater numerical impact in terms of the correlation coefficient on the project success compared to the respondents’ nationality.

As to the duration of the last international project the respondents have been involved in, 246 (42.34%) of the participants worked in a project lasting 6-18 months. Another 167 (28.74%) have worked within a duration of 18-36 months. Finally, 88 (15.15%) participants worked in a project lasting less than 6 months and 80 (13.77%) participants worked in an international project which lasted more than 36 months.

		Please specify the Time over/ under-run	Please specify the Budget over/ under-run
<b>What was the duration of the last International Project</b>	Correlation Coefficient	.349**	.338**
	Sig. (2-tailed)	0	0
	N	518	518
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 5: Duration

Table 5 shows the relationship between the duration of the last international project and time/budget over-/ under-run. There is a moderate association between the variables. There exists a moderate linear relationship among those variables ( $p = .349/.338$ ). Based on the p-value ( $p = .000/.000$ ), this relationship is statistically significant for  $n=518$ .  $H_0$  is rejected.

### **Time/Budget Over-/Under-runs: A Cross-National Deepdive**

The sample data show that over 75% of the projects had a time delay. 164 (28.23%) of the participants stated, that in their last project a 20% to 49% delay in time occurred. Another 138 (23.75%) stated, that they had to face a time over-run at 50% to 99% level. Furthermore 84 (14.46%) faced a time delay between 10% to 19%. 63 (10.84%) of the participants even had to experience an overrun of >100%. On the other side for 101 (17.38%) participants, the project was finished in time. 21 (3.61%) of the respondents experienced a time under-run of 10% to 19% and 7 (1.2%) reported a time under- run of 20% to 49%. 3 (.52%) respondents had a 50% to 99% time under-run in their last project.

From the overall data it can be pointed out, that mainly the US-Americans could achieve a time under-run. On a second look, it also can be stated, that the Germans had an almost equal allocation at 0% to 49% level of time delay, which gets less beginning from the 50% level. Finally it has to be noted, that the Japanese had no major under-run in time, they mostly faced a time delay.

As to the second success criterion, data show that over 75% of the projects had cost overruns. 134 (23.06%) of the participants stated, that there were a 50% to 99% cost overrun in their last project. Another 128 (22.03%) stated that they had to face higher costs at a 20% to 49% level. Furthermore, 114 (19.62%) faced cost overruns between 10% to 19%. 53 (9.12%) of the participants even had to experience an overrun of >100%. On the other hand, for 107 (18.42%) participants the project was finished in time. 27 (4.65%) of the respondents experienced an under-run in costs of 10% to 19% and 15 (2.58%) reported an under- run of 20% to 49%. 3 (0.52%) respondents who worked in a project which had a 50% to 99% cost under- runs in budget.

Looking at the budget under/over-run by the nationality of the team members, it can be pointed out, that mainly the US-Americans and Germans could achieve an under-run in budget. On a second look it also can be stated, that the Germans had an almost equal allocation at 0% to 49% level of cost overrun, which gets less beginning from the 50% level. Again it has to be noted, that the Japanese had only a small share at the budget under- run, they mostly face a cost overrun. This similarity to the time delay results leads to the question, whether success is correlated along the two defined criteria.

		<b>Please specify the Time over/under-run</b>
<b>Please specify the Budget over/under-run</b>	Correlation Coefficient	.762**
	Sig. (2-tailed)	0
	N	440
**. Correlation is significant at the 0.01 level (2-tailed).		

Table 6: Correlation of over-/under-runs

Table 6 confirms this expected result, as it shows the relationship between the variable time over-/ under-run and budget over-/under-run. There is a high positive association between the variables and the relationship is statistically significant ( $\rho = .762$ ;  $p = .000$ ;  $n = 440$ ). Therefore  $H_0$  is rejected.

Respondents from all three countries stated time over-runs. The Japanese respondents had to face an average time overrun of 49.02% and the US-American respondents stated, on average, the lowest time overrun (23.45%), just closely followed by the German respondents' statements (24.06%). Budgets follow a similar pattern. Respondents from all three countries stated a budget over-run. The Japanese respondents stated an average overrun of 47.80% and the Germans respondents stated, on average, the lowest budget overrun (20.04%), just close to the US-Americans respondents' statements (20.59%).



The next table takes a deeper look into the issue of time/budget over/ under- run. Here the nationality of the respondent in combination with the nationality of the majority of team member he worked with at his last international project is set into relation to time/budget over-/ under-run.

Mean – Report			
Nationality	Nationality of the team members	Time over/ under-run	Budget over/ under-run
German	USA	17.29	13.29
	Germany	23.59	16.72
	Japan	48.15	58.15
	Others	21.67	17.5
US-American	USA	14.78	15.43
	Germany	21.07	11.79
	Japan	49.13	46.52
	Others	18.57	16.19
Japanese	USA	20	18.4
	Germany	22.86	15.71
	Japan	59.52	59.76
	Others	53.75	43.75
Other	USA	15	13
	Germany	28.57	26.43
	Japan	44	38
	Others	18.33	12.5

Table 7: Overview of the average of the time/budget over/ under- run subdivided by the nationality of the participant and the nationality of the team members

Based on the source data described in above table, a solely US-American project team obtains the lowest average time over-un (14.78). Americans working within a German team stated the lowest average budget over-run (11.79), but also face bigger time over-runs than homogenous US-American teams (21.07). A solely Japanese project team obtains the highest average time/budget over-run (59.52/59.76). Homogenous German teams seem to work closer to schedules and budget targets than Japanese teams, but still are outperformed by American teams. Mixing teams has various effects that can hardly be systematized, but there is a central tendency that American respondents embedded in multicultural project teams answered most optimistically towards time/budget over-runs.

As for budget over-runs, Germans seem to have a positive effect on US-American project teams (13.29) and vice versa (11.79). US-American respondents answered that their budget performance (46.53) is better than is the case for solely Japanese teams (59.76), whereas respondents from Germany state a similar time performance to homogenous Japanese teams (58.15). According to the respondents' answers, mixing/adding Germans or US-Americans has positive effects on Japanese project teams as average time over-runs are reduced from 59.52 to 48.15/49.13.

## Limitations and further Research

Several limitations apply to the study, thus providing avenues for further research. First of all, the focus of the collected data was limited to three countries (Germany, Japan and USA) and due to that, the generalizability of the results for other countries cannot be taken for granted. Therefore, future cross-cultural research on project management should be performed on a broader scale, considering other countries and focussing on collecting data from a larger population of project managers, project team members, stakeholders and others within each country that will permit more specific assessments of the criteria used for cultural comparison and their characteristics.

Secondly, the analysis of the data and the explanation of the findings are based on Hofstede's dimensions of national culture and the selected project management standard. Other cultural theories and methodologies have to be evaluated in order to tackle this issue and to support the findings of this research.

The third limitation of this research is the assumption of the culture homogeneity. The importance of subcultures is not denied, but was not in focus. Further, the pre-knowledge about and experiences with other cultures of the respondents were not taken into account. This implies also that it was assumed that "culture" is a parallel phenomenon to "nation" which means it was supposed that there is some "national culture", i.e. a homogeneous culture within a country that ends with its political border. This also relates to the reference made to Hofstede's research (Baskerville, 2003).

A fourth limitation is the allocation of industry which showed that more than 38% of the respondents work in the automotive/IT sector. This significant share of respondents from above sectors let assume that the drawn conclusions from this research might be different for other populations. Hence, future research should imply a different distribution among various industries.

The fifth limitation is given by the way the survey was accomplished. This study was not an accompanying study to document the project development it used a self-completion questionnaire which asks for self-assessment. The reliability of any self-evaluation is questionable, due to the fact that self-evaluation might be different among cultures (Zwikael, Shimizu and Globerson, 2004). The variable "changing self-perception across cultures" was not controllable in this research. A possible suggestion for future avenues could be a change of research method.

Limitation six is that the project budget/time over-/ under-run was chosen as a measure for project success This might be a limited measure for project success. One has to be aware that a project which produces a high quality product might lead to subsequent contracts, a business partnership and in the long run to a high outcome –despite that the project at the first sight had to face a time/ budget overrun. Zwikael, Shimizu and Globerson (2005, p. 457) also considers "technical performance" and "customer satisfaction" to be relevant dimensions as a measure for project success. By adding dimensions of project success, the overall project outcome could change and the measured project success could end in different results for the USA, Germany and Japan. In order to tackle this issue, it is suggested

to develop and use standard criteria to measure project success. Further research could develop and imply standard criteria to measure project success.

Seventh and last limitation is depending on the data collection selected; specific limitations do also apply to the samples, in both scope and size. It was mentioned per sampling criteria, that all respondents already have minimum one year of international experience in international projects. Results for project members with a different cultural background or less than one year of experiences in international projects might well deviate. Furthermore, in the sample Germans (364) outnumbered American (162) and Japanese (179) participants. A sample with more American and Japanese would have been desirable.

Concluding, it has to be stated, that a further development towards even more global value-chains and markets will also generate new research needs. Further research in this direction will reduce cultural misunderstandings, increase employee morale and generate social capital (Arenius, 2005). It promises to improve competitive advantage for companies that are involved in international projects. As a result, labour and capital productivity on projects will increase dramatically, if a comprehensive cultural framework can be developed in the future.

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## **A PRELIMINARY EXAMINATION OF COMMUNICATION CONTENT, LEADERSHIP STYLES, AND JOB SATISFACTION**

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### **ABSTRACT**

This study examined the relationships between communication content, leadership styles, and job satisfaction for a sample of 354 people working in multiple organizations. Results suggest a relationship between all five communication content types and the two leadership styles. No relationship was found between communication content and job satisfaction, and no relationship was found between leadership styles and job satisfaction.

### **INTRODUCTION**

This paper is a preliminary examination of the relationship between basic communication content, leadership styles, and job satisfaction. Over the past several decades, public interest and a stream of management literature focused on quality of work life programs and on team work and team building along with high commitment human resource management practices. In general, society's perception is that "people friendly" leadership emphasizing communication maximizes not only organizational performance but also attitudes such as job satisfaction [6] [8] [3] [9]. Researchers question whether society's perception is accurate. The research question is whether the leadership styles and communication content make a difference in job satisfaction. In this study, the relationships between leadership styles-- initiating structure leadership and consideration leadership, five categories of communication content, and job satisfaction are examined. Does a "people friendly" leadership style result in subordinates who are more satisfied with their jobs? Does communication content relate to job satisfaction?

### **BACKGROUND**

Leadership can be defined as the exercise of influence by one member over other members to accomplish group or organizational goals. Leader communication is often presumed to be an important element of exercising influence [4]. There is a commonly held belief that leaders "make a difference" and that they can have an effect on individuals, groups, or entire organizations. As a result, the leader gets credit when things go right and blame when things go wrong.

Researchers question why some leaders are more effective than others. The leader behavior approach focuses on what leaders actually do; that is, the specific behaviors performed by effective leaders as opposed to ineffective leaders. The behavior approach sought to identify the leader behaviors that aid individuals, groups, or organizations in the achievement of their goals. From multiple research studies, two categories of the leader behaviors were identified-- consideration and initiating structure. Consideration behaviors show that the leader trusts, respects, and values good relationships with the subordinates. Examples of a leader's consideration behavior include being friendly, treating subordinates as equals, and providing an explanation for his or her actions. Initiating structure behaviors are those behaviors done to make sure the work gets performed and that subordinates do their jobs adequately. Setting goals, determining a strategy to reach those goals, delegating tasks to subordinates, and urging subordinates to do those tasks would be initiating structure behavior. Consideration behaviors and initiating structure behaviors are not mutually exclusive but rather are complementary. Consideration

behaviors would be the “people friendly” style of leadership; whereas initiating structure leadership would be more concerned with getting the job done.

Management scholars have assumed that communication is an important, if not necessarily well understood, indicator of success for managers [10] [3]. This assumption is entirely natural. Even the most casual consideration of the manager's job is likely to lead one to conclude that a fundamental relationship exists between communication and the potential of managers to perform the most basic functions associated with the job. Since the link between communication and managerial performance is believed to be basic in nature, there have been few efforts to identify or to understand the relationship between the content of a leader's communication and potentially important outcomes.

On the one hand, the lack of research into communication content may reflect reluctance by organization scholars to "study the obvious." On the other hand, some believe that variance in basic communication is too small to explain variance in performance between managers. This latter view is held by Jablin, Cude, Wayson, House, Lee and Roth [5] who suggest that research efforts be focused on how skills are used to achieve organization goals rather than on the identification of skills. Both of these perspectives seem too limiting for a number of reasons. First, while the link between communications and performance may seem obvious, there is no consensus on which aspects of basic communication content are more or less important indicators of managerial effectiveness. Second, the assumption that basic communication abilities also referred to as "threshold skills" are of little importance has not been empirically verified. Third, organizations spend large amounts of money and time attempting to improve the "communication skills" of their current and future managers. Understanding the basic communications abilities most critical to managerial success could provide a basis for making such efforts more meaningful.

## **METHOD**

The sample for this study consisted of employees working in a large southern city. Subjects for this study consisted of a sample of first line supervisors, middle and executive level managers and their immediate subordinates. 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 354 individuals for a response rate of 55 percent.

Leadership style was measured using a short form of the Leader Behavior Description Questionnaire XII (LBDQ XII) Stogdill, 1963 [2]. Two subscales were selected for measurement: Initiating Structure (10 items), and Consideration (10 items). Communication content was measured using the Communications Content Questionnaire (CCQ) [7]. The CCQ measures five types of leader/manager communication content: Performance Communication, Task Communication, Career Communication, Personal Communication, and Responsive Communication. Job satisfaction was measured using the Brayfield and Roth job satisfaction scale [1].

## **RESULTS**

This study was concerned with determining the basic relationship that might exist between a manager's leadership style, the content of his or her communication with subordinates, and employee job satisfaction. Pearson correlation results are reported in Table 1. The results of this preliminary study are rather surprising in that they are not consistent with “conventional wisdom.” For this sample, there were no significant relationships between any of the five communication content dimensions and job

satisfaction. Furthermore, the relationships between leadership styles and job satisfaction were not significant. However, there were significant relationships found between both leadership styles and all five communication content dimensions.

**Note:** Table 1 will be furnished upon request.

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**Advancing Facilitators and Deterrents Theory  
of Students' Study-Abroad Decisions**

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## **ABSTRACT**

The number of American college students studying abroad continues to climb every year. The increasing global market is making it necessary for an increase in foreign relations amongst college students. This study proposes a model of planned behavior to examine how students' attitude, subjective norm, and perceived behavioral control play in their decision to study abroad. The total of 448 surveys was collected from a university located in the southeast region of the United States. The study examines indirect and direct effects of each dimension on student's intent to study abroad. The survey results also indicate perceived benefits of and barriers to study abroad. Among the three dimensions of planned behavior, attitude is the pervasive predictor of study abroad participation. Implications and improvement opportunities conclude the paper.

Keywords: study abroad, model of planned behavior, Southeast United States

## **Advancing Facilitators and Deterrents Theory of Students' Study-Abroad Decisions**

The purpose of the research here is to learn what marketing strategies may be necessary to increase the number participants in university study abroad programs. Using the theory of planned behavior, the researcher examines factors that play a role in a student's decision to study abroad. Moreover, the study examines impacts of various motivators and deterrents, such as friends, family, school involvement, personality, and financial situations, on students' decision whether or not to study abroad.

The rate of participation of such programs is increasing worldwide, reflecting globalization of markets and students' interests in foreign policy and travel. Studies have shown that studying abroad while in college can positively impact a student's career path, world-view, and self-confidence (Dwyer and Peters, 2004). Study abroad experiences offer many life-changing and lasting academic, intercultural, personal, and social benefits (Sanchez, Fornerino, and Mengxia, 2006). Study abroad experiences can contribute to successfully training future global leaders to be more effective and respectful of other cultures and political and economic systems (Clark and Wright, 2010) and provide students with a world-view in which they are willing to take a stand for the world's welfare, and not just what benefits their own country (Dwyer and Peters, 2004). Business schools use study abroad programs to increase revenues, diversify the student body, add value to academic programs by offering the benefit of an international student population, and provide faculty with experiences in international teaching (Sanchez et al., 2006).

Although the number of students participating in study abroad programs has doubled over the last twenty years, the United States has the lowest participation rate in the world in study abroad programs (Releyea, Cocchiara, and Studdard, 2008). According to Open Doors 2010 fast facts, the Total U.S. Higher Education Enrollment was 3.5% or 19.5 million students in 2009. The top choices for enrollment for U.S. students were the United Kingdom, Italy, Spain, France and China. The top field of study was Business Management and Engineering with 62 percent of students' funding for international study coming from personal and family sources (Open Doors, 2010). A recent study on the differences in national investments in education helps explain that more foreign students enter programs and fewer native students leave in countries with higher spending on education (Sanchez et al., 2006). Universities in many industrialized and economically emerging countries are making significant efforts to increase involvement of students and faculty in study abroad programs.

## **THEORY DEVELOPMENT**

The theory of planned behavior explains human behavior as a function of intentions and perceived behavioral control over behavior. According to this theory, people use three factors to make decisions: attitudes, subjective norms, and perceived behavioral control. The main focus behind the theory of planned behavior is the actual intention of performing the behavior (Ajzen and Driver, 1992).

### **Attitude**

An attitude is a predisposition created by learning and experience to respond in a consistent way toward an object. Attitudes can also be applied toward feelings for services

and destinations (Lam and Hsu, 2006). Fishbein and Ajzen (1975) propose that people made decisions based on the consequences of their action. Positive or negative experiences in travel affect students' behavior toward traveling.

A person's attitude toward a specific destination can affect his or her perception of that location as well as interest in that location as a destination. Therefore, a student's attitude toward travel destinations is likely to affect perceived behavioral control and interest in studying abroad.

### **Subjective Norm**

The study estimates subjective norm by both an individual's normative beliefs about what others who are most important to the student think he or she should do and the extent to which the individual is motivated to comply with what these referents think (Lam and Hsu, 2006). When students begin to develop an interest in studying abroad, they seek advice from parents and close friends when making their decision (Smith and Bing, 2009).

Subjective norms are based on the opinions of these referents and the perceived social pressure to behave in a particular way (Lam and Hsu, 2006). Subjective norms do not directly impact a person's behavior but instead impact the intention to perform a behavior (Armitage and Conner, 2001). Therefore, a student's perception that family and friends will support his or her decision to travel abroad will positively affect the student's intention as well as perceived behavioral control.

### **Perceived Behavioral Control**

Perceived behavioral control is about how easy or difficult an individual thinks it is to perform a behavior (Lam and Hsu, 2006). Factors such as the availability of resources and opportunities play a huge role in deciding if the behavior or action is the correct one.

Also, if a person cannot control some behavioral instances because of lack of availability of required resources, the interest to travel will be lower (Han, Hsu, and Sheu, 2010).

In the case of students studying abroad, the required resources likely include finances, the ability to understand the language, the ability to interact with people from different cultures, and the ability to maneuver around the area. For example, if the study abroad destination requires some physical ability and students think that it will be too difficult for them to keep up they are less likely to be interested in going on the trip in the first place.

### **Motivation**

Until recently, research on motivation in education concentrated on its expectancy aspects (Berndt and Miller, 1990). Principles drawn from self-determination theory, however, call for some self-guided exploration of learning, curricular enrichment activities, interest-driven activities out of school, and other activities that offer opportunities for learning but do not involve striving to accomplish a particular goal (Brophy, 1998; p. 104-105). Self-determination theory disputes that humans have an innate desire for stimulation from birth (Ryan and Deci, 2000).

Applying self determination theory, the reasons for participating in study abroad can be either intrinsic or extrinsic. Intrinsically motivated students would participate in activities due to the desire to learn, to know, and to experience new things, rather than to please their parents or to enhance their professional resumes. Intrinsically motivated actions are done “for their own sake.” The study-abroad experience broadens awareness of the world and enhances a participant’s ability to learn how to adapt easily in different environmental and cultural situations (Van Hoof, 2006).

Seeking stimulation such as in desiring an exciting life or desiring to break away from everyday life motivates action intrinsically. Thus, people who claim high need for value stimulation might choose opportunities that enhance or add excitement to their social life—such as participating in a university’s study abroad program (Sanchez et al., 2006).

On the other hand, extrinsically motivated students would engage in study abroad for future professional and social benefits. External regulation occurs when our actions are regulated by external rewards, pressures, or constraints. An example of external regulation would be when a student joins a study abroad program for the credit or in the hopes of getting a better job in the future.

If a student signs up for study abroad for these reasons, external regulations are likely to be activated. Introjected regulated behaviors are controlled in part by the environment but also by internal reward/punishment contingencies such as ego enhancement, guilt, or obligation. Such regulation is internal in the sense that a person no longer requires external prodding to perform an action. However, the felt pressure to perform the action is still external to the person’s sense of self. Introjected regulation is seen in students who chose to study abroad primarily because they want to achieve higher social status among friends and to please their parents.

### **Deterrents**

The perceived negative barriers to studying abroad (deterrents) may outweigh the motivators to study abroad causing students to deny the experience (Sanchez et al., 2006). Students are aware of the academic benefits associated with international experiences in their education, but potential deterrents to studying abroad partly explain the lack of student interest and participation in study abroad programs. Among these potential deterrents are

financial feasibility, accessibility to the information, social and family obligations or restraints (Salisbury et al., 2008; Sanchez et al., 2006), and level of school involvement (Salisbury, Umbach, Paulsen, and Pascarella, 2008).

Studying abroad can be hard for some college students to afford, so students must determine the financial feasibility of participating in such programs. When an activity is considered risky, students tend to engage in a higher level of information gathering. Smith and Bing (2009) find that individuals with access to information related to the trip tend to be involved in thinking about the trip and its feasibility. Family and friends are another major factor in the decision to study abroad, and some studies show that family and friends play a dominant role in decision making.

Gitelson, Kerstetter, Crofts, and Van Raaij (1994) find that family and friends are the sole decision makers in 30 to 40 percent of all travel related decisions. A student's interactions with people on and off campus influence their decision to study abroad. Students with a high level of intercultural communication apprehension are more likely to avoid participating in a study abroad experience (Goldstein and Kim, 2005). Since interacting with culturally diverse people is a key component of the study abroad experience, people who are used to communicating and working with others on a regular basis would be more likely interested in studying abroad.

## **METHOD**

The questionnaire to measure motivational factors for and deterrents to study abroad participation was developed from the related literature (Nyaupane, Paris, and Teye, 2010; Relyea, Cocchiara, and Studdard, 2008; Salisbury et al., 2009; Sanchez et al., 2006). On a



5-point Likert scale, students were asked to rate to what extent each motivator and barrier (deterrent) would affect their decision to participate in study abroad. The attribute, subjective norm, and perceived behavioral control inventory was adapted from Ajzen and Driver (1992).

Students were asked to rate the level of agreement on each item. The intent to study abroad was measured by single item. All items were measured using 5-point Likert scales. The survey also asked participants for demographic information such as gender, ethnicity, class standing, income, and so forth. A convenience sample was used to collect the data with participants selected from across the campus at a regional liberal arts university located in the southeastern United States. The data were collected over a two week period. A total of 443 surveys were collected and later analyzed with principal component analysis and confirmatory factor analysis. The model of theory of planned behavior was tested using Structural Equation Modeling (SEM).

## **ANALYSIS AND RESULTS**

### **Respondent Demographics**

Table 1 shows that the data collected met expectations of typical college students enrolled at a large southern U.S. state-supported university—most are single, Americans, with the majority being in-state residents.

The typical respondent was a single (96%), Caucasian (717%) male (51%) between 19 and 22 years old (81%). A majority of respondents were juniors and seniors (66%) with household incomes over \$50,000 (7%). About half of the respondents were in-state students (54%) and were employed (55%). At the university where this study took place,

the majority of students are Caucasian U.S. citizens. Only four out of the 443 subjects were non-US citizen.

Table 1 about here.

### **Student Interest**

The respondents were asked to identify the destination where they would like to study abroad and their preferred length of stay. Each subject's responses were directed to this specific destination. The university offers study abroad programs in 14 different countries in four different school terms. The studying abroad program offers credit for core classes, and many are offered after the usual fall and spring semesters; for example, travel abroad is offered in the "Maymester" or summer terms. Summer study abroad opportunities are gaining popularity because they are less likely to set students back for their expected graduation date than travel during the regular, longer fall and spring terms. Figure 1 shows the number of students indicating a preference for each destination. Figure 2 shows the number of students expressing an interest in study abroad in the school terms indicated.

Figures 1 and 2 about here.

### **Exploratory Factor Analysis: Motivators and Deterrents**

A series of exploratory factor analysis was performed on the study variables to ascertain the discriminant validity of the items. A principal component analysis (PCA) of the measurement items (with varimax rotation) was conducted in order to identify the

underlying factor structure of motivators and deterrents. None of the 13 motivation items cross-loaded, and a scree plot suggested a four-factor solution where the eigenvalues drop significantly after a cutoff point of .81. The KMO measure of sampling adequacy was .87 and Bartlett's test of sphericity was significant at the .001 level. The four factors together explained 81 percent of the total variance and include intrinsic experience, professional regulators, introjected social and intrinsic liberty.

From the 14 deterrent items, a four-factor solution has an eigenvalue over 1.00. The KMO measure of sampling adequacy was .74; Bartlett's test of sphericity was significant at the .001 level. The model explained 60 percent of the total variance and factors were named information available, level of school involvement, financial feasibility, and family apprehension. The result of PCA and levels of internal consistency (Cronbach's alpha) appear in Table 2.

Table 2 about here.

### **Multiple Regressions: Motivational and Deterrent Factors**

Multiple linear regression analysis was used to test models for predicting study abroad participation from 4 motivational factor scores (retained using regression method). Basic descriptive statistics and regression coefficients appear in Table 3.

The four predictor model was able to account for 30% of the variance in study abroad intention,  $F(4, 432) = 46.99, p < .001$ . The deterrent factors only explained 2.5% of variances in study abroad intention.

Table 3 about here.

The two factors of intrinsic experience and professional regulators turned out to be far more important than social and intrinsic liberty factors. Based on this analysis, we have recommended that the Office of International Students and Services to consider focusing on self realization and future career. Also focusing on credit hours (to receive credits for classes) would be one great recruiting strategy

### **Confirmatory Factor Analysis: Theory of Planned Behavior**

CFA (measurement model) was used to assess the discriminant validity of the attitude, subjective norm, and perceived behavioral control variables. Table 3 provides the results of two nested models progressing from a one-factor model to the hypothesized three-factor model. A root mean squared error of approximation (RMSEA) for the hypothesized model was less than .10. The results indicate that the hypothesized three-factor model provides the better fit to the data.

Anderson and Gerbing (1988) recommend that alternative models be evaluated regardless of the satisfactory fit indices of the full model. Because measurement constraints imposed upon the hypothesized model provide an adequate fit to the data ( $\chi^2 = 143.31$ ,  $df=32$ ,  $RMSEA=0.08$ ), the examination of a structural model is acceptable (Anderson and Gerbing, 1988).

Table 3 about here.

### **Structural Model**

The structural equation model was drawn from the literature. Theory of Planned Behavior Inventories were adapted from Ajzen and Driver (1992)'s study. The attitude construct is composed of three variables (study abroad would be fun, study abroad would be a good experience, study abroad is beneficial). The subjective norm dimension has four items (employers think study abroad is useful, my family would support my decision to study abroad, my peers would support my decision to study abroad, and my family has traveled outside of the country in the last 5 years).

Perceived behavioral control was measured with three items (I understand the language spoken in the destination country, I have the ability to interact with people from different cultures/backgrounds, my family can pay for all or most of the expenses necessary to study abroad if I choose to go). The structure of proposed path model appears in Figure 3.

Figure 3 about here.

As Byrne (2001) recommends, a RMSEA less than 0.1; Parsimony Ratio (PRATIO) greater than 0.6; Normed Fit Index (NFI), and Common Fit Index (CFI) greater than 0.9 were used to decide the relative fit of the proposed model. As shown in Table 4, the hypothesized structure model adequately fit to the data (RMSEA =.08; Byrne, 2001).

Table 4 about here.

As Table 4 shows, the three endogenous variables were equally strong indicators of the intent to study abroad. The most detrimental factor for participation was subjective norm ( $\beta=.29$ ,  $p<.001$ ), followed by perceived behavioral control ( $\beta=.24$ ,  $p<.001$ ), and finally, attitude toward the program ( $\beta=.23$ ,  $p<.001$ ). The three factors together explained 27% of participation intent. The model examined possible mediating impact of perceived control on intention to study abroad, and the result shows an inverse relationship between attitude and perceived behavioral control ( $\beta=-.07$ ,  $p<.001$ ). The impact of attitude is negatively mediated by perceived behavioral control (lack of language skills, money, and openness to other culture), which significantly impaired a person's ability to study abroad. Students at this specific university had a fairly positive attitude about the program but their resource may be insufficient to support the decision to participate. On the other hand, referents' (family and friends) support had a strong positive impact on the student's perceived control ( $\beta=.58$ ,  $p<.001$ ), thus increasing the student's confidence which eventually strengthened his or her participation intention ( $\beta=.29$ ,  $p<.001$ ).

### **Implications for Designing Study-Abroad Marketing Strategies**

Although the United States of America produce lowest participation rate in both long-term and short-term study abroad programs in the world (Releyea, Cocchiara, and Studdard, 2008), the actual number of participants are growing. The current study respondents indicated their preferred destination as Australia, Italy, Costa Rica, Egypt, Spain, England, and Greece in the descending order, which is conforming the national survey conducted by U. S. Higher Education (Open Doors, 2010). The respondents were selected across the campus, including majors in humanity, science, business, education. The

majority of respondents were business majors. Authors examined the relationship between motivational and deterrent factors and potential participant's intention to study abroad. The factor analysis identified four motivational factors; intrinsic experience, professional regulators, introjected social, intrinsic liberty and four deterrent factors; information available, school involvement, financial feasibility, family apprehension. The current study results support the previous research findings that the majority of students' funding for international study coming from personal and family sources (Open Doors, 2010).

The study also examines prospects' intention to study abroad using theory of planned behavior. The results bring in somewhat interesting insights on perceived behavioral control. Positive attitude toward the idea of study abroad was negatively correlated to perceived behavioral control and the intent was mediated by students' perception on how much they can afford it.

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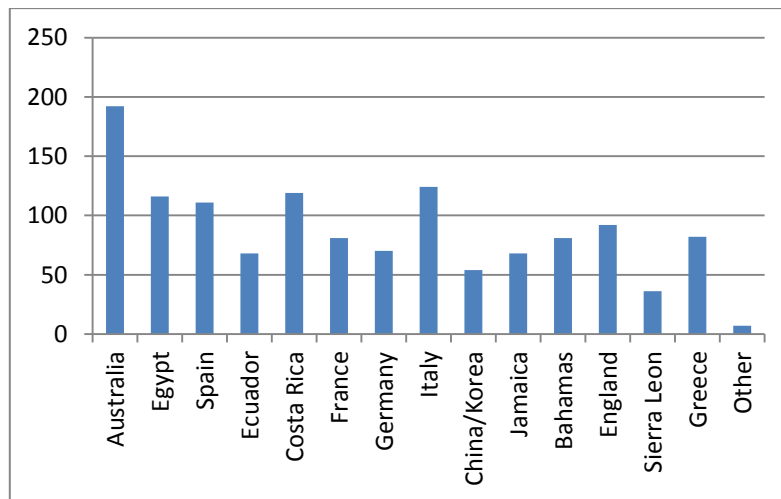
Table 1  
Profile of Respondents

	Frequency	Percent
<b>Gender (n=441)</b>		
Male	226	51.1
Female	214	48.9
<b>Grade Level (n=442)</b>		
Freshmen	56	12.7
Sophomore	87	19.7
Junior	131	29.6
Senior	163	36.9
Graduate Student	5	1.1
<b>Marital Status (n=442)</b>		
Single	426	96.4
Married	7	1.6
Divorced	9	2.4
<b>Citizenship (n=442)</b>		
US Citizen	438	99.1
Non US. Citizen	4	0.90
<b>In state (n=442)</b>		
In-state	240	54.4
Out-of-state	201	45.7
<b>Employment Status (n=441)</b>		
Employed	245	55.6
Not employed	196	44.4
<b>Ethnicity (n=442)</b>		
Caucasian/White	313	70.8
African American	80	18.1
Hispanic/Latino	21	4.8
Asian/Pacific islander	17	3.8
American Indian	11	2.5
<b>Income (n=424)</b>		
Less than 20,000	68	16.0
20,000-29,999	18	4.2
30,000-49,999	45	10.6
50,000-69,999	78	18.4
70,000-99,999	98	23.1
100,000 or more	117	27.6
<b>College (n=411)</b>		
Business	256	62.3
Humanity	52	12.7
Science	67	16.3
Education	23	5.6
Undecided	13	3.2
<b>Information Source (n=434)</b>		
Flyers	99	22.8
Friends	88	20.3
Advisor/Professor	75	17.3

Website	53	12.2
College newspaper	47	10.8
Mail	36	8.3
Other	36	8.3

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Figure 1. Preferred Destinations



Note: Other destinations include Japan, New Zealand, Argentines, Israel, St.Barts.

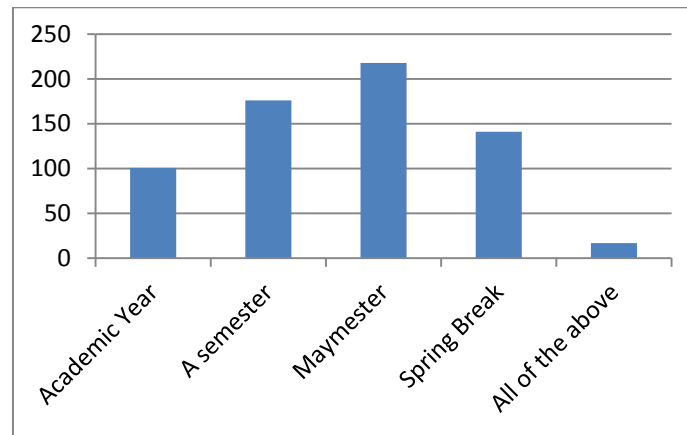


Figure 2

Number of Students per Preferred Period of Study Abroad

**Table 2**  
**Result of Principal Component Analysis**

<b>Motivation Factors</b>				
Item	INTRINSIC EXPERIENCE	PROFESSIONAL REGULATORS	INTROJECTED SOCIAL	INTRINSIC LIBERTY
To gain self confidence	.808			
To learn a new language	.784			
To experience new culture	.768			
To meet new people and interact	.757			
To more easily be able to enter the job market		.869		
To receive credits for core classes		.744		
To benefit my future career		.731		
To achieve a higher social status			.855	
To be exposed to new practices			.813	
To please my parents			.798	
To increase enjoyment				.793
To become more independent				.758
To achieve goals or dream				.692
Eigenvalues	5.594	1.688	1.377	.812
% of variance explained	43.034	12.982	10.593	6.246
Cronbach's Alpha	.851	.812	.803	.802
<b>Deterrent Factors</b>				
Item	INFORMATION AVAILABLE	SCHOOL INVOLVEMENT	FINANCIAL FEASIBILITY	FAMILY APPREHEN SION
Accessibility to information for the study abroad program	.864			
How much I already know about the program	.788			
Traveling with people I am comfortable with	.676			
Who I am going to live within the study abroad country	.673			
Leadership position in a club/organization on campus		.769		
Participating Greek life		.722		
Being a part of an athletic team		.716		
Part of academic honor society		.664		
Cost of the program			.830	
Cost of expenses once in study abroad country			.812	
A job that I need in order to support myself			.535	
Leaving family behind				.759
Limited contact with family while I am abroad				.716
Limited ability to help family while gone				.680
Eigenvalues	3.582	2.234	1.497	1.134
% of variance explained	25.587	15.957	10.694	8.098
Cronbach's Alpha	.791	.721	.609	.525



Table 3. Motivational and Deterrent Factors When making Study Aboard Decision (N=437)

Factor	Study Abroad Intention	$\beta$	$r$	$b$	$CI_{.95}$ for $r$	
Intrinsic Experience	.377***	.376***	.411***	.528***	.417	.639
Professional Regulators	.305***	.305***	.343***	.429***	.318	.540
Introjected Social	.164***	.164***	.193***	.231***	.120	.340
Intrinsic Liberty	.203***	.203***	.236***	.285***	.174	.396
Mean	3.31					
S.D.	1.405					

\*\*\* $p < .001$

Table 3. Confirmatory Factor Analysis of the Measurement Model

Model	$\chi^2$	df	$\Delta \chi^2$	RMSEA	IFI	NFI	CFI
One factor	353.37	35		.14	.71	.69	.71
Three factor	143.31	32	200.06*	.08	.90	.87	.89

Note: \*p< .05. RMSEA= root mean square error of the approximation, IFI=incremental fit index, NFI=normed fit index, CFI=comparative fit index. N=443.

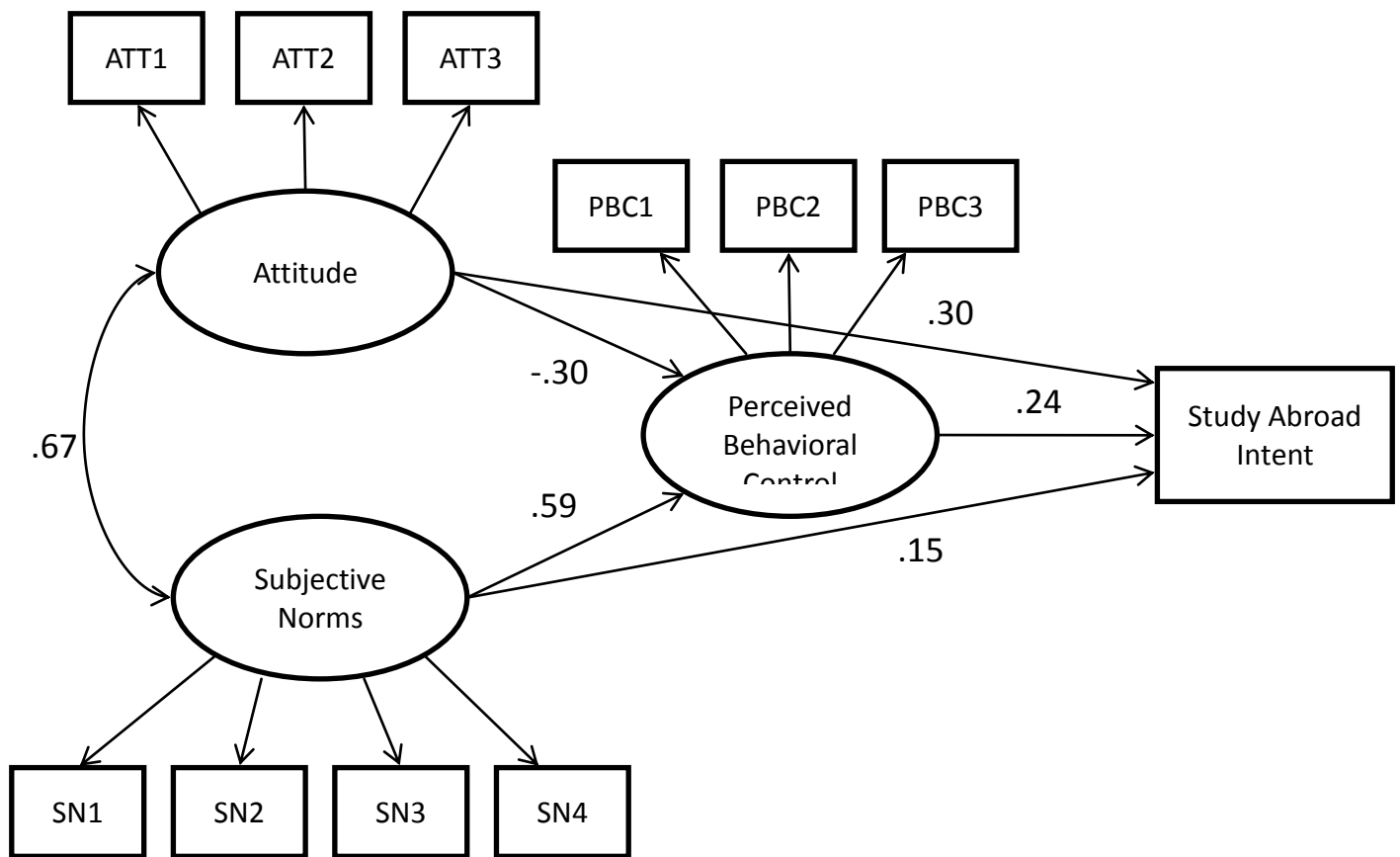


Figure 3. Structural Equation Model

Table 4. Fit Indices and Path Co-efficient of Proposed Model (n=443)

$\chi^2$	df	RMSEA	IFI	NFI	CFI
154.50	39	.08	.91	.88	.90

Effect	DE	IE	TE	Residual path coeff.	R <sup>2</sup>
On Perceived Behavioral Control				.89	.20
of Attitude	-.30***		-.30 ***		
Of Subjective Norms	.58***		.58***		
On Study Abroad Intent				.85	.27
of Attitude	.30***	-.07***	.23***		
Of Subjective Norms	.15***	.14***	.29***		
Of Perceived Behavioral Control	.24***		.24***		

Note: The significance of indirect effects were decided based on the Sobel test. For brevity, only those independent variables with either significant direct or indirect effect were listed in this table. DE=Direct effect, IE=Indirect effect, TE = total effect. \*significant at the .05 level, \*\*significant at the .01 level, \*\*\*significant at the .001 level.

**NATIONAL COMPETITIVENESS,  
GOVERNMENT REGULATORY REFORM, AND  
GDP GROWTH**

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## **Abstract**

Do introductions of government reforms of business regulations impact changes in lagged GDP per capita and does this impact vary systematically among nations based on (high/moderate/low) competitiveness? The study here proposes three alternative theories to explain why and how systematic impacts due to national competitiveness are likely to occur, referring to the three theories as the Singapore, Poland, and Rwanda perspectives. The study provides an historical analysis of data covering 2007 to 2012 World Bank "Doing Business" and CIA "Factbook" reports. The findings support the Rwanda perspective in particular; the general view that some-to-many reforms are likely to impact lagged GDP positively depending on the initial level of national competitiveness receives support. The findings of the study may be useful for nations in marketing their attractiveness to business leaders by promoting evidence of introductions of desirable business regulatory reforms.

# Supply Chain Sustainability and the Triple Bottom Line

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## Abstract

The objectives of sustainability are to satisfy the triple bottom line – social, economic and environmental goals must be met. The literature has an abundance of papers that deal with the environmental aspect. This paper explores the literature to surface examples of the other dimensions of the triple bottom line. Recommendations for addressing the triple bottom line in a more comprehensive manner are proposed.

**Keywords:** supply chain, sustainability, triple bottom line

## Introduction

The interest in sustainability has grown over recent years and is shared among a variety of national and international organizations, special interest groups and corporations around the world. Sustainable business practices and as described in this paper - sustainable supply chain practices – are becoming a worldwide business requirement. Some of the main sustainability requirements have been stated explicitly by a number of different organizations. A widely cited definition of sustainability is attributed to the United Nations Brundtland Commission and reads as follows:

“meeting the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987)(Christopher, 2011).

Another set of requirements describes the broader and more specific application of sustainability and can be seen in the ten principles of the UN Global Compact which was enacted in 1999. The ten principles establish a set of core values for organizations to follow and encourage those organizations adopting the principles to influence their partner organizations to subscribe to the principles as well. The ten principles address a set of universal issues in human rights, labor, environment and anti-corruption (see The Ten Principles <http://www.unglobalcompact.org/aboutthegc/thetenprinciples/index.html>>).

Another example that is widely acknowledged is a set of guidelines for corporate social responsibility (CSR) published by the International Institute for Sustainable Development (IISD, 2007). The CSR Principles focus on the social dimension and do not align with the full scope of sustainability. The primary area of agreement between the two sets (CSR and The Ten Principles) of principles is the intersection on the environment.

## Literature

A growing number of publications focus almost exclusively on the environmental aspects. Green supply chain management focuses on environmental aspects across every element of the supply chain. The book by Emmett and Sood (2010) is a very good example of this literature with chapters and cases that discuss green product design, responsible resource use and reverse logistics. Carter and Easton (2011) have conducted a more extensive literature review on 20 years of sustainable supply chain management research.

Environmental concerns within the supply chain are at the forefront in other articles such as environmentally responsible manufacturing (Ellram, Tate and Carter, 2008) and environmental purchasing (Tate, Ellram and Dooley, 2012). The environment and sustainability can also be found in assessment approaches as seen in the work by Pope, Annandale and Morrison-Saunders (2004). While the work by Morelli (2011) does not address supply chain explicitly, it is a prime example of defining sustainability exclusively from the environmental perspective. The other two elements of the triple bottom line are not addressed.

One possible explanation may lie in the word usage in question. The phrase ‘environmental sustainability’ works well and everyone has a reasonable understanding of that terminology. The phrases ‘economic sustainability’ and ‘social sustainability’ are not as readily understood. The acceptance of the terminology and the ability to operationalize the terms may contribute to the popularity of one topic while the others receive less attention.

## Environmental Aspects

Two international standards, ISO 14040:2006(E) and ISO 14044:2006, provide guidelines for conducting LCA. Section 4.1.2 of ISO 14040:2006(E) describes the life cycle perspective as follows: “LCA considers the entire life cycle of a product, from raw material extraction and acquisition, through energy and material production and manufacturing, to use and end of life treatment and final disposal. Through such a systematic overview and perspective, the shifting of a potential environmental burden between life cycle stages or individual processes can be identified and possibly avoided.” (ISO, 2006). Section 4.1.3 of the standard indicates the “Environmental Focus” of the standard and that ...”Economic and social aspects and impacts are, typically, outside the scope of the LCA” (ISO, 2006).

Environmental Impact Assessment (EIA) is often performed in conjunction with the LCA approach. EIA may also be used as a separate evaluation technique in some instances. EIA as the name suggests is also focused exclusively on environmental impacts and does not evaluate economic and social aspects.

NOVO Group is an excellent example of a corporation that has made extensive use of both LCA and EIA. The company is also a very good example where the sustainability philosophy is a core attribute of the organization. Everyone in the organization knows the company’s beliefs and the emphasis that is placed on sustainability. NOVO Group is also a unique example in the fact that the company embraces sustainability practices within their own operations and the commitment to sustainability extends to their product line as well (Monroe, 2013).

LCA is primarily concerned with the actual product, how it will be used, how it will be serviced and how it will be disposed of throughout the different stages of the product’s life. The EIA approach when used with LCA, is primarily concerned with the impact of producing the product and any by-products that may result from the various processes (Monroe, 2013).

LCA and EIA are very useful and effective for what they are intended to evaluate – the product and by-products and the environmental impacts. There are many other elements in the supply chain which LCA and EIA do not explicitly evaluate. Additional prompting is needed to fully consider many of the elements that are not directly involved in the production of products or the production and handling of by-products (Monroe, 2013).

Other companies like Subaru and Toyota have instituted ‘zero-landfill’ programs at their



North American facilities in an effort to operate in an environmentally friendly manner. These programs are also intended to address the ‘environmental’ objective from the triple bottom line. There may be some spillover benefit in economic or social but the primary benefit is in environmental.

### Social Aspects

The International Institute for Sustainable Development proposes a “six-stage ‘plan, do, check and improve’ implementation framework for a CSR approach” (IISD, 2007). This framework is commonly associated with the quality field and is traditionally used for process improvement. In this situation, the improvement cycle is applied to social issues that confront a company. It affords an opportunity to evaluate current policy, plan for modifications to policies, check those new policies for improvement and compliance with social guidelines.

### Comprehensive Approach

The SCOR® Model (Supply Chain Council, 2013; Bolstorff and Rosenbaum, 2007) from the Supply Chain Council provides a comprehensive view of the major elements of a supply chain (see Figure 1). By depicting the different elements of the supply chain in this fashion, the identification and evaluation of all possible sustainability issues becomes somewhat easier. The model states the elements which then prompts the necessary thought and questioning to identify sustainability issues that might otherwise be overlooked (if using LCA or EIA).

This paper proposes the use of the SCOR® Model from the Supply Chain Council as a framework for sustainability evaluations. The five terms used in the SCOR® Model are Plan, Source, Make, Deliver and Return. The sequence follows the logical order of events that occur in the supply chain. The following discussion and outline demonstrates how the SCOR® Model can be deployed for sustainability initiative evaluations.

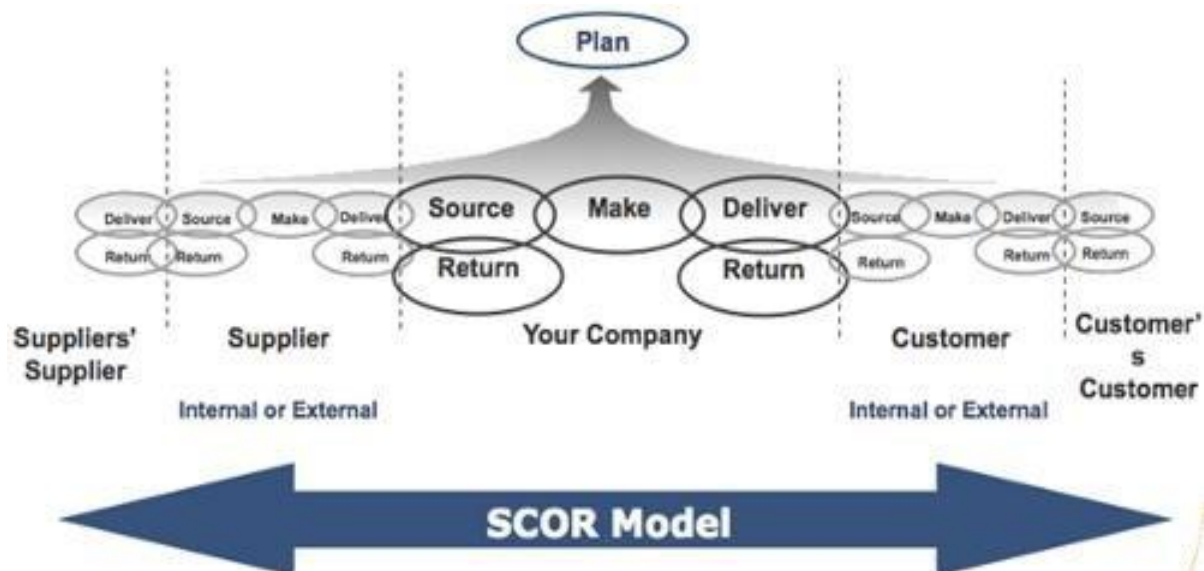


Figure 1 The SCOR® Model

SOURCE: Supply Chain Council; accessed on May 20, 2013 at [www.supply-chain.org](http://www.supply-chain.org)

### Plan

Are the principles of sustainability used as a set of guiding principles in the Planning stage for the company’s supply chain? The full range of environment, economic and social issues are included in the Planning issues to be considered.

### *Source*

Are the principles of sustainability guiding the company's choices when making sourcing decisions? These decisions include selection of suppliers, insourcing vs. outsourcing, developing a supplier as a strategic partner, choosing local vs. distance suppliers, and many other supplier related decisions. In any given sourcing decision is there a supplier that meets the company's sustainability requirements better than the original option. The entire triple bottom line is considered explicitly in making these decisions.

### *Make*

All of the sustainability statements regarding manufacturing apply here. Reduce, reuse and recycle the materials used in the manufacturing process are the primary approaches for using these resources in a responsible manner consistent with sustainability. Company positions must be developed which include environment, economic and social considerations and explicit policies to address the triple bottom line.

### *Deliver*

Throughout the entire global supply chain there are multiple transportation elements and multiple handoffs (Russell and Saldanha, 2003). Transportation is a major concern with regard to emissions and the related environmental impact. The multiple listings of Plan, Source, Make, Deliver, Return across the SCOR® diagram reinforce the idea that the material/product will be transported a number of times.

An example in this segment is intermodal transportation which translates to benefits in each of the areas for the triple bottom line. Tyssen et al. (2011) describe two case studies where decisions involving intermodal terminals resulted in benefits that are seen in each category – economic, environmental and social.

Transportation choices have a major effect on the carbon footprint for companies. The decision to utilize intermodal rail for a significant portion of the transportation of products will have a very favorable impact on the company's environmental compliance, carbon footprint or other environmental metric. Intermodal also provides an economic benefit when compared to greater utilization of truck deliveries (Monroe, 2013).

### *Return*

This stage of the supply chain applies to many of the materials used in the product itself or in the packaging and shipping materials used at different stages in the supply chain. Return may refer to the product, used component parts, packaging, or even reusable or recyclable shipping materials. The economic benefits here will manifest as cost savings and in some cases new revenue streams. While the environmental and economic benefits are at the forefront, additional probing should be used to identify social benefits as well. Most will agree that responsible use of resources is also beneficial to society in the long run.

### **Summary**

A brief summary of analysis techniques discussed in this paper appears in Table 1. The main lesson to be learned is that there is no single technique currently in use that provides a comprehensive evaluation of supply chain sustainability. In this paper, the SCOR® Model has been proposed as a framework to move towards a more comprehensive analysis technique for supply chain sustainability.

LCA and EIA are concerned only with the environment. The IISD framework focuses on CSR which may or may not cover supply chain sustainability adequately. The SCOR® Model affords the opportunity to look at the triple bottom line in a much more comprehensive manner and provides a very systematic approach to sustainability analyses.

*Table 1 Supply Chain Sustainability Assessment Techniques*

<b>Technique</b>	<b>Used for this Purpose</b>
Life Cycle Assessment	Product through all stages of product's life
Environmental Impact Assessment	Specific environmental concerns for producing the product and any by-products that occur
IISD Framework	Plan, do, check and Improve cycle for CSR; covers all aspects of CSR and incorporates the perspective from major stakeholders
SCOR® Model	Comprehensive evaluation of all supply chain elements including Plan, Source, Make, Deliver and Return as guiding terms. Covers strategic decisions, supplier selections, manufacturing, transportation, recycling, reuse and disposal.

The model of 'plan, source, make, deliver, and return' can be superimposed over each stage of the supply chain and can be used to guide the evaluation. This includes multiple tiers of suppliers, multiple transportation linkages from suppliers to the manufacturing operations, and then the multiple levels of the distribution system. By doing this, every possible element in a global supply chain is included in the model and will be evaluated when supply chain sustainability initiatives are proposed.

The SCOR® Model was developed more than two decades ago and was intended to provide a common language to discuss supply chain management elements. Recently, the SCOR® model has been proposed as a framework to guide and sustain supply chain improvement (SCC, 2013). In this paper, the model is proposed as a framework for evaluating supply chain sustainability initiatives as companies make changes to address the triple bottom line. By explicitly addressing all three of the triple bottom line components - environment, economic and social - the SCOR® Model can lead to a much more thorough evaluation of sustainability.

One future research idea that came from developing this paper is to take a new look at defining sustainability. As discussed here in the paper, 'sustainability' does not work well when used in a phrase combined with 'economic' or 'social'. On the other hand, 'environmental sustainability' is meaningful and readily understood. The proposed research will unbundle and rephrase the three different objectives of the triple bottom line in an effort to expand the investigation in the social and economic dimensions of the triple bottom line.

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## **ADDITIVE MANUFACTURING A MANUFACTURING INNOVATION WHOSE TIME HAS COME**

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### **ABSTRACT**

One of the newest areas of interest for American manufacturing is the rise of additive manufacturing, or 3-D printing. It has the potential to revolutionize the ways component parts and finished assemblies are produced. This paper provides an overview of the subject.

### **Introduction**

In the middle of 2012, the United States Government launched an initiative they hope will invigorate the resurrection of the manufacturing industry in the U.S.

*“In August 2012, the National Additive Manufacturing Innovation Institute NAMII was formally established in Youngstown, Ohio, as the pilot institute under the National Network for Manufacturing Innovation (NNMI) infrastructure. Driven by the National Center for Defense Manufacturing and Machining (NCDMM), NAMII serves as a nationally recognized additive manufacturing center of innovation excellence, working to transform the U.S. manufacturing sector and yield significant advancements throughout industry.*

*In March 2012, President Obama announced his plans to revitalize the U.S. manufacturing base with the creation of the National Network for Manufacturing Innovation (NNMI). At the core of the NNMI will be as many as 15 institutes for manufacturing innovation throughout the country. The initial step in building this collaborative infrastructure required the creation of a pilot institute to serve as a prototype for subsequent NNMI institutes.*

*An inter-agency advisory council of technical experts from the Department of Defense (DoD), Department of Energy (DOE), National Aeronautics and Space Administration (NASA), National Science Foundation (NSF), and the Department of Commerce’s National Institute of Standards and Technology (NIST) determined the pilot institute’s focus to be additive manufacturing.*

*A Broad Agency Announcement was issued in May 2012, officially commencing the solicitation of proposals to identify an agency or consortium of agencies capable of operating the pilot institute with a forward-looking technical vision; previous collaborative research experience; a background in educational outreach and workforce development; and the leadership to sustain the institute.*

*Upon completing its review of submitted proposals, the advisory council selected the National Center for Defense Manufacturing and Machining (NCDMM) to manage the National Additive Manufacturing Innovation Institute (NAMII), the NNMI pilot institute. The official announcement of the award came on August 16, 2012 at NCDMM’s Youngstown, Ohio facility and the headquarters of NAMII.” <http://namii.org/>*

Why is the U.S. Government interested in investing money in a “Rust Bowl” community like Youngstown, Ohio? Especially in a manufacturing facility? Have the people in Congress lost their minds or is this an example of another pork barrel project gone radically wrong? Perhaps not!

Does the term “additive manufacturing” mean anything to you or your business? If it doesn’t, make a note of it, because it may be either a threat or an opportunity in the near future. Many are viewing additive manufacturing as a new wave of manufacturing that will revolutionize the ways things (at least some things) are made. It gets its name because parts are produced by using a printer to add layer after layer of materials onto a surface to form a three-dimensional object. It is like making a layer cake in the kitchen except the additive manufacturing layers are much thinner (upwards of 2000 per inch) and much more stable when finished.

There are numerous videos that illustrate the way in which the additive manufacturing process works and the products that can be made with it.

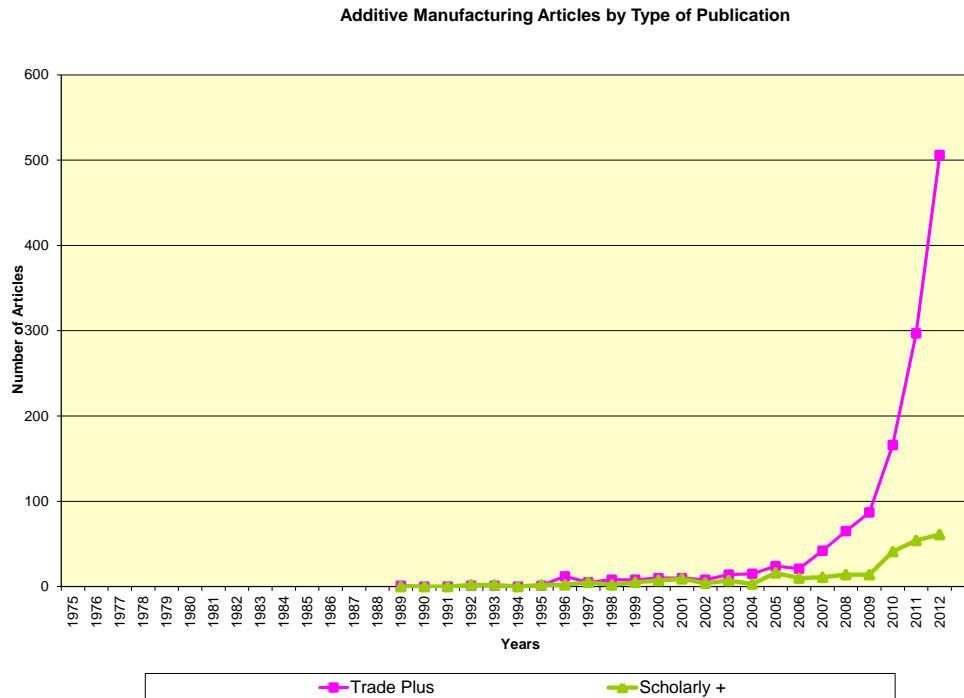
3-D Printing [http://www.industryweek.com/technology/will-3d-printing-change-world?NL=IW-02&Issue=IW-02\\_20130308\\_IW-02\\_736&YM\\_RID=crandllre@appstate.edu&YM\\_MID=1378187&sfvc4enews=42](http://www.industryweek.com/technology/will-3d-printing-change-world?NL=IW-02&Issue=IW-02_20130308_IW-02_736&YM_RID=crandllre@appstate.edu&YM_MID=1378187&sfvc4enews=42)

Mayo Clinic and hip replacement  
[http://www.textually.org/3DPrinting/cat\\_printing\\_prosthetics.html](http://www.textually.org/3DPrinting/cat_printing_prosthetics.html)

Oak Ridge and Artificial Limb <http://www.3ders.org/articles/20120809-3d-printed-lightweight-robotic-hand-wins-2012-RD-100.html>

Video about building a bicycle out of 3-D parts  
[http://www.youtube.com/watch?v=hmXjLpu2BvY&feature=player\\_embedded](http://www.youtube.com/watch?v=hmXjLpu2BvY&feature=player_embedded)

Is there interest in additive manufacturing among both practitioners and academics? Figure 1 shows the number of articles published about “additive manufacturing” or “3-D printing” through the end of 2012. As the figure shows, the number of articles about additive manufacturing, or 3-D printing, has increased dramatically during the past few years. There is no indication that the interest is abating. Although the number of articles in trade publications lead those in academic journals, this is typical for the early stages of a new management program. The level of activity indicates that additive manufacturing is of great interest to both groups.



**Figure 1. Number of Articles about Additive Manufacturing**

### The Additive Manufacturing Process

This process is also known as 3-D printing. In a comprehensive article on the subject, Berman (2012) explains that 3-D printers seamlessly integrate with CAD software, which directs the printer operation to deposit layers of materials to form the desired object. While still in its early stages of development, additive manufacturing has many researchers and practitioners actively seeking ways to improve and extend the applications of this process.

In explaining the progression among descriptive terms such as 3-D printing and rapid prototyping, Terry Wohlers, one of the pioneers in the additive manufacturing movement, explains:

“Old habits die slowly. Case in point: Transitioning to the term “additive manufacturing.” That’s now the official name of what some refer to as rapid prototyping, freeform fabrication, and a host of other names. Additive manufacturing is the official name .... according to ASTM International F42 Committee on Additive Manufacturing Technologies. The group put a lot of thought into it, first selecting AM as the favorite for the name of the committee. It then carefully defined it... The definition includes all applications of the technology, including the making of models, patterns, and prototypes for form, fit, and function; mold, die, fixture, and assembly tooling; and custom and limited-edition products, replacement parts, and short-run and series production. Rapid prototyping is the most popular application of AM technology, but it is only one of many.” (Wohlers 2010)

Gibson, Rosen and Stucker (2009) report that most AM processes involve the following eight steps:

1. Build the CAD software model to describe the external geometry
2. Convert the CAD file to the STL file format (the de facto standard)

3. Transfer the STL file to the AM machine (size, position and orientation for building)
4. Set up the AM machine (material constraints, energy source, layer thickness, timing)
5. Build the part (usually an automated process requiring only superficial monitoring)
6. Remove the part (assure there are no moving parts or high temperatures)
7. Post processing (cleaning, support removal)
8. Application (may require additional treatment such as painting or assembly with other parts)

While the basic idea behind AM is to deposit layer upon layer of material to form a finished part, there are several processes that do this. Diegel (2010) describes the process as follows: “The main technologies that can, today, be classified as rapid manufacturing technologies (as opposed to rapid prototyping) are Selective Laser Sintering (SLS), Selective Laser Melting (SLM) and Electron Beam Melting (EBM). He goes on to explain that a layer of material is deposited and then fused to the specified surface with either a laser beam (SLS and SLM) or an electron beam (EBM). The unfused material acts as support material for all the layers above it and is removed once the part is complete. See Wikipedia (2012) for a more extensive list of 3-D printing processes.

### **History of additive manufacturing**

The first use of additive manufacturing (AM) was to make prototypes, and was known at that time as rapid model prototyping (RMP). Prototypes could be made by using a CAD design that was loaded into a printer. It was also called 3-D printing for obvious reasons. This approach made it possible to produce complex shapes that would have taken much longer to design and product through conventional methods, such as molding and machining.

Once 3-D printing became more commonplace, pioneers began to use it to make small lots of production parts. Although it is slow (relative to numeric-controlled machines) in making a part, it requires much less time in the design and setup times. Consequently, making small quantities of parts is economical with the additive manufacturing process. The AM process is also capable of making complex designs that would be difficult, if not impossible, to make with conventional methods. It was during this period of expanded application that the designation changed from rapid model prototyping to additive manufacturing, a contrast to subtractive manufacturing where material is machined away in order to reach the desired part. Some applications of model building include bicycle chains, gear boxes and even miniature sculptures of famous people.

### **Applications**

As application opportunities increased, users became more innovative in their applications. Some current applications include replacement parts for washing machines, food processors and small gears (Berman 2012). An industry that is especially interested is the aircraft industry where lighter weight is a treasured goal. Boeing has 200 different AM part numbers on 10 production platforms, including both military and commercial jets (Wohlers 2012). Another application involves a joint project between Stratasys, Inc. and Optomec, Inc. to produce a “smart wing” for an unmanned aerial vehicle (UAV) model with functional electronics (Close-Up Media, Inc. 2012)

In the automotive industry, General Motors (GM) has been using AM for the past 20 years. In a lab with 15 specialists and 18 machines, they crank out some 20,000 unique parts a year, including bumpers, grilles, spoilers, and mirrors. They also can build prototypes of engines, transmissions, brake lines and drive shafts (Fish 2011). Daimler is another automotive company that is using additive manufacturing



for making aluminum alloys that are the foundation for lightweight automobile construction (Brooks 2012)

Do-it-yourself enthusiasts are also looking at the possibility of using 3-D printers to make craft items, jewelry and other small parts. However, Whitman (2012) cautions that 3-D printing won't be for the average homeowner. However, printer manufacturers continue to drive the cost of low-end printers down. Some are now available in the \$1,000 to \$2,000 range (Seitz 2012)

The medical field is also using additive manufacturing for making hearing aid molds, dental crowns, and prosthetic limbs, such as knees and arms (Berman 2012). See the video by David Goldman, CNN Money (2012). Wohler (2012) reports that millions of hearing aids and dental copings are produced annually because AM can produce products that are unique in size and shape. Although the industry is heavily regulated, implant manufacturers in the US were approved by the US Food and Drug Administration to manufacture certain products using electron beam melting (EBM) in 2010 (Wohlers 2011).

One of the areas in which AM can be used in is training students in STEM (science, technology, engineering and math) practices. The National Science Foundation has funded two Advanced Technological Education centers – MatEd (the National Resource Center for Materials Technician Education) and RapidTEch (the National Center for Rapid Technologies) to develop new AM competencies and curriculum. The project is designed to accelerate AM skills development by “decreasing the time-lag between global AM Standards development, their translation into core competencies, active integration into curriculum, and their delivery in the classroom.” (Fridan 2011) If the United States is to meet its future challenges, it must train more students to pursue engineering and other STEM careers. Students who like the hands-on experience of making things will become excited about AM education opportunities (Lacey 2010).

One outgrowth of AM is the possible application of the technique to buildings. Behrokh Khoshnevis, a professor of industrial and systems engineering at the University of Southern California in Los Angeles, has spent 15 years working on the idea of using AM techniques to construct buildings. He believes they could be built at lower cost and the technique could be used to build emergency housing in case of disasters (Thilmany 2010).

AM is finding application in the fashion industry. Shoes, clothing and accessories made by AM have been featured at large fashion shows. Models at the Stockholm Fashion Show wore shoes manufactured in polyamide by laser sintering (LS) methods (Wohlers 2011). In order to keep up with market changes, New Balance Shoes uses AM to design new products rapidly (Hessman 2012)

In one of the more exotic potential applications, NASA is planning to bring a 3D printer to the space station by 2014 to make replacement parts and tools. With the help of Autodesk, they have already printed a wrench in zero gravity conditions (King 2012). NASA has already used AM by building 70 parts for the Mars Rover, using a production-grade Stratasys 3D printer with its patented Fused Deposition Modeling (FDM) technology (Plastics Technology 2012).

Looking even further into the future, one of the most optimistic researchers envisioned the convergence of three distinct research areas: rapid prototyping (AM), smart polymers, and cell adhesion could eventually result in what could be called organ manufacturing, or making body parts. He speculates that “Once we

learn how to produce isolated body parts, we could eventually be able to build a whole body.” (Mironov 2003)

### **Benefits**

Some of the benefits of additive manufacturing include:

- Using 3D printing can eliminate the need to make custom tooling which reduces the time to develop new product models for evaluation (Hessman 2012).
- AM has the capability to make complex parts that would be difficult, if not impossible, with conventional casting and machining techniques. “Almost, without exception, if a part can be modeled on a computer in 3-D, it can be sliced and printed, layer by layer, on an AM system.” (Wohlers 2012) Parts can include lattice structures and honeycomb features.
- Lower weights of finished products. AM has found application in building unmanned aerial vehicles (UAVs) and aircraft parts where the build time is faster and the lighter weight reduces fuel consumption (Wohlers 2012).
- The materials used are powders. It is possible to reduce the number of processes necessary to prepare the materials for use, such as making the aluminum into billets. This results in a leaner and greener supply chain (Hargreaves 2011)
- High yield (low waste). The process can use almost all of the powdered materials it starts with. This compares favorably with the subtractive processes that may machine away over half of the material they start with (Velocci 2012).
- Topology optimization. This is a technique that helps decide where to locate the material in a part to optimize the strength-to-weight ratio. (Wohlers 2012)
- Predictability of product reliability. Whether the AM process uses a laser or an electron beam, it is possible to model the time/temperature profile at any location of a component. With that information, the product reliability can be accurately predicted (Velocci 2012)
- Reduction in component count. AM does not have the geometric limitations imposed on molds and dies; therefore, what would require multiple parts in conventional processing can be built in one part design (Wohlers 2011).

### **Obstacles**

Because of the newness of the AM technology, researchers and users are working their way through the learning curve to determine the best combination of materials and processes to produce an increasing variety of products. Some of the most often cited shortcomings of AM are:

- AM has a slow manufacture time, when compared to numerical control machines that have been programmed to produce high volumes of the same part.
- Some of the products have weak bonding between layers that can lead to delamination and breakage under stress (Berman 2012)
- There may be a need for some conventional finishing operations because of the ridges formed by the layer depositions.
- Limited materials can be used. However, some of the most popular metals in use include the titanium alloy Ti-6Al-4V, cobalt-chrome, stainless steels, tool steels, aluminums such as AlSi10Mg and 6061T6, jewelry and dental gold alloys, and nickel-based superalloys such as Inconel 625 and 71B (Wohlers 2012)

Progress is being made to reduce or eliminate these obstacles in the development of AM applications.

### **Companies**

There are a number of companies in the AM field. To date, many of them are still relatively small, although they may be growing rapidly. We will briefly describe two of the more prominent companies devoted exclusively to AM applications – Stratasys, Inc. and 3D Printing. We will also mention two large global companies that have made serious efforts in AM – General Electric (GE) and Hewlett-Packard (HP).

Stratasys, Inc. invented Fused Deposition Modeling (FDM) and has applications in a number of industries, including aerospace, automotive, commercial, consumer, education, medical and military (<http://www.stratasys.com/Resources/Information-Center.aspx>). It is one of two prominent manufacturers in the AM field. They have recently merged with Objet, an Israel company, to form a powerhouse company with a market valuation of \$3 billion, with a full line of machines to make an almost unlimited array of products (Hessman 2013)

3D Systems was founded in 1986 by Charles Hull who developed the stereolithography (SLA) process and operates out of Rock Hill, South Carolina (Juster 1994). They have applications in transportation, energy, consumer, recreation, healthcare and education industries (<http://www.3dsystems.com/>).

Two major companies – General Electric (GE) and Hewlett-Packard (HP) already have positions in 3D printing. HP will probably build on their base printer business, although their thinking has not been revealed. It recently ended its relationship with Stratasys, which had been making HP's exclusive line of printers since 2010, mostly marketed in Europe (Gupta 2012). This may mean they are going to focus on internal developments.

GE reports its scientists already are studying additive manufacturing techniques to reduce the labor and production costs of ultrasound systems, continuing GE's increasing emphasis in the healthcare field. (Health and Beauty Close-Up 2011). GE Aviation is also researching the use of AM to reduce the weight of jet engines (Zelenski 2012)

### **Conclusions**

Additive manufacturing is a proven technology and holds promise for invigorating the manufacturing industry in the United States. To provide greater impetus to the research, the Department of Defense and the Department of Commerce has awarded \$30 million to a consortium of regional businesses, universities and nonprofit organizations to establish the National Additive Manufacturing Innovation Institute in Youngstown, Ohio. (Hessman 2012).

It has great potential to reverse the offshoring movement. AM allows manufacturers to produce locally and respond quickly to changes in demand. It increases flexibility and makes proximity to both the design side of business and the demand side because manufacturing can be done effectively and efficiently in smaller units (Magnus 2012).

It will grow. Terry Wohlers estimates the market for 3D prints will grow from approximately \$2 billion in 2012 to \$6.5 billion by 2019 (Gupta 2012). In a Wall Street Journal article, Michael Malone (2012) lists three-dimensional printing as one of his six sources of the "next American boom." Larger printers

will be built to make larger parts. Automobile bodies, airplanes and buildings have been mentioned as future possibilities for AM applications.

Small companies will probably be acquired by larger ones. 3D Systems, one of the two pioneers in the field, has been aggressive in acquiring 20 companies since 2009. Stratasys, the other pioneer, has been more conservative but, as indicated, closed its merger with Objet, an Israel company in 2013. GE and HP appear to be the most likely large companies to grow through acquisition as well as through internal efforts.

One of the most widely referenced websites is <http://wohlersassociates.com/additive-manufacturing.html>. Mr. Terry Wohlers has been involved in 3D printing since its early days and is an active reporter on advances in the technology.

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Anyone need a new part for your car or house? Just crank up the 3D printer in your garage and make it! However, you may be well advised to outsource making your replacement body parts.

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# **LEARNING PROJECT MANAGEMENT THROUGH SIMULATION**

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## **ABSTRACT**

Through a simulation, one can enhance student learning of valuable business management skills while providing an enjoyable experience. Specifically, integrating a simulation into an undergraduate project management course is challenging and requires an innovative approach. Both information regarding the details of how a simulation was actually incorporated into a course and subsequent student comments are presented in this paper. Competition among students for best performance gave excitement to the learning process.

## **INTRODUCTION**

In the fast-paced, competitive environment of business today, time and cost are critical resources within any organization. The business graduate who understands how to use both of these effectively and efficiently has an obvious advantage. The project management simulation game presented in this paper is a practical, “hands-on” educational pedagogy for the student to learn how to make decisions regarding the allocation of human resources in the management of time and cost for a project. Coping with uncertainty during the course of the project is also a benefit of the simulation game since changes are announced as the game progresses. This element of uncertainty simulates real world situations that occur in a business project. It prepares students to enter the job market and ultimately the workplace with valuable experience in project management skills.

## **PROJECT MANAGEMENT SIMULATION**

Numerous businesses are involved in the management of projects on a day-to-day basis. The preparation of students for this environment is essential. This paper focuses on the experience gained by business students in playing a game designed for learning project management skills. Specifically, the game gives students the opportunity to manage the actual time and cost for a project by requiring them to make “real” life decisions and then to see the effects of those decisions on the project. Overall, the student develops conceptual and critical thinking skills. The game allows students to visualize the project as a whole and places them in the actual role of project manager. Business concepts and facts learned in the course gain relevance and challenge students in their application while participating in the game.

The project management simulation game used for the course was developed for educational purposes by Ken Klassen and Keith Willoughby [1]. It was one of the resources available from the project

management book by Pinto [2]. It can be used as a stand-alone project management learning exercise. Before beginning the simulation, students needed to formulate an initial strategy for the project. Information showing the various project activities, immediate predecessors, and duration of each activity for accomplishing the project were provided for students. With this information, students completed the network diagram and identified the critical path, i.e. longest one through the network. Once this was done, the instructor verified that the student's network was correct. Then the student allocated resources to tasks for each weekly round of the project. The goals of the simulation were to complete it in as few weeks as possible and to do this at minimum cost.

Because the simulation also teaches the student about uncertainty, a decision making condition that is common for managers, success required that the student think ahead about what things may happen during a project and how to manage these uncertainties if or when they happen. Specifically, the critical path was increased in length over the project life while the time for the total project completion was shortened. Coping with this reality presented a particular challenge for students because the critical path determines the earliest a project can be accomplished. This path can only be shortened if the activities are "crashed," i.e. apply extra resources to the activities on the critical path. To succeed in the simulation, a student needed to recognize this fact in the early weeks of the project.

### **SIMULATION EXERCISE CONDITIONS**

There were constraints given in the simulation for its play. Major ones stated that a maximum of two workers could be assigned to any given activity and that no more than five workers could be assigned overall per week. The normal allocation per week for workers was four. A cost was associated with each worker used, and a premium was charged if the one additional worker that was available each week was used. Additionally a surcharge was levied if two workers were assigned to an activity to cover the coordination and/or overtime required. Initially the completion deadline for the project was to be ten weeks with a penalty charged for each week that the project exceeded the deadline. In order to simulate uncertainty as previously stated, changes in time for various activities were announced as the game progressed. Also, the completion deadline for the project was decreased from ten to nine weeks after the fifth week of the simulation. Student decisions for allocation of workers per week were recorded in an Excel spreadsheet that automatically calculated cost.

### **OUTCOMES**

Upon completion of the simulation, each student was required to write a paper about his or her experience, including a summary of the simulation, discussion of their decisions during the simulation, and what he or she may have done differently in retrospect. This reflective exercise after the completion of the simulation provided the student with an invaluable learning opportunity as it exposed the wisdom of his or her prior decisions. In context, if a student did not realize or account for the critical path increasing during the simulation and then suddenly the project length was decreased, this could potentially cause major problems in the completion of the project on time and on budget. By reflecting upon past decisions, it is hoped that the student would now realize, if he or she had not already done so, that distributing resources among activities in a balanced fashion was necessary to finish the project successfully.

Additionally, included in the student's reflective paper was a section pertaining to what the student learned by participating in the simulation. Some sentences from comments of the students regarding their learning experience are included below:

“The management game assignment to me was very helpful in expanding my knowledge of project management...It brought what was taught through lecture and through Microsoft project together...The fact that the game presented many changes like the ones that we can really face in real-time projects served as a learning experience for me.”

“The game was a valuable learning tool....As a project manager, I need to be conscious to the idea of potential problems being right around the corner.”

“This assignment gave me project management skills I will be able to utilize in real life. I know that no project will be able to be completed without some unexpected challenges being presented. Whether the challenges occur due to human error or not, they still must be assessed and accommodated in a timely and effective manner in order to be able to successfully ensure the completion of the project...I will use this simulation in the future to remember the importance of thorough monitoring and controlling and the effects my follow up can have on my own success as a project manager and a businesswoman.”

“I enjoyed working on the game because it taught me the importance of time management...I have also learned the importance of establishing a budget and staying within that range as you endure the complications throughout the project.”

“In doing this simulation again I would have tried to plan out all my decisions ahead of time and then make changes to my decision as the changes for the game were announced each week...Overall this project gave a good taste of what a project manager needs to think about when scheduling tasks for a certain project, without having to deal with the actual employees. So it let us stick to making the decisions to give us a feel for completing tasks under a deadline and keeping our costs as small as possible.”

“...I learned that there will be things to go wrong when working on a project. Some of these negative events can be miniscule in relative importance...some are very crucial like the time frame of the project being shortened...I learned that completing the project as quickly as possible does not always mean that you have succeeded.”

“If I had the chance to play the project management game again I would have used the extra employee several times in the early weeks to create a buffer by finishing tasks early rather than right on time.”

Overall, these student comments demonstrated the benefits of applied learning from using this project management simulation in an undergraduate project management course.

## CONCLUSION

Knowing the facts about project management requires the next step of how to use those facts for a successful project outcome. Putting project management concepts into practice is complex. Incorporating this simulation into the project management course provided a valuable opportunity for business students to explore the complexity of project management and to learn through experience the following concepts as recognized by Klassen and Willoughby[1]:

- 1) Network Diagram Relationships
- 2) Critical Path and Its Management Throughout a Project
- 3) Time Management of Activities



- 4) Cost Management in Projects
- 5) The Balance and or tradeoff between Time & Cost In  
Managing Any Business Project
- 6) Impact of a Project Deadline & Penalty for Exceeding
- 7) Optimal Use of Limited Resources
- 8) Concept of “Crashing”
- 9) Managing in an Uncertain Environment

Incorporating this simulation in a project management course has provided students with the opportunity to learn in a hands-on, pro-active environment the concepts of project management. It serves as a bridge where business concepts and theory converge with practice.

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A Literature Review of Workplace Bullying: A Serious Organizational Problem

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## Abstract

In 1992, Andrea Adams, a BBC journalist, coined the term “workplace bullying” describing an ongoing harassing workplace behavior between employees, which can result in negative outcomes for the targeted employees (Adams, 1992). Workplace bullying is receiving increased attention worldwide as a negative behavioral that impacts an organization at both the individual and collective level. It is considered a serious and chronic workplace stressor (Hoel & Cooper, 2004). The literature review indicated this type of organizational behavior is a global problem which needs to be addressed. This review will focus on workplace bullying in the healthcare industry.

## *Introduction*

Although this negative organizational employee behavior was first recognized in the 1980s in Sweden, the term “workplace bullying” was not coined until 1992 by Andrea Adams, a BBC journalist (Adams, 1992). Workplace bullying has been consistently defined in the literature worldwide as repeated and systematic negative behavior targeted to individuals or a group of individuals that perceive the behavior as unfair, threatening or embarrassing. Definitions also include negative verbal or non verbal behavior such as snide comments, verbal or physical threats or items being thrown. Employees have also reported less aggressive behavior such as demeaning their work or gossiping about them on a continual basis as workplace bullying.

Although the definitions are similar worldwide, there are different labels that are used—mobbing is used in France, Germany and Sweden, harassment in Finland, and in the U.S and Australia, aggression or emotional abuse. In the health care industry, the term ‘lateral violence’ is used for bullying between nurses (Keashly, 2001; Sheehan, 1999). Workplace bullying can occur at all organizational levels. It can occur between same or different genders. The literature has reported an increased incident of bullying reported in healthcare organizations and in academe ( Ayoko, Callan, & Hartel, 2003; Vartia, 2001; Djurkovic, McCormack & Casimir, 2008).

## **Literature Review**

Similar to the literature, Wiedmer (2011) defines workplace bullying as repetitive negative behavior to one or more persons. Examples of workplace bullying are: verbal abuse, offensive conduct which can be perceived as threatening or hostile, and actions which prevent an employee from completing their work. A bully’s goal is to intimidate another employee to jeopardize their

job. The reported prevalence of U.S. workplace bullying is 37% of the U.S. workforce according to the WBI-Zogby survey which is the largest scientific study of U.S. workplace bullying.

McMullen (2011) also emphasizes the responsibilities of organizations to implement policies to punish this type of behavior. Yamada (2004) developed a journal for employee rights specifically targeted at workplace bullying. Yamada indicates there is no federal legislation that specifically addresses workplace bullying although there are 47 states that have implemented anti-bullying laws in elementary and secondary schools.

Hauge, Skogstad & Einarsen (2010) survey research indicates that workplace bullying is a predictor for anxiety and depression as well as job dissatisfaction, turnover and absenteeism. Results indicate that those individuals who were bullied may also become bullies themselves. Situational factors such as work conflicts also resulted in bullying behavior. They recommend that management develop anti-bullying policies. Glaso, Matthiesen, Nielsen & Einarsen (2010) focused on whether there was a typical personality profile for bullied employees. Their research indicates that those individuals who were more likely to be bullied were characterized as more anxious and neurotic, less extroverted, less organized and less dependable. De Cuyper, Baillen & DeWitte (2009) survey research examined the relationship between the job stressor, job insecurity, and workplace bullying. Their research indicates that there is a correlation between job insecurity and bullying and being a victim of a bully. In both instances, because the employee is unsure of their job status, they may lash out at other employees or become a victim of a bully because of fear of losing their job. Bukspan (2004) indicated that workplace bullying has been a taboo subject in France for many years until the 1990s. Unlike the U. S., in 2002, the French government passed a law recognizing workplace bullying as illegal with prison and sanctions. Escartin, Rodriguez-Carballeira, Zapf, Porrua & Martin-Pena (2009) survey

research examine the different types of workplace bullying and the degree of harm they cause. They categorize workplace bullying into two types: direct and indirect. Direct bullying consists of emotional abuse and professional discredit. Indirect bullying consists of isolation of the victim, interfering with the victim's communications and creating a negative work environment. The survey results indicated that workers indicated that both categories were very severe with emotional abuse as the most severe category of bullying. Similar to other studies, the authors recommend organizational training against workplace bullying.

Nolfe, Petrella, Zontini, Uttieri & Nolfe (2010) survey research support other studies that indicate that the work environment, job insecurity and interpersonal conflicts are predictors of workplace bullying. Their research also indicates that depression is associated with workplace bullying. Rhodes, Pullen, Vickers, Clegg & Pitsits (2010) discusses the organization's ethical responsibilities to deter workplace bullying. Unlike other studies that focus on workplace bullying as an individual behavior, this study focuses on the organizational responsibility to prevent this activity. They believe that workplace bullying is unethical and therefore is the ethical responsibility of the organization to implement policies to prevent this negative behavior. Privitera, Psych & Campbell (2009) survey research assesses cyberbullying or bullying through electronic means, as another way to bully in the workplace. Cyberbullying consists of negative behavior such as withholding information via telephone or email to hurt the victim's job performance and electronic gossip. A victim could experience both face to face and cyberbullying.

Olaffson & Johannsdottir (2004) surveyed employees and categorized them by how frequent they were bullied and their coping strategies. The two most frequent types of bullying focused on unfairly increasing the workload and assigning work not included in the job description. Coping

strategies included seeking organizational help, avoidance such as taking sick leave and vacation, fighting back or doing nothing. Males tended to seek less help and fight back. Females sought more help and practiced avoidance. The older the employee, the more likely they would do nothing.

Hoel, Faragher & Cooper (2004) performed a national survey to assess the health impact of workplace bullying. Survey results indicate that victims experienced depression and anxiety as reported in other studies. Gender differences indicate that males' mental health was more impacted by the following bullying actions: persistent criticism, being ignored or finding faults with work. Female employees were negatively impacted by hints to quit their job, pressure not take a vacation, accusations against female employee. Coyne, Craig & Chong (2004) approached workplace bullying from a team context, examining fire fighter teams. Surveys were given to personnel to identify both bullies and victims by self identification. Questions were asked about informal and formal networks in the organization. Results indicated that the majority of victims were often included in teams. Victims tended to bond more closely than bullies in a team. Bullies tended to not be included in teams.

### **Workplace Bullying in the Healthcare Industry**

Halverson (2010) discussed the myths surrounding workplace bullying which include that the prevalence of bullying in health care is low, smart people are not targets, employers effectively deal with bullies, there are legal protections against bullying in the U.S, bullies are needed as part of maintain quality patient care and there is nothing to be done against bullying. Murray (2009) indicates that there is nurse to nurse bullying because one feels threatened by the other professionally. It continues to be a major issue because there are not enough policies in place to

protect employees against bullying. It can be financially costly to a healthcare organization because bullied nurses often feel frustrated from lack of support and quit. It has become a reason for work dissatisfaction, increased absences and lost productivity. Johnson (2009) discussed the international scope of this workplace problem citing that in the US and the UK, estimates of 10-38% exist. Research indicates that healthcare has one of the higher rates of bullying. Similar to the other studies, the physical effects of bullying are discussed which range from psychological to physical damage. Johnson also indicates that bullying in the healthcare workplace can impact patient safety. The bullied nurses are feeling anxious and are afraid to ask questions which may result in poor patient care.

The U.S. American Nurses Association reports that between 18-31% of nurses experienced bullying behavior. In 2012, The ANA released a second edition of their booklet: *Bullying in the Workplace: Reversing the Culture*. The Emergency Nurses's Association (ENA) 2011 violence surveillance survey of 7200 indicated that many who were bullied did not file a complaint so the reported prevalence rates could be higher (Nurse Bullying, 2013).

In 2008, the Joint Commission developed a standard for workplace bullying which they call intimidating and disruptive behaviors in the workplace. They issued the following statement:

*“Intimidating and disruptive behaviors can foster medical errors, contribute to poor patient satisfaction and to preventable adverse outcomes, increase the cost of care, and cause qualified clinicians, administrators, and managers to seek new positions in more professional environments. Safety and quality of patient care is dependent on teamwork, communication, and a collaborative work environment. To assure quality and to promote a culture of safety, health*



*care organizations must address the problem of behaviors that threaten the performance of the health care team”.*

In a recent Joint Commission study, it was found that more than 50% of nurses have suffered some type of bullying with 90% observing some type of abuse. Their standard focused on the impact of these types of behavior on patient care quality. The Joint Commission requires healthcare institutions to create a code of conduct that defines appropriate behavior and has a system in place to manage inappropriate behavior such as workplace bullying. In addition to the stance of the Joint Commission, the Center for Professional Health at the Vanderbilt University Medical Center has developed a program for treating and remediating disruptive behaviors by physicians. Nurses’ unions are also developing education programs on workplace bullying.

Two leadership standards are now part of the Joint Commission’s accreditation provisions:

- 1)The first requires an institution to have “a code of conduct that defines acceptable and disruptive and inappropriate behaviors”.
- 2) The second requires an institution “to create and implement a process for managing disruptive and inappropriate behaviors” (Workplace Bullying in Healthcare I, 2013).

Rocker (2008) examined this issue in Canada, indicating that workplace bullying is a major organizational issue because it has contributed to the nursing shortage in Canada. This behavior has effects on the victim such as nausea, anxiety, insomnia, depression, alcoholism and suicidal tendencies. Fortunately, the Canada Labor Code has amended its 2000 regulations to require healthcare organizations to develop policies to prevent this behavior. Workplace bullying exists

between two nurses and between physicians and nurses. Like the other publications, the organization must develop specific policies to eliminate this issue.

Cleary, Hunt & Hosfall (2010) discuss workplace bullying in the nursing profession in Australia. The most common bullying behaviors include an unmanageable workload, isolation, gossip, and excessive criticism, humiliation in front of colleagues or being given impossible targets or deadlines. Consistent with the literature, they recommend the need for senior management to develop a zero tolerance against workplace bullying. Hutchinson, Wilkes, Jackson & Vickers (2010) also assess the organizational influences of bullying in the nursing industry which include organizational tolerance, rewards for bullying and informal organizational structures. The results indicate that bullying cannot be separate from organizational characteristics. In order to remove this negative behavior, the organizational structure must change. The authors asked 26 nurses to identify the different types of bullying behavior: personal attacks, damage to professional reputation and making work tasks difficult. In their 2010 article, *Bullying as Circuits of Power*, the authors examine the relationship of power and workplace bullying. Abuse of both organizational and informal power in the workplace such as networks of alliances enables bullying to become a normative as part of these alliances and organizational structure. In the article, *Workplace Aggression and Violence: Nurses and Midwives Say No* (Anderson 2011) support other Australian research that indicates nurses are exposed to workplace bullying. Horizontal or lateral violence, nurse to nurse, is escalating but oftentimes underreported. Lateral violence can also be covert such as giving a colleague the silent treatment or not providing enough information to accomplish a task. Lateral violence results in increased absenteeism, high

turnover, and poor patient care because the employee is distracted. Fortunately, legislation was passed in Victoria and NSW which sends workplace bullies to prison for up to 10 years.

In Turkey, Yildiz (2007) performed a survey in the healthcare and higher education sectors—two industries that have issues with workplace bullying. In the healthcare sector, the most reported bullying category was excessive micro monitoring of daily activity. Being shouted at in front of others was also common in health care. Victim responses to bullying were anxiety, depression and loss of motivation. Katrinili, Atabay, Gunay & Cangarli (2010) discusses nurses' perceptions of workplace bullying. The authors emphasize that bullies in healthcare can not only impact the well being of the employee but also the quality of patient care. Their survey research indicates that nurses bullied other nurses for political power, enhanced work performance or was concerned about their job or life. Leadership must take a zero tolerance approach to workplace bullying. Yildirim (2009) discussed the effects of bullying on nurses. Their survey research indicated that the most common bullying tactic was attacks on professional behavior and personality and being blamed unfairly for poor work performance. The nurses' responses to bullying was lower energy level and less organizational loyalty. The authors indicate that regulations need to be implemented to control this negative behavior.

Randle & Stevenson (2007) discussed ways to reduce bullying in health care in the United Kingdom. Their research supports other research that indicates organizational culture plays a role in allowing workplace bullying. They suggested organizational rules to encourage collaboration and teamwork. Allan, Cowie & Smith (2009) discuss three cases of discrimination of overseas trained nurses that were perceived as bullying and that discrimination can be considered racist bullying. Racist bullying, like general workplace bullying, can occur as the result of abuse of power. The reactions to racist bullying were similar to workplace bullying. Victims' loss self

esteem which impacted their job performance. Tehrani (2004) examined workplace bullying in the health care industry. Survey results are similar to other research: unfair criticism, intimidation and public humiliation. Over 50% were bullied by supervisors which impacted whether the victim would report the behavior.

### **Conclusion**

The Workplace Bullying Institute was started in the 1990s in the U.S by Dr. Gary and Ruth Nanie as a result of Ruth Nanie being bullied in her workplace by a female supervisor. They established a website (<http://www.workplacebullying.org>) in 2002 as a venue to promote and educate the public on workplace bullying worldwide. In August 2007, they conducted the first study of all adult Americans on workplace bullying—the results indicating that workplace bullying was a major organizational issue. Approximately, 8,000 respondents, representative of the U.S. adult population, indicated that 37% of the workers were bullied—12% of the employees witnessed the problem. Approximately 70% of the bullies were their supervisors with 60% of the bullies being women who targeted women in 71% of the cases. According to the survey, over 60% of the employers ignored the problem. It was also reported by 45% of those who were bullied experienced stress-related health problems such as anxiety, depression, and panic attacks (Results of the 2010 CBI Survey, 2013).

The literature indicates that workplace bully targets can experience a range of physical and psychological symptoms such as work stress anxiety, lowered job satisfaction and loyalty to the organization, increase in absenteeism, lowered work productivity and depression (Ayoko et al, 2003). A sense of powerlessness is often reported by the target. In order for a bully to be successful, the target must feel they cannot defend themselves against them which allow the

bully to continue the behavior. In two Australian studies, over 40% of the employees were bullied by their supervisors, over 10% were bullied by their peers, and 2% bullied by their subordinates (Ayoko et al, 2003). Workplace bullying also impacts other employees because if the bullying continues and is not addressed by management, it impacts the overall morale of the workforce. Low morale often results in high employee turnover which can be detrimental to the organization's success. It also can disrupt the professional career of the target as well as the personal life of the target. From an organizational perspective, continued bullying may result in the organization paying for litigation fees, counseling, worker's compensation and early retirement pay-outs (Kieserer & Merchant, 1999).

Unfortunately, 80% of workplace bullying incidents is not illegal. There is no specific legislation in the U.S. that forbids workplace bullying. Thirteen states have introduced bills. New York is the only state that has enacted legislation that forbids this type of behavior in the workplace. There are two federal laws that can be applied to workplace bullying activity: The Occupational Safety and Health Act of 1970 (OSHA) and Title VII of the Civil Rights Act of 1964. Under the OSHA Act of 1970, it states that the employer must provide a safe and healthful working environment for their employees. If an organization does nothing to stop this behavior, this could lead to violations under OSHA. Under Title VII of the Civil Rights Act, if a protected class employee is bullied by another employee, the action can be illegal based on the concept of a hostile work environment which is illegal under sexual harassment (Results of the WBI Survey, 2012).

The literature was in agreement on the definition of workplace bullying and the types of actions that are considered bullying. The literature was also in agreement on the negative impact bullying had on the victim's health including anxiety and depression. The literature also

indicates that bullying often occurs between a supervisor and supervisee and occurs because of a power struggle, issues in the workplace and job insecurity. Although some countries have passed legislation to ban workplace bullying, it has yet to happen in the U.S., although there continues to be a grass roots movement to encourage U.S. federal legislation. In addition to legislation, in order to reduce the prevalence of workplace bullying, the literature consistently indicates the organization should implement policies to eliminate this behavior. The following are recommendations for organizational programs:

- 1) adopt a policy of zero tolerance for workplace bullying and develop measures to discipline bullies in the workplace;
- 2) create an organizational culture that focuses on a positive work environment enabling all individuals to pursue their careers;
- 3) reward behaviors that encourage teamwork and collaboration among employees and their supervisors; and
- 4) develop an employee educational program on what constitutes workplace bullying and how to prevent it (LaVan & Martin, 2007).

This literature review indicates that workplace bullying continues to be a pervasive organizational problem worldwide. Although there are some countries with anti bullying legislation, no U.S. federal legislation has been passed. In the U.S., the Workplace Bullying Institute has developed a Healthy Workplace Bill which defines workplace bullying and extends protection to employees against this type of behavior. In 2012, there are 16 states that have introduced a Healthy Workplace Bill (Healthy Workplace Bill, 2013). In addition to legislation, organizations should implement workplace bullying educational programs and establish organizational policies to ensure that employees will be protected against this type of negative

behavior and there is accountability for workplace bullies. These types of activities are particularly important to the healthcare industry because this workplace bullying can impact patient safety. This author believes that this behavioral problem can be compared to the evolution of the concept of sexual harassment which eventually became illegal as part of the Civil Rights Act of 1964. Eventually, legislation will be passed that will ensure that this type of behavior is illegal and there will be accountability for those workplace bullies.

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## **INTRODUCTION TO ATTRIBUTE BASED ACCESS CONTROL**

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### **ABSTRACT**

A major problem in the operational control of enterprise information systems is to promote information sharing while maintaining control over the integrity and privacy of information. Many organizations employ identity management and authentication for access, and then partition the application domain so that a separate access facility is required for each system. Simple access control lists are used for access control, so flexibility and information sharing is cumbersome and inefficient, often leading to a state where design objectives are easily diminished. With Attribute Based Access Control (ABAC), a highly effective means of information sharing, based on the use of attributes, can be achieved, while enhancing efficiency and efficacy among enterprise agencies. This paper provides an introduction to this important concept as it applies to federal and non-federal organizational structures.

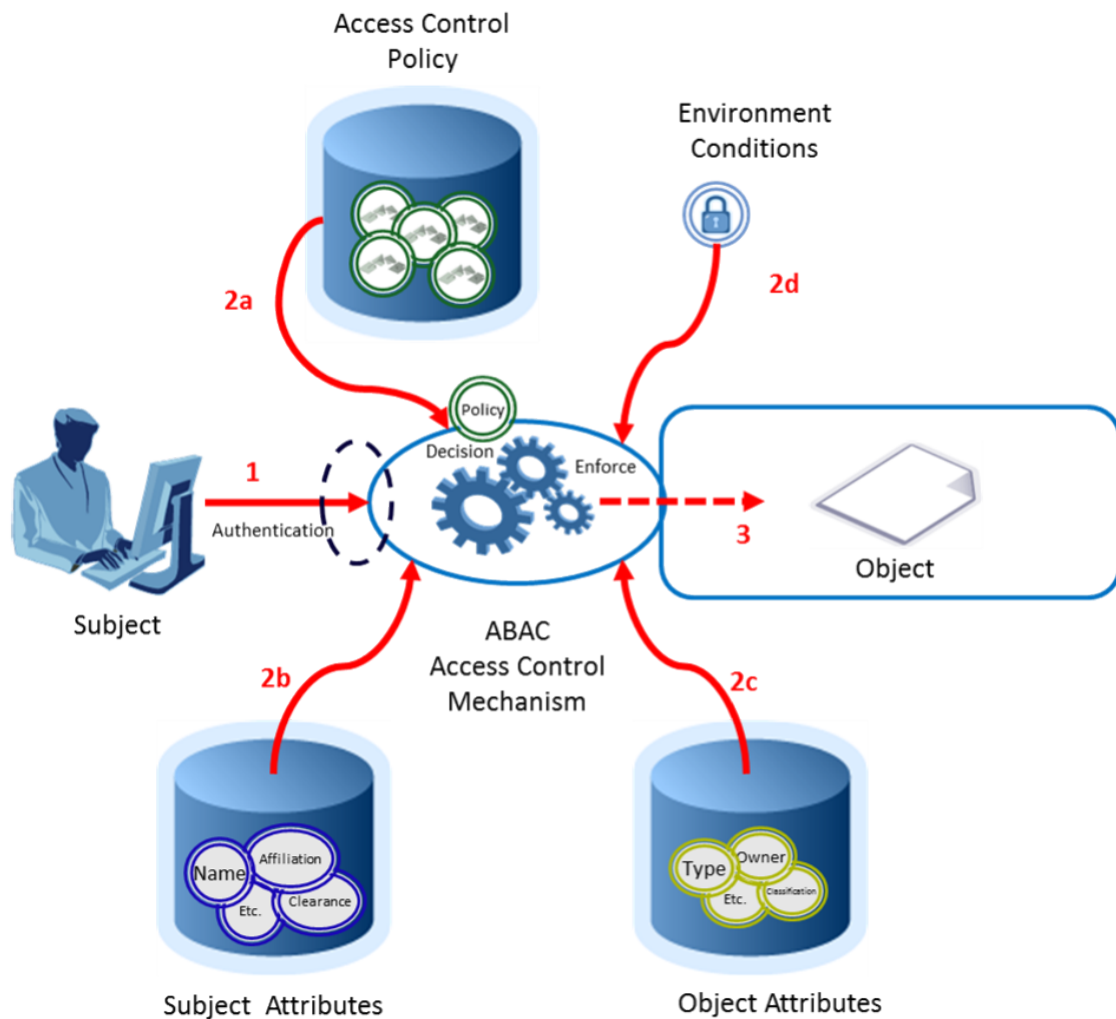
### **THE ACCESS CONTROL LANDSCAPE**

This section gives a brief overview of access control in information systems and an executive summary of Attribute Based Access Control (ABAC). A government document (NIST 800-162) on that subject is out for review and the rationale underlying this paper is to promote that effort. Cybersecurity is a major subject in the modern world, and effective access control is an important aspect of security countermeasures.

In most information systems, access control is based on identity management. The user provides identity credentials to the system, and based on that identity, that person is permitted to perform certain well-defined operations. Control is maintained by access control lists, often implemented as a matrix that implicitly specifies the level of authorization between subjects and objects. Mandatory and discretionary controls are established on a system-wide basis and are typically the responsibility of the owners of the various objects. Access control management is the cumbersome process of adding and revoking privileges as organizational structures change.

With Attribute Based Access Control (ABAC), access control management relies on the use of subject attributes, object attributes, and control rules that define the allowable operations determined by the relationships between subject-object combinations. For example, an analyst in the supply-chain group would be assigned a set of subject attributes upon employment. Similarly, the database administrator would assign a set of supplier attributes when the supply-chain database is populated. Finally, the owner of the supplier database creates an appropriate set of access control rules that governs the permissible operations.

It follows that attributes of subjects and objects and the values of those attributes can be modified during the lifecycle of a project without having to change a subject/object relationship whenever a relevant event occurs. Access behavior can be adjusted dynamically adding to the flexibility and efficiency of the system. Thus, administrators can achieve policy decisions without requiring specific attention to changes of subjects, objects, and other environmental conditions. This scenario is depicted in Figure 1.



1. Subject Requests Access to Object
2. Access Control Mechanism Assesses a) Rules, b) Subject Attributes, c) Object Attributes, and d) Environment Conditions to Determine Authorization
3. Subject is Given Access to Object if Authorized and Denied Access if Not authorized

Figure 1. ABAC Access Control Scenario. (Source: NIST Special Publication 800-162, *Guide to Attribute Based Access Control (ABAC) Definition and Consideration (Draft)*, 54 pages, (April 2013), p. viii)

The implementation of ABAC is complex, because the underlying requirements are complicated. An enterprise deploying ABAC must develop attribute management facilities, policy rules, and access control methods, taking into consideration principles that are infrequently addressed in traditional systems design. Factors necessary for development are encompassed by the following design principles:<sup>1</sup>

1. Establish the business case for ABAC implementation;

<sup>1</sup> NIST Special Publication 800-162, *Guide to Attribute Based Access Control (ABAC) Definition and Consideration (Draft)*, p. ix-x)

2. Understand the operational requirement and overall enterprise architecture;
3. Establish or refine business processes to support ABAC;
4. Develop and acquire an interoperable set of capabilities; and
5. Operate with efficiency.

The principles apply to the Federal Government in particular and all business, educational, and governmental organizations in general. The National Institute for Science and Technology has prepared a draft of ABAC for Federal agencies; it is currently out for public review. The concepts apply equally well to non-federal organizations, such as business organizations and educational institutions. Accordingly, public awareness is required for effective review by concerned parties.

### NECESSARY TERMINOLOGY

Several terms are implicitly understood in the security and control domains but are usually left undefined, some of which that are relevant to this paper are: object, subject, user, attribute, identity, credential, authentication, authorization, privileges, policy, policy decision point, and policy enforcement point. There are others, of course, but this list gives the main terms.

A resource that has value to the organization and is regarded by the object's owner as something that should be protected is referred to as an **object**, such as information, a computational facility, or a network. The person or non-person entity that requests access to the object is known as the **subject**. There are differing opinions of exactly what constitutes a subject, but it is safe to think of the subject as a **user**. Information about a subject – but not what a subject knows – is that subject's **attributes**, or more properly “subject attributes.” A subject attribute could be a person's role in an organization. Subject attributes that uniquely distinguish one subject from another is known as an **identity**. Attributes applied to an object are known as **object attributes**. An object attribute may be inherent in the object or it may be a designation that someone has assigned to that object with the objective of restricting access.

A subset of a subject's attributes used to verify a subject is called a **credential**, and is used to permit access to a system or resource. **Authentication** is the process of verifying that a subject is who he or she says they are and does not necessarily give permission to do anything, except in elementary cases. **Authorization** gives the subject **privilege** to access a resource, based on a rule set, termed a **policy**. Policies are customarily digital, implying that their use is intended to be used by a computational resource as part of a total system configuration. A **policy decision point (PDP)** is the mechanism within access control where a decision is made to assign **privileges** to perform certain tasks in the application domain, and a **policy enforcement point (PEP)** serves as the point of enforcement for permission or denial to access services.

### CONCEPTUAL MODEL OF ATTRIBUTE BASED ACCESS CONTROL

The basic purpose of access control is to protect objects, such as data, services, applications, and networks, from unauthorized use, taken to include discovery, reading, creating, modifying, deleting and otherwise performing operations involving those objects. The owner of an object in this domain is motivated to protect it for reasons that are not always explicitly known. A subject without the proper authority and need to access the object is customarily denied access. Access is therefore restricted to subjects with acceptable credentials and other necessary attributes – from the owner's perspective. Accordingly, the owner of an object has the need to establish a policy for the protection of objects based on the operations to be performed, by what entity, and for what reason – i.e., the operational context. Historically, methods of access control based on identity, higher authority (mandatory-access control – MAC), the owner's discretion (discretionary-access control – DAC), and the subject's function in the organization (role-based access – RBAC) have been used with reasonable success. The biggest problem

has been that privilege management has been inefficient and inflexible thereby limiting the inherent value of the objects protected. It is no exaggeration that most access-control facilities have been based primarily on identity management methods. In fact, when a subject from one organization requires access to an object from another organization, a supplementary account has to be created, as suggested by Figure 2. In the terms of the ABAC document, "... authenticated access to resource objects outside of the subject's originating organization would require the subject's identity to be pre-provisioned in the target organization and pre-populated on an access list." [ibid, p.6]

Clearly, what is needed is to enable access decisions to be made without knowledge of the object by the subject or knowledge of the subject by the object-owner. Explicit authorization is avoided through the use of object and subject attributes, as long as the attributes are consistently administered by the separate organizations.

### DEFINITION OF ABAC AND CORE CAPABILITIES

The authors of NIST 800-162 provide the following high-level definition of ABAC:

*Attribute Based Access Control (ABAC): A logical access control methodology where authorization to perform a set of operations is determined by evaluating attributes associated with the subject, object, requested operations, and, in some cases, environment conditions against policy, rules, or relationships that describe the allowable operations for a given set of attributes.*

A conceptual diagram of ABAC is given in Figure 1, displayed earlier.

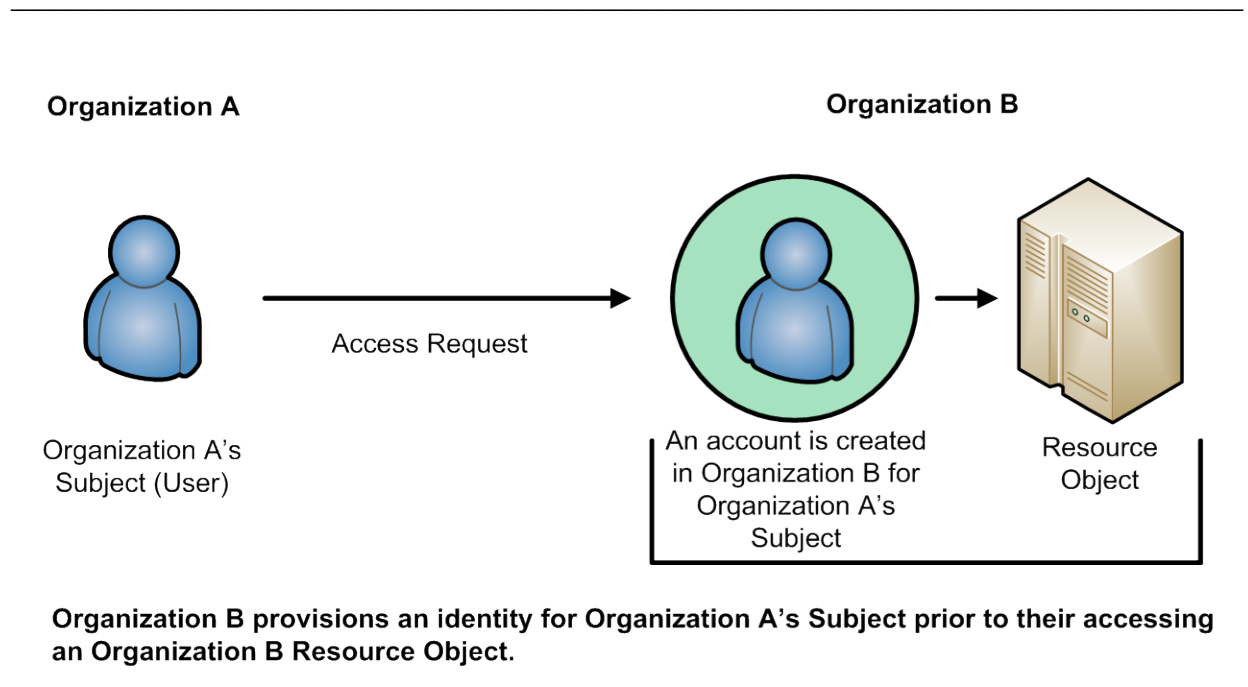


Figure 2. Multi-Organizational Access. (Source: NIST 800-162, op. cit., p. 7)



ABAC relies on the assignment and management of attributes and the evaluation of those attributes by an access-control mechanism. The relationships are reflected in the set of access-control rules, representing the access policy, and used by the policy decision and enforcement points. Contextual attributes are added to the control set and referred to as environmental conditions. Moreover, the attributes can be grouped in various ways, such as descriptive, operational, and so forth. Combinations of attributes, for example, subject-object, form the basis for access rules.

Subjects must be assigned subject attributes, such as name, role, organizational affiliation, and functional capability. Other attributes could include country status, nationality, and security clearance. Thus, a subject authority is required to assign and manage subject attributes. Similarly, object attributes must be identified and controlled. Operations that can be performed with or on an object are also of concern and must be supported by at least one subject-object rule. Subjects and objects can be grouped into categories, such that attributes are assigned individually or according to an enclosing category.

Subject attributes are assigned individually or by an organizational affiliation. In general, an administrator is needed for this function, and that person necessarily requires a software facility specifically designed for this purpose. The management of subject attribute is a major part of an Access Control Mechanism (ACM), and an access control language that will satisfy the demands of interoperability is required. An analogous facility for object and environmental attributes is also required, so the ACM has the capability to enforce the rule sets for the Policy Decision and Policy Enforcement Points. The ACM process is summarized in Figure 3.

## **OPERATION AND MANAGEMENT OF ABAC**

In one form or another, most aspects of ABAC have been implemented in specific systems for particular purposes. The objectives of the ABAC document are to propagate the concept across organizational systems for diverse objects and subjects under varying conditions. Clearly, each object under consideration must be assigned attributes, and each user must be assigned the requisite attributes. These are up-front tasks, as well as policy determination. During operation, the ACM must be established to provide the required functionality.

## **SUMMARY**

Access control is an important component of a total cybersecurity program. A single insecure system can undermine the security of an otherwise secure operating environment. If a common conceptual methodology is adopted between organizations, together with packaged support facilities, then the overall level of risk can be improved.

## **ACKNOWLEDGEMENT**

The major reference for this paper is the following document, available as a download from the National Institute of Standards and Technology:

NIST Special Publication 800-162

**Guide to Attribute Based Access Control (ABAC) Definition and Considerations (Draft)**

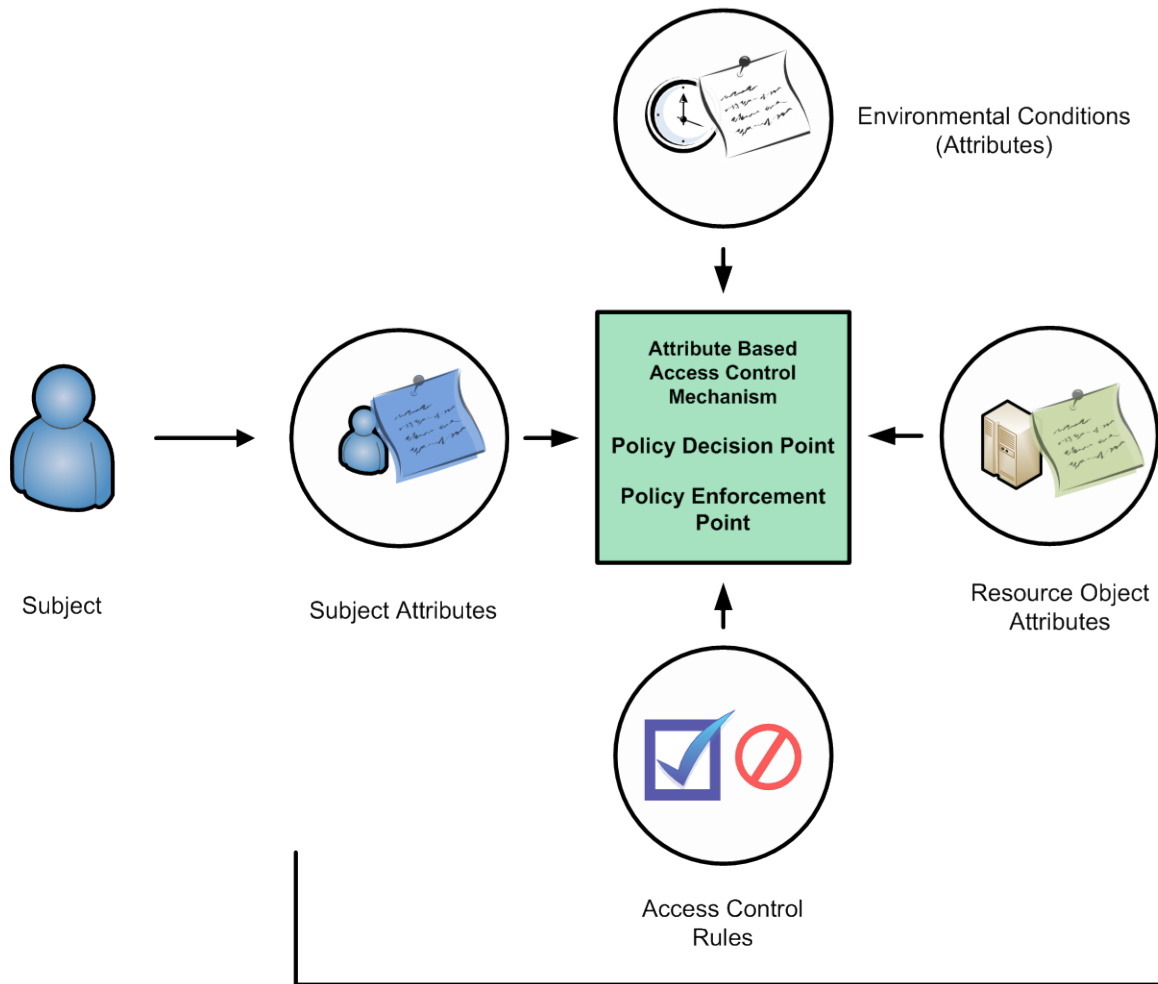
**National Institute of Standards and Technology**

U.S. Department of Commerce

Authors: Vincent C. Hu, David Ferraiolo, Rick Kuhn, Arthur R. Friedman, Alan J. Lang,

Margaret M. Cogdell, Adam Schnitzer, Kenneth Sandlin, Robert Miller, Karen Scarfone

The report is extensive and supplies the technical and theoretical basis of Access Based Access Control.



When an access request is made, Attributes and Access Control Rules are evaluated by the Attribute Based Access Control Mechanism to provide an access control decision. In ABAC's basic form, the Access Control Mechanism contains both a Policy Decision Point, and a Policy Enforcement Point.

Figure 3. ABAC Operation. (Source: NIST 800-162, op. cit., p. 10)

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**PRIVACY AND SECURITY ON THE WEB –  
HAVE MARKETERS AND THE FEDERAL GOVERNMENT  
GONE TOO FAR?**

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**ABSTRACT**

Privacy and security on the web has emerged as a major government policy and marketing issue. Everyone from politicians to children will be affected by regulation of the internet and the construction of gigantic data warehouses. The recent breaches in security and privacy by hackers and agencies of the Federal Government, and the common practice of planting software on home computers to track users online have negatively affected public perceptions of surveillance on the internet. Younger users may not be as aware of the extent and intrusive nature of tracking and surveillance as are older adults. This differential reaction may be due to the spread of social media. Recently, the Federal Government has been building vast data warehouses to store information about citizens and their daily activities. Regulation of marketing practices is probably inevitable even if the regulations are obsolete as soon as they are written. But, who will regulate the Federal agencies and their use of personal information concerning citizens. This study is an attempt to determine how concerned the public is about advertisers, companies, and the Federal Government collecting information about them. Issues are raised in several aspects of the modern internet and electronic communications era before the giant Federal data warehouses are built by the end of 2013.

**THE NATIONAL SECURITY AGENCY/CENTRAL SECURITY SERVICE**

“The National Security Agency/Central Security Service (NSA/CSS) is home to America's codemakers and codebreakers.” This description is now attached to the Federal agency created in 1972 to provide services and products to the Department of Defense, Central Intelligence Agency, and other security related entities both public and private. More recently, the NSA created the Domestic Surveillance Directorate. The Directorate was created after October 2008, when the Federal Government infused \$125 billion into nine of the largest US banks to avert a banking crisis. Another \$125 billion was also sent to smaller banks to keep them afloat. These infusions of capital were part of the government rescue of the financial system. This activity gave Federal access to each bank's credit card processing system thereby integrating each bank with the NSA's 470,000-square-foot data mining facility in San Antonio, Texas.

As noted on the NSA's website, “The new Citizen Data Warehouse System (CDWS) will create a comprehensive database containing detailed information about each U.S. citizen. Since the vast majority of all U.S. credit card transactions will be fed through this new system, the depth of information will be

unparalleled. Intelligent routing of this citizen data throughout the inter-connected computer systems of various federal agencies will provide citizens a new level of service from the federal government.”

Exactly what service is to be provided remains to be seen but may include the description below:

- The description of the facilities involved continues with the following: “Let's say you purchase an airline ticket for an international destination using a credit card. A copy of this transaction will be forwarded to the new NSA data mining facility in San Antonio and then transmitted to various federal agencies. If there are any travel advisories for your destination, you will be automatically notified by the State Department. Should some sort of natural disaster strike while you are on your trip, the local US embassy will already have your contact information. If there are any health concerns regarding your destination, the Center for Disease Control will email you in advance regarding recommended vaccinations. Plus, the FAA will contact you on the day of your trip if there are any expected air traffic delays. The information-sharing possibilities are endless.

Personally identifiable credit card transaction data for:

- Groceries and medications will be routed to the Food and Drug Administration
- Alcohol and cigarette purchases will be routed to the National Institutes of Health
- Battery, light bulb, and gasoline purchases will be routed to the Department of Energy
- Children's books and video purchases will be routed to the Department of Education
- Children's toys and appliances to the Consumer Product Safety Commission
- Cell phone, radio, and walkie talkie purchases will be routed to the FCC
- Hunting rifles and fishing rods will be routed to the Department of the Interior
- And everything else will be routed to the Department of Justice for safekeeping

In an effort to provide even better government services, the NSA has developed special software that unobtrusively collects important information about American consumers in their homes and offices.”

The description of data collection continues with a software and hardware list:

“While we prefer not to use the term "Flame virus", this data collection program is designed to remotely control common computer functions such as logging keyboard strokes, activating computer microphones and cameras, taking computer screen shots, extracting geolocation data from images, downloading personal files, and sending and receiving commands and data through Bluetooth wireless technology. To reduce the impact on our citizens, the remote data collection program can be periodically embedded in routine operating system software updates. This information will be transmitted for processing and storage in our new \$2 billion NSA data center in Bluffdale, Utah scheduled to open in September 2013.”

However, transparency is apparently not complete:

“For security reasons, it is unrealistic to expect a complete list of information we collect for our national citizen database. In the spirit of openness and transparency however, here is a partial list:

- internet searches
- websites visited
- emails sent and received
- social media activity (Facebook, Twitter, etc)
- blogging activity including posts read, written, and commented on
- videos watched and/or uploaded online
- photos viewed and/or uploaded online
- music downloads

- mobile phone GPS-location data
- mobile phone apps downloaded
- phone call records
- text messages sent and received
- online purchases and auction transactions
- bookstore receipts
- credit card/ debit card transactions
- bank statements
- cable television shows watched and recorded
- commuter toll records
- parking receipts
- electronic bus and subway passes / Smartpasses
- travel itineraries
- border crossings
- surveillance cameras
- medical information including diagnoses and treatments
- prescription drug purchases
- guns and ammunition sales
- educational records
- arrest records
- driver license information”

Further description of the data collection techniques includes:

“NSA technicians have installed intercept stations at key junction points, or switches, throughout the country. These switches are located in large windowless buildings owned by the major telecommunication companies and control the domestic internet traffic flow across the nation. A fiber optic splitter is placed on the incoming communication lines and routes the traffic to an NSA intercept station for processing. Eventually, all of the domestic data flow will be routed to the new Utah Data Center when it opens in Fall 2013. The NSA also monitors all satellite communications in and out of the U.S. via satellite receivers located across the country.

In addition to NSA data collection activities, the Domestic Surveillance Directorate receives a constant flow of information from other sources. Some sources are secret and some are public. Public sources include:

- FBI - Information collected from the use of National Security Letters authorized by the PATRIOT Act; Phone calls and text messages from the FBI Digital Collection System (DCSNet); "Google-like" search capability of citizen information from the FBI Law Enforcement National Data Exchange Program; Cell phone location tracking from the Stingray "IMSI catchers" (International Mobile Subscriber Identity) masquerading as cell phone towers.
- CIA - The Central Intelligence Agency has publicly committed to increasing its data collection efforts. CIA Chief Technology Officer Gus Hunt explains why: "The value of any piece of information is only known when you can connect it with something else that arrives at a future point in time. Since you can't connect dots you don't have, we fundamentally try to collect everything and hang on to it forever.
- DHS - TSA airline passenger data; surveillance data from unmanned domestic Predator B drones patrolling the northern and southern borders.
- Treasury - Cash Transaction Reporting and Suspicious Activity Reporting data .

- State/Local government - Electronic transit cards transactions; electronic toll collectors; vehicle information and location data captured by license plate readers; public transportation video/audio surveillance systems.”

With data warehouses in San Antonio, Texas, Oak Ridge, Tennessee, and at Camp Williams near Bluffdale, Utah and Fusion Centers throughout the country allows continuous surveillance of citizens with indefinite storage of data concerning every aspect of their lives.

## **Background to Marketing Security and Privacy Concerns**

The internet defines the intersection of public policy and marketing activities in a new and complicated way. While a great deal of effort has been put into discussion of ‘Net Neutrality’ [4] [5], that policy issue is more of a concern to broadband providers like Comcast and Verizon than it is to the public. Privacy and security in purchasing products (Amazon) or membership on social media sites (Facebook) on the web create policy issues more relevant to the public [6] [12]. On the self-regulation front, The American Marketing Association Code of Ethics for Marketing on the Internet covers privacy, ownership of information, and access to information. However, this code is being ignored by many businesses on the internet using tracking technology. This situation has been worsened by the advent of social media websites where information is routinely shared [3] and by data mining where huge caches of data are exploited for marketing purposes[10].

When Google first sent out its ‘bots’ to comb the internet, the seeds of internet security and privacy concerns were sown [2]. Google’s website says it collects data from users, not including names or other personal identifiers. Names, credit card information, phone numbers, credit history, and purchases are collected from those who opt-in to use Google Checkout to make online purchases. Some marketing companies create pop up ads offering such things as free phone cards to get web users to allow them to track their web activities and preferences.

Marketing researchers are drowning in data from customer activities in web surfing and use of online purchasing, social media, and gaming portals. Some software companies like SPSS have partnered with IBM to create data mining programs that utilize such tracking data for marketing purposes [10]. In the process, a company name like Google, has become a verb; to Google or Google it.

Technology has evolved to the extent that privacy and security policy and marketing issues revolve around what is known as behavioral tracking [8]. Behavioral tracking means following an individual web surfer over multiple websites and over time using several technologies including:

1. Traditional HTML Cookies may be placed on any computer by a website or a script running ads. These Cookies are easily detected and erased by the user or antivirus software.
2. Flash Cookies stored outside the browser can ‘resurrect’ HTML Cookies that have been deleted. Flash Cookies are more difficult for a user to detect and erase. These Cookies are sometimes called Ever Cookies for that reason.
3. DPI or Deep Packet Inspection of unencrypted information that may flow from one server to another as occurs on any Internet Service Provider (ISP) network when a game system like a Wii is installed and used on a TV.
4. Tracking Software deliberately placed on a computer to record web browsing history, key strokes, or other data.

## **Extent of Tracking and Data Utilization by Marketers**

The Wall Street Journal has claimed that business web sites for large U.S. corporations are extraordinarily intrusive and may employ more than 100 different tracking tools to gather data on customers who visit a website. Some of them use the data only in-house [1]. There are tracking specialist businesses that have created a new business model who collect customer data and sell data and predictions about what customers will do in the future using their past activities and interests. This use of tracking data is called Predictive Analytics and can be done in 'real time.' This research approach is so technical and powerful it has spawned a highly specialized MBA program at Northwestern University and makes customer online tracking the leading edge of marketing research activity.

### **Research on the Issues**

In an industry sponsored assessment of voluntary disclosures of consumer information policies on company websites, [6] it was found that 67% of 361 websites posted a privacy policy, but only 15% were comprehensive in nature and conforming to the AMA guidelines. The policy question is whether or not marketing trade-group rules for self-regulation are good enough to protect consumers, or are regulations and laws needed? In a consumer perceptions study, [12] it was found that consumers consider security concerns (49.8%) more important than privacy concerns (16.0%) in online shopping. To date, the Federal Trade Commission has not recommended legislation be passed governing internet security and privacy.

### **Privacy, Security, and Tracking Concerns**

In a carefully conducted study of the various web tracking technologies, the Wall Street Journal delved into the issues of privacy and security. In a broad based survey of 14,632 internet users done by the Wall Street Journal, the question was asked: 'How concerned are you about advertisers and companies tracking your behavior across the Web?' [14]. The results indicated that 60% of the participants were very concerned about tracking. A Spring 2011 survey of 19 faculty in the Wall College of Business Administration at Coastal Carolina University indicated only 21% were very concerned about tracking.

The unregulated nature of this online activity will probably not last a long time unless a professional organization like the American Marketing Association can supply specific guidelines and lobby to keep the internet relatively free for marketing. The advocates for legislation and regulation may be able to use privacy and security concerns among the public to take over the internet and shut off a rich data source from internet traffic and social media. As the Wall Street Journal study authors ask: 'Are we giving away too much personal data about ourselves, that is then sold to advertisers in exchange for the convenience of having sites remember our passwords? What is lost and what is gained by the technology?'

### **Sites Feed Personal Details to New Tracking Industry for Marketing Purposes**

Recently the Wall Street Journal also published a major study on internet privacy [1]. Large company websites are tracking individuals visiting company sites. These data-gatherers are establishing a new business model using cookies, bots, and beacons to gather and sell raw data about consumers in real time. The companies that routinely use tracking tools are Google Inc., Microsoft, and Quantcast Corp., all of which are in the business of targeting ads at people online.

Google, Microsoft, and Quantcast all say as a matter of policy they do not track individuals by name and offer Internet users a way to opt-out of their tracking networks. However, the state of the tracking art is growing increasingly intrusive, with real time recording of keystrokes and then transmitting them to a data-gathering company that analyzes it for content, tone, and clues to a person's social media site memberships. Other technology can reactivate cookies and other tools that were deleted by the user.



Protective software like Trend Microsystems, Symantec, and Windows defenses are unable to prevent installation and reactivation many times.

Tracking companies and their customers in the ad industry say tracking does not violate anyone's privacy or security because the data sold does not identify people by name, and the tracking activity is disclosed in privacy policies. That may be the case, but consumers still have security and privacy concerns [6].

### **Students Do Not See the Problem**

The most avid users of the web are students. Public policy and marketing impact them more than other age groups in the area of internet privacy. In a survey of University of Minnesota Students[13], some interesting findings were: 33% of students believed that “their Internet activities are anonymous,85% have visited a social networking website,73% are a member of at least one site with 63% members of Facebook, 32% members of MySpace, and 27% members of both, just over half “trust online companies and organizations to keep information about them private,” nearly one quarter “say they feel safe making purchases online,” but 80% “are concerned that someone could steal their identity using personal information found on the Internet.”

A survey of 56 Wall College of Business Administration students at Coastal Carolina University showed these students believe ethical scandals differentiate ethical from non-ethical businesses (75%), they worsen perceptions of business (50%), and that they have no direct impact on perceptions of business schools (57%). Regardless of these results, students will not reduce their use of the internet or social media as a result.

## **A NEW SURVEY OF CONCERNS ABOUT BUSINESS AND GOVERNMENT SURVEILLANCE OF INDIVIDUAL CITIZENS: METHODS**

A sample of 48 students and 32 Faculty/Staff at a small liberal arts University was asked to respond to questions concerning their level of concern with surveillance of individual citizens by advertisers, businesses, and Federal Government Agencies. The response scale used was identical to the Wall Street Journal survey and included the following response categories:

- Very Concerned
- Somewhat Concerned
- Neutral
- Not a Big Worry
- Could Not Care Less

The marketing question included the stem:

How concerned are you about advertisers and companies tracking your behavior across the Web?  
The Federal Agency questions were taken from the Domestic Surveillance Directorate’s list of 28 data types collected and stored.

The questionnaire is in the Appendix. As a check on consistency the first and last item for the Federal Agency list was identical and related to internet searches since most people have done an internet search even if they are technologically challenged.

## RESULTS

The percentage responding “Very Concerned” to the questionnaire items for the total sample, students, and faculty/staff groupings appear in Table 1 below.

**Table 1**  
**Percentage Very Concerned About Tracking by Advertisers, Companies and the Federal Government Domestic Surveillance**

Tracking	Total % Very Concerned	Student % Very Concerned	Faculty/Staff % Very Concerned
Federal tracking of bank statements	53	48	59
Federal tracking of text messages sent and received	47	43	53
Federal tracking of emails sent and received*	46	40	56
Federal tracking of mobile phone GPS-location data	46	40	56
Federal tracking of credit card/ debit card transactions	45	39	53
Federal tracking of phone call records	41	35	50
Federal tracking of medical information including diagnoses and treatments***	37	28	50
Federal tracking of guns and ammunition sales	33	32	34
Federal tracking of prescription drug purchases***	29	21	41
Federal tracking of internet searches 1**	28	23	34

Federal tracking of surveillance cameras	28	24	34
Federal tracking of internet searches 2**	28	23	34
Federal tracking of online purchases and auction transactions*	27	21	34
Federal tracking of websites visited	26	23	31
<b>Tracking by Advertisers and Companies</b>	<b>24</b>	<b>19</b>	<b>31</b>
Federal tracking of social media activity (Facebook, Twitter, etc)	24	21	28
Federal tracking of photos viewed and/or uploaded online	24	21	29
Federal tracking of videos watched and/or uploaded online	23	19	28
Federal tracking of mobile phone apps downloaded	21	17	28
Federal tracking of blogging activity including posts read, written, and commented on - View our patent	20	19	22
Federal tracking of cable television shows watched and recorded	19	13	28
Federal tracking of travel itineraries	19	17	23
Federal tracking of border crossings	18	15	22
Federal tracking of arrest records	18	15	22

Federal tracking of driver license information	18	15	22
Federal tracking of bookstore receipts**	17	11	26
Federal tracking of commuter toll records	17	15	19
Federal tracking of educational records*	17	13	22
Federal tracking of music downloads	15	13	19
Federal tracking of electronic bus and subway passes / Smartpasses*	15	15	16
Federal tracking of parking receipts*	14	13	16

Chi Square significant at  $p < .10$  \*,  $p < .05$  \*\*,  $p < .01$  \*\*\*

Responses to the first and last item were identical and showed consistency across the sample. Fourteen instances of Federal Agency tracking elicited a higher percentage of ‘Very Concerned’ citizens than those who were ‘Very Concerned’ about advertisers and companies. Most of these items concern personal financial information, communication channels, and medical records; but also included guns and ammunition and general surveillance activities of the Federal Government.

## DISCUSSION

Online shopping and banking as well as social media memberships and coupon aggregators like Groupon all provide convenience and a way to find exactly what the consumer wants. Even though security and privacy risks are substantial, students are still heavy users of the internet. The next wave of technology, Near Field Communication (NFC), will soon be implemented by Google Wallet with Master Card, Inc., First Data Corp., and Citigroup, Inc., plus a variety of retailers like American Eagle Outfitters, Walgreen Co., Macy’s, and Subway to allow smart phones to make payments with a wave of the card from credit accounts stored on the phone itself. The security and privacy settings on those smart phones will be of high importance in an opt-in system like Google Wallet. Like ATM cards, the ‘digital wallet’ may turn out to be a risky payment option. All of these extensions of technology that put the public at risk for security and privacy breaches will most likely draw the attention of the Federal Trade Commission and Congress. But the advantages of the digital marketplace have so far out-weighted the risks in the mind of the consumer.

Co-founders Larry Page and Sergey Brin brought Google to life in September 1998. From the beginning, Google's mission was to organize the world's information and make it universally accessible and useful.

The Google service package is ‘free,’ paid for by advertising dollars of those who seek to market to Google’s users [9]. Mark Zuckerberg launched Facebook in 2004 and bought the domain name facebook.com in 2005 to provide an online meeting house known as a social network. Google, Facebook, and other web companies are more about marketing than anything else including risk, security, public policy, and legislation. As a true innovation much like the iPhone, Google has changed the way we live. This change occurred by bringing to the user only relevant information to solve a problem. Are you trying to find someone, something, or someplace? Google it! Regulation and legislation could kill the revolution Google started, but may be inevitable.

On the Federal Agency side, the recent IRS scandals involving targeting political opponents and members of the press have raised concerns about an intrusive Federal Government. The Utah Data Center, which is only one of three giant Federal data centers, was designed to be capable of storing data on the scale of yottabytes (1 yottabyte = 1 trillion terabytes, or 1 quadrillion gigabytes). Its public purpose is to assist in the operations of the Comprehensive National Cybersecurity Initiative (CNCI), though its precise mission of course is secret. A popular TV series, ‘Person of Interest,’ has the storyline of a massive Federal surveillance system having the ability to identify a single individual and track them at any time to any place. The constitutional and policy implications of the existence of the Domestic Surveillance Directorate’s list of 28 data types collected and stored, presumably forever, are just now entering the public’s consciousness. Will this Federal surveillance system also change the way we live as Google did? Only further research will tell the tale.

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## APPENDIX

A study of how people view issues related to business ethics and privacy, is being conducted. If you volunteer to participate, it will take about 3 minutes of your time. There is no consequence to not participating. Also, none of your individual answers will be shared with other people, and your name will not be connected with your answers in any way. The information gathered will be reported in group summary form and will be used to describe people in general. If you would like to participate, please begin by answering the questions below.

**PLEASE RETURN THIS SURVEY TO CAROL**

For each item below, please **check only one option**.

1. Who are you?  Undergraduate Student     MBA Student     Faculty  
 Staff     Administration
2. Are you:  Male    OR     Female
3. How concerned are you about **advertisers and companies** tracking your behavior across the Web?

**Check only one of the 4 options below.**

Very concerned	
Somewhat concerned	
Neutral	
Not a Big Worry	
Could Not Care Less	

4. How concerned are you about **Federal Government Agencies** such as the Domestic Surveillance Directorate and Home Land Security collecting data about you from the following sources?

**Check only one of the 4 options for each source below.**

Source	Very Concerned	Somewhat Concerned	Neutral	Not a Big Worry	Could Not Care Less
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internet searches					
websites visited					
emails sent and received					
social media activity (Facebook, Twitter, etc)					
blogging activity including posts read, written, and commented on - View our patent					
videos watched and/or uploaded online					
photos viewed and/or uploaded online					
music downloads					
mobile phone GPS- location data					
mobile phone apps downloaded					
phone call records					
text messages sent and received					
online purchases and auction transactions					
bookstore receipts					
credit card/ debit card transactions					
bank statements					
cable television shows watched and recorded					
commuter toll records					
parking receipts					
electronic bus and subway passes / Smartpasses					
travel itineraries					
border crossings					
surveillance cameras					
medical information including diagnoses and treatments					
prescription drug purchases					
guns and ammunition sales					
educational records					
arrest records					
driver license information					
internet searches					

**Thank You For Your Help**

**PLEASE RETURN THIS SURVEY TO CAROL**

## **Paper Proposal**

Prepared for the SEINFORMS 2013 meetings, October 2013

### **Title: Heuristic Strategies in Business Decision-Making**

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**Abstract:** The main idea evolves around the empirical findings that assessment and dealing with the business risk involves heuristic judgment. If so, one central question concerns the methods of risk assessment, which remain relevant to the way in which risk managers actually evaluate their business environment. Formal risk assessment is based on the probability theory, whereas business risk might involve situation that are non-reducible to probability distributions. The elements of knowledge creation that heuristic strategies introduce into the process of information can shed light on highly uncertain nature of business decision-making.

**Motivation:** Empirical evidence on the role of gut feel in business decision-making is abundant. Managers use heuristics to make financial, hiring, investment and sales decisions. Consumers use heuristics to specify their consideration sets. CEO's gut feel plays a major role in capital budgeting decisions in corporations all over the world. Focusing on the Knightian distinction between risk and uncertainty, we explore the links between intuition and decision-making under uncertainty. We especially look for ways in which information is processed in repeatable versus near-unique situations.

The following outlines the structure and content of the paper.



1. Corporate executives ranks gut feel among important factors in making major corporate decisions such as capital allocation. We provide literature review on this.
2. Evaluation of the empirical evidence in favor of heuristic strategies in business decision-making: (i) how important is the evidence? (ii) why should we care about this evidence? (iii) is there a tendency to under report the importance of gut feel? Why?
3. We provide a case by case review of examples of heuristic strategies in a wide variety business areas including marketing, finance, trade, hiring, consumer behavior, crisis management, etc.
4. Business decision-making evolves around the central goal of profit creation. Frank Knight wrote a famous book on the nature of business profit and its creation in relation to different types of risk in the business environment. We provide an overview of his approach and relate it to the observed use of heuristic strategies in business profit making.
5. Knightian uncertainty has been formalized and utilized by economists for several decades. We provide an overview of such formalizations, as well as the way in which these ideas relate to ambiguity in experimental economics.
6. We conclude with proposing a structure that has the potential of heuristic modeling of the profit generating business uncertainty.

## **PLAYING THE LOTTERY?**

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### **ABSTRACT**

The lottery is a huge business. In 2011, \$57.6 billion worth of lottery tickets were sold in 43 states and the District of Columbia. There are three major parties (governments, lottery players, and retailers) involved in the lottery industry, plus many more stakeholders. This paper examines the lottery from the viewpoints of these three primary parties. From the lottery players' viewpoint, we show how to statistically determine the expected value of a lottery ticket and discuss when to conclude it is profitable to buy lottery tickets. We explore the question of whether lottery players are rational. State governments have, for years, relied on lottery money to fund education and other expenses. We examine the economic benefits as well as the societal costs of operating the lottery business. Finally, we examine the economics of selling lottery tickets from the retailers' viewpoint.

### **1. INTRODUCTION**

Lottery tickets are sold in more than 100 countries worldwide. The lottery industry took in revenue of over \$260 billion worldwide in 2011, of which \$57.6 billion or 22% was derived from U.S. sales (LaFleur 2012). On average, an American spends about \$200 buying lottery tickets per year (Dubner 2010). Lottery tickets are legally available for sales in 43 states and the District of Columbia. The seven states that do not sell government-run lottery tickets are Alabama, Alaska, Hawaii, Mississippi, Nevada, Utah, and Wyoming.

There are currently 44 lotteries in the United States. More than 80% of the U.S. population lives in lottery states. There are two major categories of lottery games, namely draw and instant/scratch-off. In 2011, U.S. draw lottery sales accounted for about 42% of the total lottery sales, whereas U.S. instant lottery sales represented approximately 58% (LaFleur 2012). Mega Millions and Powerball are two of the largest draw games, and they are available in 42 states and DC (Mega Millions is unavailable in Florida, while Powerball is unavailable in California). The Mega Millions drawings are held twice a week, on Tuesday and Friday nights. The Powerball drawings are also held twice a week, on Wednesday and Saturday nights.

On March 30, 2012, Mega Millions announced the world's largest jackpot of \$656 million had been won by three winning tickets. Each winning ticket received a third of the jackpot or about \$219 million. It is important to note that the winning amount is divided into 26 annual payments and is spread over a period of 25 years. The holder of a winning ticket can choose to receive a lump-sum payment; however, the lump sum is significantly smaller than the total annuity payment.

There are three main parties involved in the lottery industry—issuers (governments), buyers (lottery players), and intermediaries (retailers)—and many more stakeholders, such as advertisers. The issuers of lotteries certainly have vested interests in the lottery industry. Lotteries create jobs for government agencies as well as in the retail sector. In addition, state governments derive hundreds of millions of dollars in revenue annually, if not billions of dollars, from selling lottery tickets. Lottery revenue is particularly important because it is relatively stable and enjoys a hefty profit margin. It earns more than one-third of the revenue as profit.

Lottery players are clearly at the center of the lottery industry. They are the reason why the industry exists. A critical question facing lottery players is how and when to play so as to maximize the return.

The third major party is made up of intermediaries or retailers. The retailers serve as an important bridge between the issuers and lottery ticket buyers. They benefit greatly from selling lottery tickets as this business helps drive traffic to their stores, especially important for smaller retailers such as convenience stores.

In addition to these three major parties, there are other stakeholders involved. Companies that are involved in the production of ticket machines, the printing of lottery tickets, and advertising media for the lottery.

This paper examines the lottery from the viewpoints of the three main parties with a primary focus on draw lottery. State governments have, for years, relied on lottery money to fund education and other expenses. Section 2 examines the challenges and problems facing state governments associated with the lottery business. Section 3 shows how to statistically determine the expected value of a lottery ticket and discusses when to conclude it is profitable to buy lottery tickets. It also explores the question of whether lottery players are rational. Section 4 examines the economics of selling lottery tickets from the retailers' viewpoint. Finally, we conclude this paper in Section 5.

## 2. GOVERNMENTS

With the current dire financial situation of state governments, it is hard to imagine that these governments would abandon their involvement in lotteries. In fact, most state governments have devoted a great deal of their effort to increasing lottery demand and thus revenue. This is understandable because the lottery business model is very simple and yet highly profitable. Revenue is made of lottery tickets sold, whereas total expenses consist of prizes paid to lottery players, commissions paid to retailers, and gaming and operating costs. Profit, which is computed as revenue minus total expenses, goes directly to government coffers. As a result, lotteries provide a stable source of additional revenue for the governments. More importantly, state governments are essentially monopolies and do not have to face any competition; thus, they are very well suited to operate the lottery business. Nevertheless, there are several challenges and problems facing state governments regarding their lottery businesses:

1. Lottery demand
2. Gaming and operating expenses
3. Regressive tax
4. Crime

### 2.1 Lottery Demand

Over the past several decades, state governments have tried various ways to increase lottery sales. Previous research has identified three factors related to lottery design (i.e., the odds of winning, the prize structure, and the payout rate of the game) which can affect demand.

Over the past two decades, there has been a rise in multi-state lotto games with huge jackpots at longer odds. According to Cook and Clotfelter (1993), this phenomenon is known as the *scale of economies of lotto*. They find that states frequently design their lottery games so that the probability of winning the jackpot is approximately equal to the reciprocal of the population within the state. Hence, the larger the population is, the smaller the probability of winning the jackpot will be. DeBoer (1990) concludes that the New York state lottery should offer an extremely small probability of winning the jackpot so as to attract more lottery players to its lotto game. Thiel (1991) draws a similar conclusion regarding the Washington state lottery. The rationale is that consumers pay more attention to the size of the lottery prize than they

do about the odds of winning. Furthermore, longer odds would result in more rollovers, resulting in larger jackpots. Nevertheless, the ability to generate more demand by lengthening the odds of winning the jackpot is not unlimited. If the jackpot is won too rarely, this could cause players to lose interest (Forrest and Alagic 2007).

With respect to the prize structure, Scoggins (1995) finds that Florida lottery officials should increase the jackpot prize from 25% to 30% of the sales to increase demand. Quiggin (1991) develops a mathematical model which suggests that consumers may prefer lottery games with multiple prizes and prize levels, even though smaller prizes do not have much impact on the overall expected value of a ticket. Garrett and Sobel (1999) conclude that lottery players in 216 U.S. games appear to be risk averse and favor skewed returns. They recommend lottery providers achieve more skewness by offering smaller consolation prizes along with larger jackpots.

A higher payout rate of lottery games, which is defined as percentage of sales returned to lottery players as prizes, may have a positive effect on consumer demand if consumers are responsive to the effective price. On the other hand, a higher takeout rate, which is defined as percentage of sales that is not distributed as prizes, may depress demand. Hence, it is critical to set an appropriate level of the payout rate and thus the effective price so as to maximize profit. Researchers have recommended that changes be made to payout rates when effective price elasticities of demand deviate from the revenue-maximizing figure (i.e.,  $-1$ ).

In addition to lottery design, there are other aspects that states have adjusted to increase lottery sales. One of the simplest ways is to increase the frequency of games; for example, both Mega Millions and Powerball games have two drawings a week. It is important to point out that continuously increasing the frequency could lead to undesirable results, such as lottery players' fatigue. Another way is to introduce a wide variety of lottery. States have added more lottery games over the years as a means to increase sales. However, states must be mindful when introducing new games so as to avoid or minimize market cannibalism.

Recently, states have employed technology to bypass the traditional lottery retailers and sell lottery tickets directly to consumers. The Illinois Lottery launched a revamped Web site aimed at boosting lottery ticket sales in November 2012. According to the Illinois Lottery, one of the biggest changes to the site is the ability to play Powerball, Mega Millions, and Lotto using cell phones and other mobile devices, including iPads, as long as they are connected to the Internet (Lazare 2012). The technology allows the site to verify that online players of the Illinois Lottery are of legal age and live within the state's borders. In addition, the new site can measure and limit play per registrant to a maximum of \$150 per day.

At about the same time, the Georgia Lottery board members approved online lottery after making sure that proper technological controls on players were put in place. These controls include mandatory account registration, banking requirements that will match an applicant's name, address and social security number, and limits on how much account activity is allowed (Torres 2012). Similar to the Illinois Lottery, players must be of the legal age of 18 and live within the state's borders to purchase lottery tickets online. The addition of online sales is expected to boost revenue by about 2% of annual existing sales of those games.

Back in November 2012, Minnesota became the first state to sell lottery tickets at gas pumps and ATMs. With a debit card, driver's license, and cell phone number, buyers can try their luck at a touch screen (Matos 2012). The system allows people to purchase quick-pick Powerball and Mega Millions tickets without going inside a store. According to the Minnesota lottery's executive director, Ed Van Petten, "People are always in a hurry nowadays. The thought is it takes 10 to 15 seconds to go through the process, and I think people would say, 'Why not? I'll give it a shot.'"

Virginia has recently installed self-service machines (called the Lottery Express) to sell lottery tickets at Richmond Airport, again bypassing the traditional retailers. According to Virginia Lottery director Paula Otto, the Lottery Express is expected to generate \$10.7 million in revenue annually for the Virginia Lottery, of which more than \$4 million goes to the Virginia public schools (Macenka and Llovio 2013). The Lottery Express enables the Virginia Lottery to reach a lot more potential customers. In February 2013, a couple bought a lottery ticket from a Lottery Express machine and won the Virginia Lottery's \$217 million Powerball jackpot.

We believe that a pricing strategy could also help stimulate consumer demand—that is, offering discounts for lottery drawings with low expected jackpots. For example, giving a 5% discount on draw tickets when the expected jackpot is below a certain benchmark point, such as the median, and a 10% discount when it is below the 25th percentile. The pricing strategy may be applied to both lottery tickets sold in stores or online.

## **2.2 Gaming and Operating Expenses**

Keeping gaming and operating expenses low is critical for states to maximize profit. Since the lottery does not actually involve the production of goods (i.e., tangible output), information technology can play a very important role in reducing costs and, at the same time, protecting the environment.

Selling lottery tickets online and thus bypassing the traditional retailers is an effective way to keep expenses low. In addition, paying lottery winners electronically is another way that technology can help bring costs down.

## **2.3 Regressive Tax**

One of the most compelling criticisms against lotteries is that they are very regressive; that is, lotteries place a heavier tax burden on the poor than on the wealthy. In fact, there is general agreement among economists on this point; see Kearney (2005), Campbell and Finney (2005), Wisman (2006), and Combs et al. (2008). Moreover, Combs et al. (2008) find statistically significant differences in regressivity between some lottery products and conclude that Minnesota's newly introduced G3 instant/scratch product is the most regressive lottery game. Freund and Morris (2005, 2006) studied the impact of gambling on income inequality from 1976 to 1995. They find clear evidence that state-run lotteries foster inequality, but no evidence of a similar effect is found for other types of gambling.

Another stream of research focuses on where the lottery spending goes rather than who pays for the lottery tickets when assessing income equity. The studies from Stranahan and Borg (2004) and Feehan and Forrest (2007) indicate regressivity in the spending of lottery taxation, thus exacerbating the regressivity of the income side of lotteries. Gripaios et al. (2010) suggest that inequalities in the distribution of lottery proceeds go beyond income level; race/ethnicity and geography also play an important role.

## **2.4 Crime**

Crime rate is certainly influenced by a large number of factors. A crucial issue states must deal with is whether the introduction of lottery games increases crime rate. Mikesell and Pirog-Good (1990) conducted a comprehensive study to examine the impact of having a state lottery on the crime rate. Analyzing data for the 50 states and the District of Columbia from 1970 through 1984, they find that there is a significant positive correlation between crime rate and the presence of a lottery.

The adoption of lotteries may also impact the well-being of lottery players. Kearney (2005) finds that household lottery gambling reduces roughly \$38 per month of other household consumption, or 2%, with larger proportional reductions among low-income households. This finding is consistent with a general concern of Borg, Mason, and Shapiro (1991).

### 3. LOTTERY PLAYERS

The lottery players are the consumers. In this section, we will discuss the expected value of a lottery ticket and explore the following question: is playing lottery rational?

#### 3.1 Expected Return

From the angle of lottery players, the focus is primarily on how to maximize their return. In order to do so, lottery players should understand how to calculate the odds of winning and the expected value of a ticket. The probabilities of any number of matched winning numbers are determined by a ratio of three combinations in the hypergeometric distribution. A combination counts the number of ways items can be arranged when their order of occurrence is unimportant and the numbers cannot be duplicated (i.e., the same number cannot be drawn twice among the winning numbers selected). The following terms are used to specify the hypergeometric distribution using Mega Millions as a specific example:

- $N$ : population size (56)
- $n$ : sample size (5 numbers on each ticket)
- $W$ : number of winning numbers (5)
- $w$ : number of winning numbers on any ticket (0 to 5)
- $N - W$ : number of losing numbers
- $n - w$ : number of losing numbers on any ticket

The mathematical formula for the hypergeometric distribution is as follows:

$$\frac{W!}{w! \cdot (W - w)!} \cdot \frac{(N - W)!}{(n - w)! \cdot (N + w - W - n)!} \cdot \frac{N!}{n! \cdot (N - n)!} \quad (1)$$

where ! represents a factorial.

The denominator of Equation (1) computes how many combinations there are when using a sample of size  $n = 5$  from a population of size  $N = 56$ . This gives  $56! / (5! \cdot (56 - 5)!)$  or 3,819,816 possible tickets for the lottery. Applying the numerator of the equation as follows:  $5! / (5! \cdot (5 - 5)!) \cdot 51! / (0! \cdot (51 - 0)!) = 1$ . Only one of the possible tickets can have all the winning numbers (5) in any drawing. Therefore, the probability of any ticket having all five winning numbers is  $1/(3,819,816)$  or 0.0000002561.

In addition to matching the five winning numbers, the Mega Millions jackpot ticket also has to match the winning Powerball number. Here, the lottery player selects only one of 46 numbers (1 to 46). Clearly, the probability of matching the winning Powerball number alone is  $1/46$ .

Let  $A$  be the event of matching the five winning numbers, and let  $B$  be the event of matching the winning Powerball number. Since these two events are statistically independent,  $P(A \cap B) = P(A) \cdot P(B)$ . Therefore, the probability of winning the Mega Millions jackpot is as follows:  $1/(3,819,816) \times 1/(46) = 1/(175,711,536) = 0.0000000569$ , whereas the odds of winning are 1:175,711,536. Table 1 summarizes the probability calculations of eight other prizes available from the Mega Millions lottery.

**TABLE 1: THE PROBABILITY OF WINNING THE MEGA MILLIONS LOTTERY**

Prize	Matching White Balls	Matching Mega Ball	$P(A)$	$P(B)$	$P(A \cap B)$	Odds
Jackpot	5	Yes	0.000000262	0.021739130	0.00000000569	1:175,711,536
\$250,000	5	No	0.000000262	0.978260870	0.00000025610	1:3,904,701
\$10,000	4	Yes	0.000066757	0.021739130	0.00000145124	1:689,065
\$150	4	No	0.000066757	0.978260870	0.00006530590	1:15,313
\$150	3	Yes	0.003337857	0.021739130	0.00007256211	1:13,781
\$10	2	Yes	0.054518333	0.021739130	0.00118518115	1:844
\$7	3	No	0.003337857	0.978260870	0.00326529500	1:306
\$3	1	Yes	0.327109997	0.021739130	0.00711108689	1:141
\$2	0	Yes	0.614966794	0.021739130	0.01336884335	1:75
Any	NA	NA	NA	NA	0.02050699874	1:38.9888

The probability of winning any prize is certainly of great interest to lottery players. It is simply equal to the sum of the individual winning probability of the prizes since a ticket can at most win one prize (i.e., mutually exclusive). Therefore,  $P(\text{Jackpot or } \$250,000 \text{ or } \dots \text{ or } \$2) = P(\text{Jackpot}) + P(\$250,000) + \dots + P(\$2) = (0.00000000569 + 0.00000025610 + \dots + 0.01336884335) = 0.02050699874$ . The overall odds of winning are computed as follows:  $1:1 / (0.02050699874) = 1:39.888333$ .

The expected value cannot be determined prior to buying a lottery ticket since the jackpot amount is pari-mutuel. The expected value assuming the jackpot is \$100 million (annuity value) and with only one winning ticket is as follows:  $(\$100,000,000) \cdot P(\text{Jackpot}) \cdot \text{Discount Factor} + (\$250,000) \cdot P(\$250,000) + \dots + (\$2) \cdot P(\$2) = \$0.593$ . We use a discount factor of 0.7226, which is based on the largest Mega Millions jackpot data from March 2012. Suppose that there are two jackpot-winning tickets, then the expected present value is cut roughly in half to \$0.297. When the expected present value of a lottery ticket is less than the price of the ticket or when net expected present value, defined as expected present value minus ticket price, is negative, it is unprofitable to play the lottery in the long run.

Table 2 shows the expected present value for 15 selected values of the jackpot (ranging from \$50 million to \$750 million at \$50 million increments) for one, two and three winning tickets. As shown in the Table, it becomes profitable (i.e., expected present value is greater than \$1) when the jackpot is \$200 million or higher with only one jackpot-winning ticket, at least \$450 million assuming there are two winning tickets, or at least \$700 million with three winning tickets.

According to the Mega Millions jackpot history, it is uncommon for the jackpot to hit \$200 million or more. Hence, it is unlikely that the net expected present value is positive, implying that it is unprofitable to play Mega Millions over the long run. Of course, the jackpot does occasionally reach \$200 million, even \$450 million; however, even a jackpot of \$500 million is no guarantee that the net expected present value is positive. Therefore, lottery players only have perhaps several opportunities a year to play the lottery based on the likelihood of net expected present value being positive. In short, it is both impractical and infeasible to play a lottery game for the purpose of making a relatively small but steady gain over the long run. Casinos could be a better alternative for this purpose.

However, the lottery game does offer the lottery player a real chance, albeit small, to become a millionaire. This kind of opportunity is generally unavailable via other avenues. In addition to buying a millionaire dream, there are other reasons that people buy lottery tickets. Charity is certainly one that comes to most people's minds. The vast majority of the profits from the lottery goes to education in most states. People are generally more inclined to accept their losses for the sake of education.

**TABLE 2: JACKPOT AND EXPECTED PRESENT VALUE**

Jackpot (in Millions)	One Winning Ticket	Two Winning Tickets	Three Winning Tickets
\$50	\$0.388	\$0.194	\$0.129
\$100	\$0.593	\$0.297	\$0.198
\$150	\$0.799	\$0.399	\$0.266
\$200	\$1.004	\$0.502	\$0.335
\$250	\$1.210	\$0.605	\$0.403
\$300	\$1.416	\$0.708	\$0.472
\$350	\$1.621	\$0.811	\$0.540
\$400	\$1.827	\$0.913	\$0.609
\$450	\$2.032	\$1.016	\$0.677
\$500	\$2.238	\$1.119	\$0.746
\$550	\$2.444	\$1.222	\$0.815
\$600	\$2.649	\$1.325	\$0.883
\$650	\$2.855	\$1.427	\$0.952
\$700	\$3.061	\$1.530	\$1.020
\$750	\$3.266	\$1.633	\$1.089

**3.2 Is Playing the Lottery Rational?**

Certainly not from the economic viewpoint of earning a positive return over the long term. Why do people continue to play the lottery if it does not make pure economic sense? We contend that playing the lottery could be rational if using the utility theory to determine the net expected present utility value. People are generally risk averse when risking a large sum of their money. Let's assume that person A has a monthly salary of \$2,500, and he faces a betting offer as follows: wager \$2,500 for a 25% of getting \$10,000 and a 75% chance of getting \$0. Most people would balk at this offer even though the expected value is non-negative because the high probability (75%) of losing \$2,500 is very real and uncomfortable. Consequently, most people see the utility of \$2,500,  $U(\$2,500)$ , is far higher than a quarter of  $U(\$10,000)$ . That is,  $U(\$2,500) > 0.25 \cdot U(\$10,000)$ .

Suppose that person A is offered to buy a \$1 lottery ticket which carries a jackpot of \$5 million. Even though the probability of winning the jackpot is miniscule and the calculated net expected present value of the lottery is negative, he is quite likely willing to take the lottery offer. Hence, he is a risk taker in this case. This can be explained by the fact that most people view \$1 or  $U(\$1)$  as extremely small since it won't cause a material impact on their life. At the same time, they view \$5 million and  $U(\$5 \text{ million})$  as extremely high as they most likely have no other feasible avenue to make that much. Even though the probability of winning is miniscule, people find that a miniscule probability of receiving  $U(\$5 \text{ million})$  is better than  $U(\$1)$ , i.e.,  $m \cdot U(\$5 \text{ million}) > U(\$1)$ , where  $m$  is extremely small. As a result, people buy the lottery ticket. Clearly, betting \$1 is very different from betting a month's salary.

In summary, it is irrational to play the lottery according to the expected present value approach; however, lottery players might very well believe that their bets are rational using the utility theory as illustrated by the above example. Since there are hardly any good alternatives to becoming a millionaire overnight for most lottery players.



#### **4. RETAILERS**

Lottery retailers are critical to the success of the lottery business. As a result, state governments actively recruit retailers to sell lottery tickets. They are committed to making the process of becoming a lottery retailer as smooth as possible. For instance, the Georgia Lottery Corporation, an agency of the Georgia government, provides retailers with state-of-the-art electronic equipment, attractive point-of-sale lottery materials, and marketing assistance.

The up-front cost prospective retailers are required to put up is minimal. In Ohio, a new lottery retailer submits a \$25 onetime licensing fee to the government and is responsible for any internal wiring needs in regard to electrical outlets, if necessary. Also, there is a \$12 weekly communication charge for selling lottery products. Furthermore, a new retailer is required to obtain a surety bond, which typically costs \$15 per thousand dollars of coverage. Most retailers are required to carry a \$15,000 bond, depending on past lottery sales amounts. Ohio lottery retailers earn a 5.5% commission on tickets sales, plus up to 1.5% on cashing winning tickets. According to the Ohio Lottery, the average lottery retailer sells \$250,000 in lottery tickets and makes about \$15,000 a year in commissions.

Selling lottery tickets is straightforward, and most state governments provide free training to lottery retailers. There are several especially favorable reasons for selling lottery tickets. First of all, it has a high rate of return per square inch of counter space in comparison to other products. A retailer requires relatively little shelf space needed for the lottery to achieve a high dollar sales volume. According to the Florida Lottery, Florida Lottery retailers average a \$1,547 gross margin per square foot. Therefore, selling lottery tickets is highly rewarding.

Second, unlike most items sold in convenience stores, such as food and newspapers, lottery retailers don't have to deal with inventory expiration for draw lottery games. As for the instant lottery games, the task for restocking is relatively simple, and the need for restocking is infrequent. This saves lottery retailers a great deal of restocking time. Another benefit of managing instant lottery inventory is that expired instant lottery tickets can be returned for a full refund, which minimizes the risk of holding inventory.

Third, lottery retailers don't have to have their capital tied up with draw lottery tickets, which means that there is almost no inventory holding cost for selling draw lottery tickets.

Fourth, there is no risk of supply shortage for draw lottery games and a minimal risk for instant lottery games.

Selling lottery tickets helps boost customer traffic and increase demand for other items. The Georgia Lottery did a study and concluded that approximately 80% of lottery players buy an additional item when making their lottery purchase. In Florida, the average customer who comes to buy a lottery ticket spends \$10.35 in the store compared to \$6.29 for non-lottery customers.

States have recently employed technology to sell lottery tickets directly to customers, thus bypassing the traditional retailers, as discussed in Section 2.1. This represents the most serious threat to the lottery retailers. Moreover, the competition among the lottery retailers has become very intense. For example, New Jersey has over 6,000 lottery retailers statewide.

#### **5. CONCLUSIONS**

This paper provides an in-depth look at three major parties of the lottery industry, namely governments, lottery players, and retailers. State governments have, for years, relied on lottery money to fund education and other expenses. We examine the economic benefits as well as the societal costs of operating the

lottery business. We also discuss ways that states have employed to increase lottery demand and propose pricing as a means to stimulate demand during drawings with low jackpots. From the lottery players' viewpoint, we show how to statistically determine the expected value of a lottery ticket and discuss when to conclude it is profitable to buy lottery tickets. Moreover, we explore the question of whether lottery players are rational. Finally, we examine the opportunities and threats of selling lottery tickets from the retailers' viewpoint.

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# **DETERMINING THE VALUE OF A VOTE IN THE UNITED STATES UNDER THE ELECTORAL COLLEGE VOTING SYSTEM USING LINEAR PROGRAMMING**

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## **ABSTRACT**

The Electoral College system in the United States allows for a leader to be elected to the position of president without the support of the majority of the population by a large margin. In this paper we derive the minimum percentage of registered voters required to elect a president by creating a binary integer programming problem to represent the minimum number of registered voters to win the Electoral College. To find this minimum number, we make some reasonable assumptions to cut down on run time and then apply an algorithm that we created to exhaustively test every remaining possibility. To confirm this result, we also apply Balas Algorithm to the problem. We compare this minimum number of voters against the whole population to see the magnitude of the difference. We found that only 21.91% of the registered voters are required to win a majority vote in the current Electoral College system. This represents less than 10% of the total U.S. population.

## **Keywords**

Electoral College system; Integer Programming; Balas Algorithm

## **INTRODUCTION**

The Electoral College is a system that was uniquely designed by the founding fathers for the United States intent on overcoming certain difficulties faced when trying to equally represent a large group of dispersed people with limited means of communication and transportation. Although it was also originally created intent on preventing a party system from emerging in the U.S, the college is now a major proponent of the strong bi-partisan system it has. While the college did achieve most of its intended goals and seemed to adequately represent the targeted people, it also allows for a very interesting extremity. A candidate in this system can be elected to the status of president by a majority of the college votes while simultaneously holding a minority of the popular votes. Knowing this, one might raise questions regarding its place in today's voting system. Is a system that was designed with very specific obstacles in mind no longer satisfying its ultimate goal, to represent the will of the people, in the most effective way possible?

To derive just how inadequately the Electoral College system can represent the people, we model the Electoral College with a binary integer programming problem. Through this model we are able to minimize the number of citizen's votes while maintaining a majority vote in the Electoral College.

## **THE ELECTORAL COLLAGE**

Although it has since been slightly modified, the founding fathers created the Electoral College system that we use today. In its creation, they faced interesting problems in regards to how to elect a national leader. How can the citizens of thirteen states of various sizes and interests be encouraged to elect a single candidate with a majority vote to represent them all? Emphasizing this dilemma was a lack of

communication and transportation among its citizens, especially since the act of campaigning for a public official position was frowned upon and because of this, no one should be actively seeking recognition in hopes of achieving the position of president. Furthermore, the possibility of a growing party system was particularly scary to the founding fathers as they had much knowledge of the corrupt party system in Britain and were hoping to avoid the possibility of such a system becoming established in their new homeland. To combat these issues, it was decided that a group of politically informed individuals, including two senators and at least one (based on state population) non-government affiliated representative, would vote for a national leader in place of, what we now know as, a popular vote. Kimberling (1992) says, “The original idea was for the most knowledgeable and informed individuals from each State to select the president solely on merit and without regard to State of origin or political party” (p. 2) This system of voting served its purpose well in every aspect except that the grouping of people seeking political clout by compromising some values for the sake of others seems to be an inevitability and, even in this system, a party system emerged.

The Electoral College was originally created intent on discouraging a party system from forming, however the opportunities a party system brings for groups with similar ideas to increase control over the nation must have been too attractive as parties were formed anyway. According to Duverger’s law, the plurality rule system, in which the candidate with the most votes receives all of the support, that the U.S. has in all states, excluding Maine and Nebraska, encourages a two-party system over a multiparty (more than two parties) system by making it extremely difficult for a third party to receive enough political support to earn even a single electoral vote. As a result, voters are more likely to vote for one of the two major candidates since voting for a third-party would most likely be the equivalent of having no vote at all. According to Grofman (2009), “This behavior can induce a self-fulfilling prophesy whereby minor party candidates rarely achieve an aura of viability that permits them to effectively compete alongside their major party opposition” (p. 65).

## INTEGER PROGRAMMING

An integer programming problem is an optimization problem wherein the variable of the system represents only integer possibilities. This sort of problem can be extremely useful when representing a lot of real world scenarios that take on only discrete possibilities. A binary integer programming problem is a special kind of integer programming problem in that the domain of the variable is trimmed down to only two possibilities: 0 or 1. This sort of problem is useful when representing something that has only two possibilities, such as 'on' or 'off', or 'for' or 'against'. A binary integer programming problem is the kind of problem that we use to solve the proposed question: What is the minimum number of voters required to award a candidate a majority of the electoral votes?

State	Voters per Electoral Vote	Electoral Votes	State	Voters per Electoral Vote	Electoral Votes	State	Voters per Electoral Vote	Electoral Votes
WY	79,666.67	3	ME	194,750.00	4	KY	264,125.00	8
DC	98,333.33	3	AR	209,333.33	6	AZ	266,727.27	11
AK	105,666.67	3	KS	224,833.33	6	VA	272,769.23	13
HI	116,500.00	4	OK	229,000.00	7	MN	275,600.00	10
VT	118,666.67	3	CT	234,428.57	7	FL	275,655.17	29
ND	120,333.33	3	AL	247,111.11	9	WA	280,583.33	12
RI	127,500.00	4	TX	249,815.79	38	OR	286,428.57	7
SD	135,333.33	3	MD	250,900.00	10	NY	289,482.76	29
DE	139,333.33	3	CA	252,072.73	55	WI	290,800.00	10
NM	149,200.00	5	GA	254,750.00	16	IL	291,150.00	20
NE	160,800.00	5	MS	255,333.33	6	MA	293,636.36	11
MT	163,666.67	3	CO	255,444.44	9	NC	297,000.00	15
NV	166,000.00	6	SC	256,000.00	9	MO	301,300.00	10
ID	166,500.00	4	IA	257,833.33	6	PA	301,550.00	20
NH	166,500.00	4	IN	258,000.00	11	LA	303,125.00	8
WV	176,600.00	5	TN	259,454.55	11	OH	311,166.67	18
UT	182,500.00	6	NJ	261,142.86	14	MI	320,437.50	16

**Figure 1.** The ordered weights of voters per electoral vote for each state.

Although the opinion of whether a ‘plurality rules’ system in the U.S. is better than any proposed alternative can be debated, what we’re interested in is the extreme possibility case in the electoral college system together with the plurality system employed by most states. The Electoral College enables a U.S. President to be elected by a majority vote in the college while not having a majority of the popular vote. This is a result of not being able to represent many groups of people’s votes with a single vote equally. Because of the process of determining how many electoral votes each state should get, “... the apportionment of electoral votes always over-represents some states and under-represents others.” according to Edwards III (2004, p. 2). As can be seen from the table, the number of voters per electoral vote has an outstanding range from around 80 thousand voters per electoral vote in Wyoming to 320 thousand voters per electoral vote in Michigan. This data was calculated based off of the number of registered voters per state at the time of the 2010 census. To acquire all of the votes from a particular state, a candidate needs to only obtain more votes than any other candidate in that state. If there are only two candidates, then the winning candidate only needs more than 50% of the citizen's votes in a particular state to receive 100% of the state’s support through electoral votes. If there are more than two candidates, the percentage can be much less (33% for three, 25% for four, etc), but since the U.S. is a bi-partisan nation, we will make the safe assumption that there are only two candidates in our problem. Furthermore, more than two candidates serve only to strengthen the point of the paper by allowing a candidate to be elected president with even fewer votes.

As it is clearly evident by history and by the misrepresentations described above, it is possible to be elected president by majority Electoral College vote while maintaining a minority popular vote, but how extreme can this situation become? To derive this, we must represent the situation with a system of weighted sums in which the number of citizen's votes and electoral votes is either counted or not counted. We must find the minimum number of citizen's votes such that the sum of electoral votes is greater than 270. The model of this system is known as a binary integer programming problem and can be written as follows:

$$\begin{aligned} \text{Minimize} \quad & Z = \sum_{i=1}^{51} b_i x_i \\ \text{Subject to:} \quad & \sum_{i=1}^{51} a_i x_i \geq 270 \\ & x_i \in \{0,1\} \end{aligned}$$

where  $a_i$  is the number of electoral votes per state,  $b_i$  is the minimum number of citizen's votes required to win the electoral vote for the state, and  $x_i$  is a binary variable, 1 or 0, depending on whether the state wins or loses the electoral college, respectively. The function to be minimized is known as the objective function and should be ordered such that  $b_i$  is less than or equal to  $b_{i+1}$ .

## OUR SOLUTION

We found a solution to this problem using two methods. First, we derived a means of solving it that will test every possible value. Secondly, by using the Balas Algorithm, we can find a solution in a much shorter time. We describe and implement both methods.

### The Exhaustive Method

To solve this problem, we initially wrote an algorithm that exhaustively tests every possible combination of states being for or not for a candidate, verified that the value of electoral votes is equal to or greater than 270, and compared the value of the objective function with any previous findings, replacing it if the new value was lower. The run-time of the algorithm was found to be approximately ten minutes for all combinations of two possibilities on 20 variables. To do all 51 variables would take 231 times longer, which would take about 41 thousand years. In order to maximize the probability of finding the absolute minimum in the range of the number of possibilities we are able to try in a timely manner, it makes sense to assume that the states with the least voters per electoral vote will have to be for the candidate and the states with the most voters per electoral vote will be have to be against the candidate. Following this logic, we let the first 21 states be proponents for the candidate by the minimum number of voters possible and the last 10 states be against the candidate. Algorithm A.1 was used to find the solution in this manner.

### The Balas Algorithm Method

While the above solution has a high probability of being correct, having excluded some solutions from being tested, the possibility that we missed the minimal solution still remains. By following the Balas Algorithm, we can find the same optimal solution by testing possibilities in a much shorter time than the exhaustive method is capable of. In this algorithm, we take full advantage of our two well determined constraints. Our program that applies the Balas Algorithm took less than 1 minute to complete and found the same minimal solution. We implemented algorithm A.2 to take advantage of this method.



Figure 2. A graphical display of the accumulation of voters to win compared with registered voters.

The figure above is a graphical representation of the solution. We found that the sum of the minimum voters to win the Electoral College by majority vote is 21.91% of the sum of the registered voters in the U.S. and only 9.77% of the total population of the U.S. We also found that in a proportional representation system where a percent of each state’s electoral votes would go toward separate candidates based on the percentage of voters in the state that voted each way, the minimum percentage of votes to win the Electoral College by majority increases to a little more than 39%.

### CONCLUSIONS

Although at first glance the proportional representation system seems like a very appealing and obvious alternative to our current system, according to Duverger’s law, it would lead to a multi-party system which would clearly increase the probability of candidates winning the electoral college by a plurality

vote (more than the rest, but less than 50%) more often than they do now and by a much greater split. It is, however, significant to note that it would require five almost equally competitive candidates to push the minimum winning proportional representation system's plurality percentage down to the minimum winning U.S. plurality system's majority percentage.

## APPENDIX A. ALGORITHMS

The algorithms below were used when finding the solution to the proposed question.

### A.1. Exhaustive Algorithm

1. *LET S be an array of arrays such that the inner arrays are comprised of the state name, the total of registered voters in the state, the number of votes required to win the electoral college, and the number of electoral votes assigned to the state.*
2. *FOR each element in S;*  
*Add up the 'Registered voters' sub-element.*
3. *SORT S by number of votes required to win the college in the state from least to greatest.*
4. *DEFINE the constraint function:*
  
5. *DEFINE the objective function:*
  
6. *LET  $w = 100\%$  be the minimum number of voters required to win the Electoral College.*
7. *FOR i from 0 to 251 (base 2);*  
*Input the characters of i into an array, B, in reverse order.*  
*WHILE the length of B is less than 51;*  
*Add 0's to the array.*  
*Evaluate constraint function at B.*  
*IF constraint function at B is  $+270$ ;*  
*Evaluate objective function at B (Percentage to Registered Voters);*  
*IF objective function at b is less than w;*  
*$w = \text{objective function at B}$*
8. *RETURN w*

### A.2. Balas Algorithm

1. *LET S be an array of arrays such that the inner arrays are comprised of the state name, the total of registered voters in the state, the number of votes required to win the electoral college, and the number of electoral votes assigned to the state.*
2. *FOR each element in S;*  
*Add up the 'Registered voters' sub-element.*
3. *SORT S by number of votes required to win the college in the state from least to greatest.*
4. *DEFINE the constraint functions:*
  
5. *DEFINE the objective function:*
  
6. *LET  $w = 100\%$  be the minimum number of voters required to win the Electoral College.*
7. *LET  $A = [1]$  be an array.*
8. *DEFINE a function F that appends 0's to A till the length of A is 51.*



9. *EVALUATE* the constraint functions at  $F(A)$
10. *IF*  $F(A)$  satisfies all constraints:
  - IF* the objective function at  $F(A)$  is less than  $w$ :  
 $w =$  objective function at  $F(A)$  divided by total voters.
11. *IF* the constraint function evaluated at  $F(A)$  is less than 270:
  - Add a 0* to the beginning of  $A$  and repeat 9 through 11.
  - Add a 1* to the beginning of  $A$  and repeat 9 through 11.
12. *RETURN*  $w$

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# Using a Tabu Search Approach to Align DNA Sequences

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## INTRODUCTION

### DNA Sequencing

DNA sequencing can show the evolution of sequences that diverged from common ancestors over time. Although the most important regions of DNA are usually conserved to ensure survival, slight changes or mutations do occur as sequences evolve [37]. These mutations are any combination of insertion, deletion and/or substitution events. Methods such as sequence alignment are used to detect and quantify similarities between different DNA and protein sequences that may have evolved from a common ancestor. Sequence alignment gives insight into the structure and functions of a sequence, shows a common ancestry or homology between sequences, detects mutations in DNA that lead to genetic disease and is the first step in constructing phylogenetic or evolutionary trees.

Sequence alignment (SA) is an optimal way of inserting dashes into sequences in order to minimize (or maximize) a specified scoring function [1, 37]. Generally, genetic sequencing can be classified as a pairwise sequence alignment or a multiple sequence alignment (MSA). MSA is simply an extension of pairwise alignments that align 3 or more sequences. Both MSA and pairwise SA can further be categorized as global or local methods. Whereas global methods

attempt to align entire sequences, local methods only align conserved regions of similarity.

### **Multiple Sequence Alignment**

Multiple sequence alignments are often classified as progressive or iterative. Typically progressive alignments involve three steps. In the first step, each pair of sequences is aligned using a Dynamic Programming approach. Then, the scores from the pairwise alignments in step one are used to construct a tree. Finally, the tree from step two is used to progressively align the sequences and calculate an alignment score. In progressive algorithms, once a gap is introduced in the early stages of an MSA it is always present; thus one major drawback is that an error in an initial subalignment will be propagated throughout the entire MSA [26]. To avoid these problems, iterative techniques are used and initial alignments are constantly modified.

In many MSAs, a distance score is used to construct a tree. A distance score represents the number of changes required to change one sequence into another. In theory, the score reflects the amount of evolutionary time that has elapsed since the sequences diverged from a common ancestor; thus, a larger distance score, indicates greater evolutionary time and more sequence divergence [26]. The simplest way to calculate the distance score is to sum up the number of mismatches in an alignment and divide by the total number of matches and mismatches.

### **LITERATURE REVIEW**

ClustalW is a commonly used multiple sequence alignment program [19, 40, 20]. As with any other heuristic, ClustalW does not guarantee an optimal solution. It progressively aligns sequences and exploits the fact that similar sequences are evolutionarily related. First, ClustalW aligns and scores all possible pairs of sequences to determine their distance score. Then a guide tree is constructed using the edit distances and a neighbor joining algorithm.

Finally, the guide tree is used to progressively align the sequences. Although an optimal solution is not guaranteed, ClustalW usually provides a good starting point for other refinement methods such as Hidden Markov Modeling. Since ClustalW progressively aligns sequences, any regions that were misaligned early in the process cannot be corrected as the program progresses and more information is introduced. Another problem with ClustalW is the choice of alignment parameters. Sequences that are not highly conserved or not very similar are extremely sensitive to the adjustments of the parameters. When aligning divergent sequences, slight parameter adjustments will drastically change the final multiple sequence alignment. In general, it is difficult to justify why one scoring matrix or parameter selection is better than another [37]. As a direct result of the uncertainty involved in selecting the parameters, ClustalW is most useful when sequences are known to be evolutionarily related.

Notredame and Higgins [29] have the best known genetic algorithm, Sequence Alignment by Genetic Algorithm (SAGA), for multiple sequence alignment. Similar to other genetic algorithms (GA), SAGA uses the principles of evolution to find the optimal alignment for multiple sequences. This method generates many different alignments by rearrangements that simulate gap insertion and recombination events to generate higher and higher scores for the MSA [26]. In this GA, the population consists of alignments that were formed from a complex set of twenty two different crossover and mutation operations. To determine the fitness of an alignment, SAGA uses a weighted sum of pairs approach in which each pair of sequences is aligned and scored; then the scores from all the pairwise alignments are summed to produce an alignment score. As with any heuristic approach, SAGA may not generate an optimal MSA. Although it has been shown that SAGA does produce quality alignments, the time complexity involved in the weighted sum of pairs fitness function is a major drawback to

this approach.

Brudno et al. [5] propose a glocal alignment approach that combines features of both local and global alignment methods. This glocal aligner, Shuffle-LAGAN (SLAGAN), is a pairwise alignment algorithm that can be extended to multiple sequence alignment. The distinct differences between global and local alignments are merged in the SLAGAN approach. Whereas global alignments transform one sequence into the other by using a combination of insertions, deletions and substitutions (simple edits), local alignment techniques tend to focus on similarities between conserved regions; this glocal alignment combines these features and creates a map that transforms one sequence into the other while allowing for rearrangement events. SLAGAN includes rearrangement events because DNA is known to mutate by simple edits, rearrangements such as translocations (a subsegment is removed and inserted in a different location but with the same orientation), inversions (a subsegment is removed from the sequence and then reinserted in the same location but with the opposite orientation and duplications (a copy of a subsegment is inserted into the sequence and the original subsequence remains unchanged) or any combination of these simple edits. SLAGAN quickly aligns long sequences. In this technique, a penalty is incurred for the set of operations that include insertions, deletions, point mutations, inversions, translocations and duplications. This approach minimizes the sum of these penalties (edit distance). SLAGAN has three distinct stages. The first stage consists of finding local alignments using the CHAOS tool. The second stage picks the maximal scoring subset of the local alignments under certain gap penalties to form a 1-monotonic conservation map. Whereas standard global alignments are non-decreasing in both sequences, the structure of the 1-monotonic conservation map is non-decreasing in one sequence and without restrictions in the second sequence. Relaxing this assumption in the

second sequence, allows the algorithm to detect rearrangements. The inclusion of rearrangement events is one of the features that make this algorithm different than typical global alignment approaches. In the final stage of SLAGAN, the conservation map of local alignments is joined to form maximal consistent subsegments that are aligned using the LAGAN global aligner. One drawback of the SLAGAN algorithm is that it is not symmetric in the sequence order, so it frequently misses duplications in the sequences.

## **NEW APPROACH TO MULTIPLE SEQUENCE ALIGNMENT**

### **Basic Components of a Tabu Search**

Tabu search is a heuristic approach that uses adaptive memory features to align multiple sequences. The adaptive memory feature, a tabu list, helps the search process avoid local optimal solutions and explores the solution space in an effective manner [33]. While the tabu list restricts the search of some neighboring solutions, there are conditions which allow exceptions to the tabu list. As displayed in Figure 1, a tabu procedure starts with an initial solution, generates neighbors and then moves to the best accessible neighboring solution. Accessible solutions are either not on the tabu list or are on the tabu list but satisfy a condition, an aspiration criterion, which allow exceptions to the tabu list [9]. In cases where the tabu search becomes stabilized and is no longer moving toward better solutions, a diversification and intensification procedure is implemented, so that more of the solution space can be explored. These steps are repeated, until some termination criterion is met.

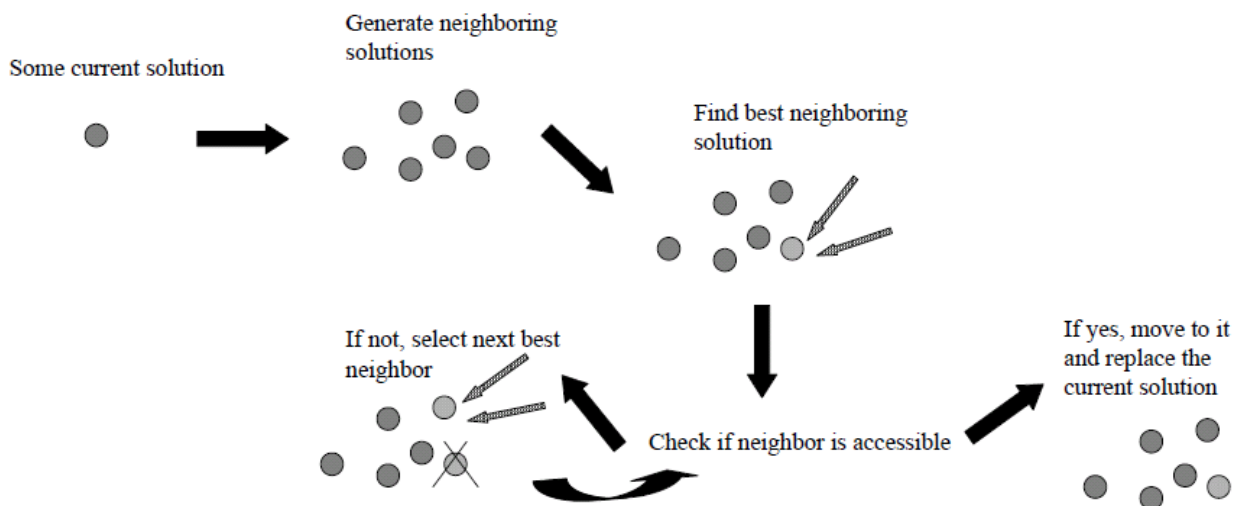
### **Specific Tabu Search Components**

We develop and implement a tabu search based on the basic components outlined in the previous section and Glover's tutorial [14]. A solution consists of arrays that contain the sequence order and the positions of the gaps in the corresponding MSA. The actual MSA is not

stored in memory. The optimality criterion attempts to maximize the most important measure of an MSA -the alignment score. Thus, the quality of an alignment is measured using the final alignment score. Finally, the algorithm terminates after the current best solution has not improved for a specified number of iterations.

There are three types of move strategies that will generate a neighbor from a current solution. The solution representation in Figure 2 displays the first two types of moves. The first type of move is made by swapping pairs of sequences. In Figure 2a) the current solution, is composed of two arrays, s and sg, that contain the sequence order of the MSA and the gap locations, respectively. A possible neighbor, displayed in Figure 2b), is generated by swapping the sequences in positions 3 and 5 as well as the sequences in positions 8 and 10. For this neighbor, the arrays containing the sequence order and gap location are different from

**Figure 1: The basic steps of a tabu search.**



the arrays in the current solution. The second type of move is made by swapping blocks (two or

more consecutive sequences). For example in Figure 2c, a possible neighbor of the current solution is generated by swapping sequences in positions 2, 3 and 4 with sequences in positions 7, 8 and 9. The third type of move is made by changing the gap positions within a sequence. So, the array containing the sequence order would remain the same and only the array with the gap positions would change.

This tabu search, simply progressively aligns all N sequences together in the order specified by a solution. For the MSA in Figure 2a, s1 is aligned with s4 to compose the subalignment, a(s1, s4). Next, s3 is aligned with the subalignment a(s1, s4) to compose the subalignment, a(s1, s4, s3). This progressive alignment continues until the entire MSA, a(s1, s4, s3, s5, s7, s2, s10, s6, s8, s9), is composed.

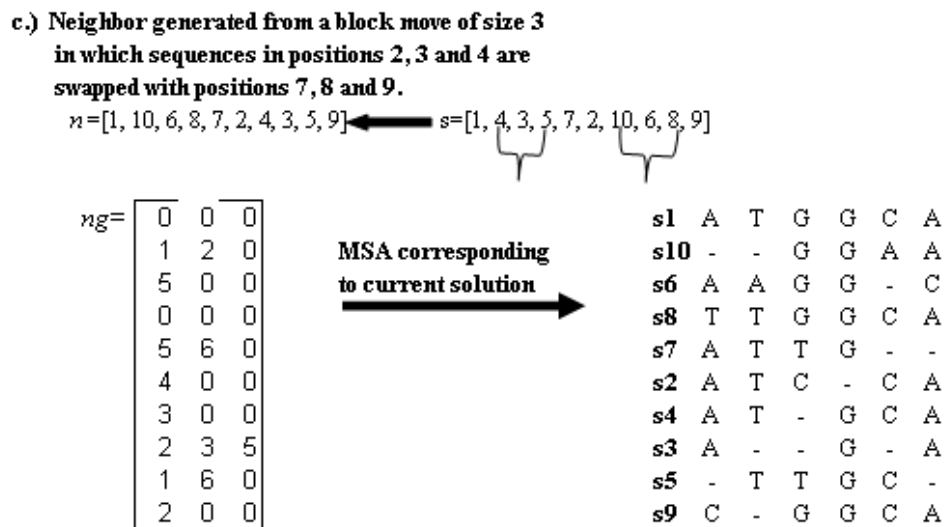
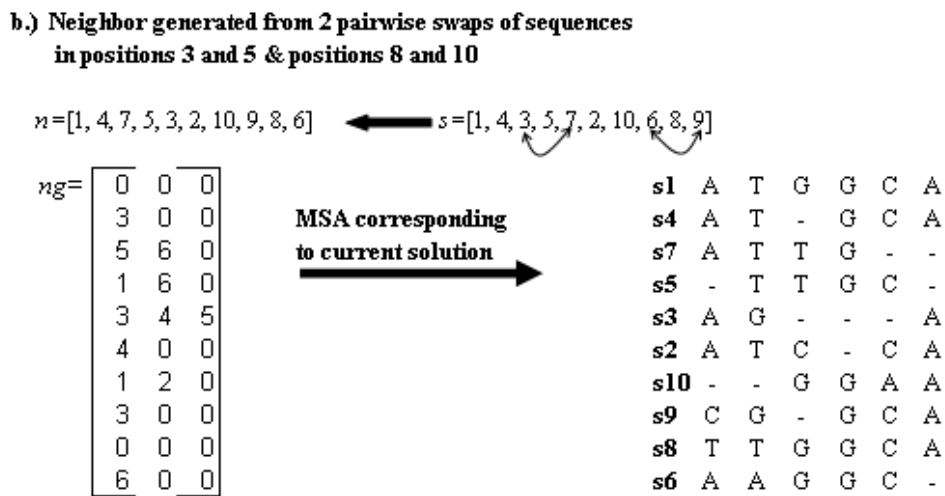
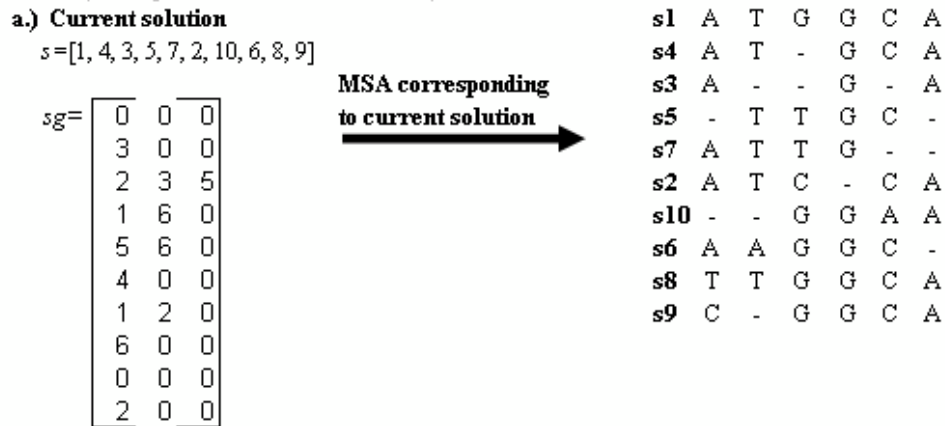
## RESULTS

A multiple sequence generation procedure adapted from Shyu et al. [37] was used to simulate DNA sequences for 4 different groups. This procedure attempts to simulate real biological sequences, with conserved regions that often correspond to important biological functions. Twenty sequences were generated for each of the 4 groups that contained between 18-201 base pairs. For each group of sequences, the tabu search algorithm was run 10 times each.

In Table 1, the highest alignment score in each group from the tabu search was compared with the scores from SAGA, ClustalW, and PRALINE. Also in Table 1, the alignment scores are ranked according to the SP alignment score. A 1 represents the best alignment and 4 represent the worst alignment. As a result of using the sum of pairs scoring function, generally, as the number of sequences or base pairs (BP) increases, the alignment



**Figure 2: Solutions representation and moves for the tabu search**



score decreases. This decrease in the SP alignment score is the direct result of more gaps with negative gap penalties being introduced into larger MSAs.

MSAs from ClustalW, the most popular commercial alignment program, are used to measure the quality of the alignments from other programs. Quality is measured in terms of the alignment score. Thus, it is assumed that higher alignment scores will yield a higher quality MSA. For all 4 groups, ClustalW yielded MSAs with the highest alignment score. Conversely, in most instances, PRALINE yielded the lowest alignment score. The MSA scores for SAGA were higher than the tabu scores for each of the 4 groups. There was only 1 instance in which the tabu search produced the worst alignment of all the MSA programs.

**Table 1: SP alignment scores from ClustalW, SAGA, PRALINE and the tabu search**

	No. of Seq, Length	SP Score		No. of Seq, Length	SP Score	
Clus	20 ,18-21	-7.150E+03	1	50,18-21	-1.067E+04	1
SAG	20 ,18-21	-7.150E+03	1	50,18-21	-1.069E+04	2
PRA	20 ,18-21	-7.512E+03	3	50,18-21	-1.074E+04	3
Tabu	20 ,18-21	-7.401E+03	2	50,18-21	-1.088E+04	4
Clus	20, 39-51	-1.500E+04	1	50, 39-51	-3.193E+04	1
SAG	20, 39-51	-1.500E+04	1	50, 39-51	-3.196E+04	2
PRA	20, 39-51	-1.773E+04	3	50, 39-51	-3.298E+04	4
Tabu	20, 39-51	-1.692E+04	2	50, 39-51	-3.215E+04	3
Clus	20, 75-102	-3.776E+04	1	50, 75-102	-2.040E+04	1
SAG	20, 75-102	-3.786E+04	2	50, 75-102	-2.128E+04	2

PRA	20, 75-102	-3.942E+04	3	50, 75-102	-2.279E+04	4
Tabu	20, 75-102	-3.943E+04	4	50, 75-102	-2.278E+04	3
Clus	20, 150-201	-5.901E+04	1	50, 150-201	-7.028E+04	1
SAG	20, 150-201	-5.901E+04	1	50, 150-201	-7.167E+04	2
PRA	20, 150-201	-5.991E+04	3	50, 150-201	-7.391E+04	4
Tabu	20, 150-201	-5.947E+04	2	50, 150-201	-7.385E+04	3

The tabu search is run 10 times for each of the 8 groups of sequences. Each run does not necessarily yield the best alignment score attained using the tabu. The minimum, maximum, average, standard deviation and the percentage of times the best score was reached (for 10 SP scores per group) are displayed in Table 2. The variability in the alignment scores increases as the number of sequences in the group increases. The percentage of times that the best score is reached ranges between 10 and 50 percent. The lack of a diversification procedure explains the widely varying MSA scores and the low percentage of times the best score is reached. It is clear that adding a diversification procedure would help prevent the tabu from cycling back into local optimal solutions.

**Table 2: Measures for the 10 tabu search runs per group using the tabu search**

No. of seq, Length	Tabu Search				
	Min SP	Max SP	Avg SP	St Dev	%Max
20, 18-21	-7.52E+03	-7.40E+03	-7.46E+03	8.70E+01	50
20, 39-51	-1.80E+04	-1.69E+04	-1.75E+04	7.79E+02	40
20, 75-102	-4.14E+04	-3.94E+04	-4.04E+04	1.40E+03	40
20, 150-201	-6.14E+04	-5.95E+04	-6.05E+04	1.39E+03	30

## CONCLUSION

Tabu search is an effective way to align multiple sequences. This Tabu search does not use a tree to guide the alignment process. One advantage of not using a guide tree is that the tabu search avoids performing pairwise alignments for each pair of sequences in an MSA. When aligning large groups of sequences, making all of the pairwise alignments could become computationally expensive. Another advantage of not using a guide tree (typically produced from a neighbor joining algorithm) is that we can avoid predicting incorrect evolutionary trees. With the addition of a diversification procedure, the tabu search has the potential of producing better alignments that are comparable with ClustalW.

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## **DIGITAL PRIVACY: THINK TWICE BEFORE YOU TWEET!**

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### **ABSTRACT**

An important social and legal issue with significant personal and professional implications is the scope of the right of privacy associated with digital communication. Privacy is an important guardian of free speech – one of the critical elements promoting creativity. In the spring of 2013, the author conducted the Digital Privacy Survey of 103 undergraduate students and the results of the survey are analyzed. The limitations of the Electronic Communications Privacy Act (ECPA) are discussed and amendments to this law are proposed. Suggestions are also made for minimizing the unintentional sharing of personal information.

### **Introduction**

Data collection begins the moment a computer is turned on. Each online search, website encounter and email generates personal information that the user may be unconsciously revealing. With the ubiquitous camera-phone, subjects are frequently unaware that they have been photographed until their image appears online. Additionally, daily social interactions are both voluntarily and inadvertently shared through Twitter, Instagram, social media, text messages and email.

There are significant limitations to privacy rights attached to digital communication stored at least 180 days. To ensure that digital information is stored and thus more accessible, the National Security Agency (NSA) is currently constructing an enormous Data Collection Center in Utah and another analytics facility in North Carolina. [Biesecker, 2013] Some experts estimate that the Utah facility will be capable of storing 5 zettabytes of information – every digital footprint in the world for a very long time [Berkes, 2013]. In the wake of the NSA's Prism program and internal auditor's recent revelations that the NSA has violated privacy laws thousands of times a year since 2008 [Gellman, 2013], users of digital technology should be acutely aware that digital information is stored and at times, illegally seized. Innumerable regulations and obscure laws combined with the outdated ECPA and new governmental data warehouses, creates legitimate concerns.

### **Digital Footprint**

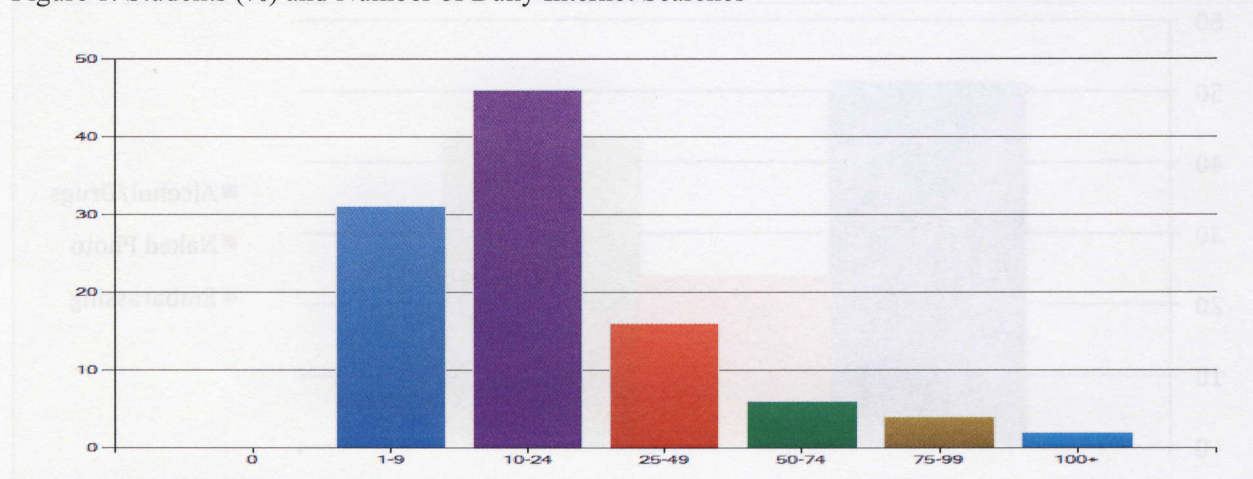
There are several misconceptions about the privacy of digital technology including, but not limited to, text messages, email, and social networking. The Internet does not have a delete button and when asked in the 2013 Digital Privacy Survey, 40% of respondents were unaware of the permanent nature of Internet activity. Only 36.19% were aware of the massive NSA data collection and storage facilities.

In the digital age, new methods of communication and living life in the public eye are developing at a rapid rate. According to the 2013 Digital Privacy Survey, 94.1% of survey respondents had an ever-present Smart phone -- essentially a mini-computer and mother lode of personal information. Although e-mail, text messages, Twitter and Facebook may provide an efficient means to communicate and chronicle life events, they are generally used without time to reflect on the potential consequences. Some of the common ways that a daily narrative is digitally recorded is revealed in the aforementioned survey of 103 students. The 2013 Digital Privacy survey indicates that 62.9% have a Twitter account, 95.2% have a Facebook page, and 99% have a laptop. Survey results also indicate the extent to which the students are digitally connected. On a daily basis, all of those surveyed use email, 98.1% text message, and 82.8%

access Facebook. Approximately three fourths of the Facebook users access their account multiple times a day.

As Figure 1 illustrates, 100% of the survey respondents search the Internet on a daily basis. Every time an email is sent or an app is bought, personal information is shared and sold to others. Collecting, selling, sharing and data mining personal information are commonplace and Internet users participate in these pursuits without due consideration of privacy.

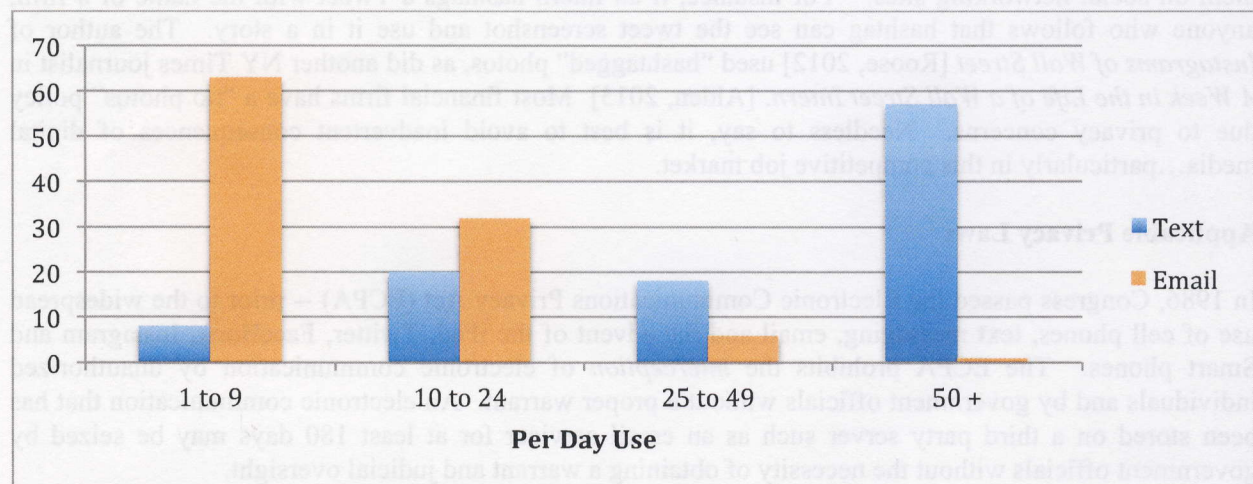
Figure 1. Students (%) and Number of Daily Internet Searches



Source: La Roche 2013 Digital Privacy Survey

E-mail messages are informal and are frequently sent without much consideration of the contents. Text messages are even more instantaneous and are commonly sent with even less reflection than an email. The 2013 Digital Privacy Survey indicates that among respondents, text messages are now a more frequently used communication tool than email and the results are shown in Figure 2. In a typical day, 63 of respondents (60%) said that they use email between 1-9 times and 57 students (54%) use text messaging 50+ times a day.

Figure 2. Students and Daily Use of Text versus Email

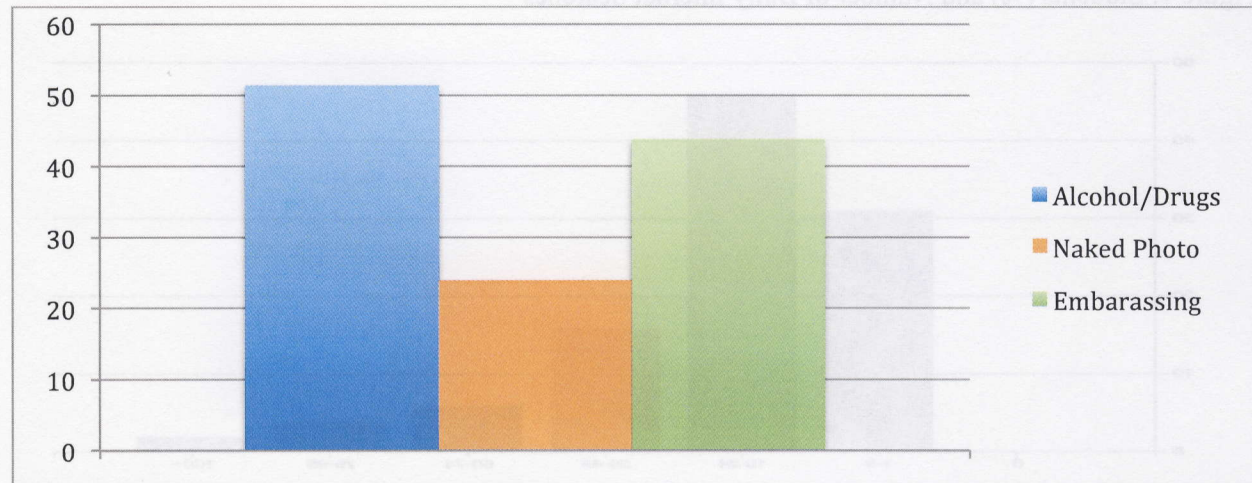


Source: La Roche 2013 Digital Privacy Survey



Due to the immediate and casual nature of text messages, tweets and other forms of digital communication, users frequently post inappropriate personal information. Figure 3 shows that 43.8% of the survey respondents indicated they have posted, tweeted or texted digital content that they consider embarrassing and would not want a prospective or current employer to view. The survey responses also indicated that 23.8% have had photos posted or sent in which they are partially or completely unclothed and 51.4% have had photos drinking alcohol or using an illegal substance digitally communicated.

Figure 3. Embarrassing Digital Content (percent)



Source: La Roche 2013 Digital Privacy Survey

**“Hashtags” Enlarge Footprint**

Twitter is growing in popularity and 62.8% (66) of the respondents “tweet” -- over half on a daily basis (51%). A Twitter user may think that only their known followers on Twitter have the ability to see their tweets. In reality, if a tweet or Instagram (a popular photo sharing/social networking site) is hashtagged, others including savvy journalists and financial firms can see it. According to one business journalist who declined to be named, “There are hundreds, if not thousands of journalists trolling Twitter. Every journalist uses TweetDeck and a lot of financial firms are Twitter savvy and follow what people say about them on social networking sites.” For instance, if an intern hashtags a Tweet with the name of a firm, anyone who follows that hashtag can see the tweet screenshot and use it in a story. The author of *Instagrams of Wall Street* [Roose, 2012] used “hashtagged” photos, as did another NY Times journalist in *A Week in the Life of a Wall Street Intern*. [Alden, 2013] Most financial firms have a “no photos” policy due to privacy concerns. Needless to say, it is best to avoid inadvertent consequences of digital media...particularly in this competitive job market.

**Applicable Privacy Laws**

In 1986, Congress passed the Electronic Communications Privacy Act (ECPA) -- prior to the widespread use of cell phones, text messaging, email and the advent of the iPad, Twitter, FaceBook, Instagram and Smart phones. The ECPA prohibits the *interception* of electronic communication by unauthorized individuals and by government officials without a proper warrant. An electronic communication that has been stored on a third party server such as an email servicer for at least 180 days may be seized by government officials without the necessity of obtaining a warrant and judicial oversight.

The following are some of the fundamental changes that have been made since the analog age of 1986 morphed into the digital age:

- **Email** -- Although Title I of the ECPA protects electronic communications while in transit, after email messages have been stored on a server for at least 180 days they are deemed “abandoned” and law enforcement may obtain these communications without the necessity of obtaining a warrant and an accompanying judicial review. The only requirement is a statement that the communication may be relevant to an investigation. This is pertinent because at the time the ECPA was signed into law, electronic communication was stored on a third party server for a brief period of time -- just long enough for it to be transferred to the customer’s email account. Today, Hotmail and Gmail users may store email online or the third party server may store digital communication indefinitely. The new NSA Data Collection Center will insure that these digital communications are stored on a third party server.
- **Social Networking** – Facebook was not established until 2004, eighteen years after the adoption of the ECPA. The omnipresent digital camera and the use of Facebook, Twitter and Instagram encourage users to live daily life in the public eye.
- **“The Cloud”**-- Saving digital information and files in “the cloud” provides users with the ability to store massive amounts of data and at the same time the cloud facilitates collaboration.
- **Smart phones** – Smart phones are essentially mini-computers with built-in GPS. The location data generated by a Smart phone is stored and can readily be accessed. Employers frequently provide employees with Smart phones. The ECPA has never prohibited employers from accessing an employee’s electronic communication in the workplace when one of the parties consents, when the employer is providing the service, or when monitoring is done in the ordinary course of business. Thus, employers may legally access most, if not all, of the employee’s personal communications and movements. With minimal effort, the government has access to the same information.

Based on the rationale of national security, Internet service providers (ISP) are being pressured by the NSA, FBI, IRS and the Executive Branch to reveal subscribers’ digital activity. [Miller, 2013] Google freely admits that users do not have a reasonable expectation of privacy with Gmail. In part, this is because users signed up for this service agreeing to contextual advertising based on searchable email. [Wood, 2013] In a court motion to dismiss a class action accusing Google of violating the ECPA, Google’s executive chairman, Eric Schmidt admitted that “Google policy is to get right up to the creepy line and not cross it.” [Rushe, 2013] To make matters worse, there is a dearth of federal court decisions applying the Fourth Amendment to digital technology. For instance, the US Supreme Court has not specifically weighed in on privacy rights associated with stored text messages.

## **Conclusion**

The mass surveillance of US citizens undertaken by the NSA combined with the enormous data collection and warehousing facility coming on line in Utah presents an affront to freedom of speech and personal privacy. The ECPA and court decisions provide that: (1) Employees have no reasonable expectation of privacy regarding electronic communications and should consider all digital communications sent on their company’s system to be legally accessible and (2) Once any digital communication has been stored for 180 days, it may be accessed by the government without the necessity of a warrant.

Senator Mike Lee along with Senator Patrick Leahy, one of the original sponsors of the ECPA, recently introduced legislation to require a warrant prior to the seizure of stored electronic communication. “The ACLU, along with Google, Microsoft, Yahoo and Facebook, are all lobbying Congress to revise the ECPA, according to their most recent lobbying disclosure reports.” [Sasso, 2013]

Amendments to the ECPA should be clear, simple and consistent and include the following:

- Preservation of the applicability of the Fourth Amendment and search warrant requirements for access to private communications.
- Internet Service Providers only have to reveal stored communications after a search warrant has been provided.
- Communication should be protected without regard to age, whether it is in transit or stored, opened or not.

It is almost impossible to avoid using digital technology. We should all be aware of the permanent nature of our digital footprint and keep in mind the lack of privacy protection. Scanning and reading personal and private email is an ordinary business practice for Google and others. If email users want to avoid the routine scanning of the contents of their email, they should avoid using the free email services of providers such as Gmail and Hotmail. Due to the propensity to digitally chronicle daily life, students should set their Twitter account to private and perhaps remove their Facebook page before applying for a job. Interns should avoid using hashtags -- unintended followers can and will see their Instagrams and Tweets.

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# **DIGITAL MEDIA AS A CASE STUDY TOOL**

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## **ABSTRACT**

Education in digital age is changing. We are moving from face-to-face to hybrid to eLearning environment. This evolution is blending millennium students with returning students creating a mix of the old and the new. Many students taking on-line classes, typically, are part of the millennium or X-generation and are computer savvy. Many of them are well versed in social media such as iPod, blackberry and youtube to name a few and social networking concepts like facebook, twitter and blogs. On the other hand there are students who are returning after a long pause for various reasons. Teaching these two diverse groups is quite challenging. Based on our many years of teaching experience, we find many students using laptops and twittering in face-to-face classes. This raises interesting question, can we use digital media as a learning tool? This paper presents a case study that enhances learning using digital media in case studies. The final paper will present results of this study.

## **INTRODUCTION**

Digital media is growing rapidly. Digital media is defined as any resource which is in digital form including video streaming, videos, internet resources and social media. Many authors have advocated use of digital media to enhance learning. Commenting on social media, McAurthur Foundation of learning, suggested “..What would it mean to really exploit the potential of the learning opportunities available through online resources and networks?” This is becoming especially true as we move to the e-learning which is growing exponentially and it is expected to continue to do so. Since e-Learning provides time and space independent education, it is attracting students from different disciplines, nationalities, age groups etc. However, e-Learning is self-driven in that students become the driver and faculty becomes the mentor. This paper presents a case study that involved using digital media and social networking to enhance Learning in a face-to-face class which uses course management system extensively. The final paper will present results of our study. The sections are organized as follows. The next section describes the research design, and the following sections discuss the experiment, preliminary research results, their implications and finally the conclusions.

## **RESEARCH DESIGN**

We used introductory graduate information systems class for experiment. This is a challenging class to teach due to the nature of the students. It is a required course of all business students. Contents are introductory and fairly broad that relate to IT components and its applications to business. Some students are well versed in these while others are naïve (students returning after a pause). The class can be quite boring for savvy students while difficult for others.

Digital medias are proliferating [8][9] and they would be good candidate as a learning tool [6]. Jenkins, et al (2012) also presented a comprehensive view of how digital media can impact learning.

The class was divided in groups and each group was given a case to analyze. All cases were taken from the text book but students were instructed to use whatever digital media resources they wanted to use. This allowed student to create a 1) blog site, 2) develop/use clips from youtube or 3) develop a facebook page (if they did not have). Groups were also asked to rate group members on their contribution to the case. The next section discusses various steps of this experiment.

### ***Selection of learning objectives***

IT related learning objectives (LO) of the course were used for assessment purposes.

### ***Selection of assessment approaches***

We used the following measures for the above LO.

- Questionnaires at the beginning and end of the course to measure student's perception of their IT skills.
- Group's usage of digital media in case study
- Student's performance in the case study.

## **The Experiment**

The present study was conducted at an urban public university in the Mid-Atlantic area. In hybrid classes internet based skills are important since students have to occasionally communicate with peers and the professor through the course management systems. Skills may require downloading articles, streaming videos, posting files and/or using the chat area for group work [1]. As already mentioned, we wanted to study the impact of digital media on student learning as measured through a case study. The following hypothesis was developed:

H1: Groups that used digital media performed better on the final exam.

A t-test of mean was used to study this hypothesis.

### **Collect data**



## **Students' Backgrounds**

Several items related to skill levels were collected at the beginning of the semester. Students were given 1% of the final grade for completing the questionnaire at the beginning and will be given 1% at the end of the semester. We also measure student's perception of their competencies in internet related skills. Survey revealed that almost 73% of the students consider themselves to be competent in surfing the web as measured by their browsing skills. This would imply student's feel they have excellent browsing capability and they should be able to search a document or a concept on the internet quite easily.

In addition, we also measured student's familiarity (1 being yes and 2 being no) with emerging technologies (ipod, blackberry) and social networking concepts like (facebook, youtube, blogs). Survey revealed that – 93% have iPod and 100% have smartphones (other than iPod) and 73% have Facebook page. However only 20% blog or twitter or have a youtube video. This would imply students may not using digital media to fullest extent and would be interested in learning and possibly using social networking concepts of blogs, facebook and youtube in their case analysis.

## **Discussions and Future Experiments**

SPSS was used to study differences in group performance. Our results did not indicate students who used social media performed any better than students who did not. However we did find students who used social media (youtube, google docs, Skydrive, skype) did score more than the groups who did not.

Advances in digital media (DM) are creating an exciting environment and it is becoming a necessity to use DM to enhance learning of millennium generation. We plan to mandate social media usage in future assignments and study its impact on student performance. This paper is an attempt in that direction.

## **REFERENCE**

Provided on request

## **Office 2013: There Is a Lot To Like**

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### **Abstract:**

Office 2013 new features for Word, Excel and PowerPoint will be highlighted in this session. The Ribbon has a new look to facilitate touch screens with Windows 8. The cloud is emphasized for saving files and collaborating. And the Web Apps have been improved. Session attendees will be encouraged to interact with the presenters.

### **Session:**

#### **Microsoft Office 2013**

The move toward the cloud with the 2013 release includes: cloud storage options at **SkyDrive**, improved online **Web Apps**, and better collaboration tools within the applications. There are also new annual subscription options as well as the traditional installation for purchase.

New common Office 2013 features include: changes to the Backstage and Start menu; less color on the Ribbon to allow space for touch screen use in Windows 8; connectivity over multiple devices using SkyDrive; more task panes; Office Apps that can be downloaded; and better collaboration.

#### **EXCEL 2013**

Excel's new features include Flash Fill, Quick Analysis, new functions, new chart features, Office Apps, filtering with slicers and time lines, and the insertion of online images. For those using Excel for big data analysis, PowerPivot is an included Add-In in the Professional Plus version and it works with PowerView and PowerCharts to provide better analytics tools. The Data Visualization Apps for Excel – some free, some for purchase - link to various databases, maps, crime stats etc.

#### **WORD 2013**

Images and videos can now be more easily inserted into Word documents. There are changes to the reviewing features with more ease in collaboration which now includes a chat feature. PDF documents can be opened and edited in Word. **Present Online at Share** in the Backstage area allows the sending of documents to the cloud which automatically generates a link that can be sent to others who can then view the

document online, even without having Word on their computer. There are Office Apps, new formatting pane, line spacing at 1.08, a Reading Pane, and improved Table tools.

### **PowerPoint 2013**

**Presenter View** first launched in 2010 now includes a view showing the presenter the current slide, current slide notes and the next slide, while only projecting the current slide to the audience. The **Eye Dropper** allows for matching and customization of colors. **Online Meetings** creates a link that can be sent to others enabling them to view the presentation even if the viewer does not have PowerPoint installed. There is now a wide screen option, new chart features, more Smart Guides, and improved ways to create personalized shapes.

## Stop Death by PowerPoint at Conference Presentations

Session Facilitator

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### **ABSTRACT**

This session will overview new trends in presentations which will hopefully encourage all presenters to rethink how they currently do conference presentations. Topics will include how the brain processes information and why bullet points and lots of text just lead to “Death by PowerPoint”. There will be tips and tricks gathered from Microsoft PowerPoint MVP’s and other presentation professionals. The session will also cover some of the newer PowerPoint features in 2010 and 2013, tools that attendees can use to give new looks to their presentations. The goal of the session is to promote more effective and interesting conference presentations and to encourage attendees to also rethink how they can redo classroom presentations using some of these trends and tools.

Evaluation, Assessment, and Accreditation, Oh My!  
Dr. John R. O'Malley Jr.  
Georgia Southern University

Whenever evaluation, assessment and accreditation are mentioned, faculty and administrators tend to cringe and whine. It is hoped that at the end of the session, participants will have a more positive view of these three aspects of the new normal in higher education. The session will begin with a discussion on the differences between evaluation and assessment and how they relate to accreditation. The discussion will then move to how assessment can be properly perceived as a way to improve program and student outcomes by informing faculty on how to maximize student learning. The session will conclude with a discussion on how the importance of these concepts is changing due to external pressures. The session will be interactive with participation by attendees.

## **Digital Literacy Course Redesign**

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### **Abstract:**

This session covers the several models of providing digital literacy courses in today's Schools of Business. Faculty are finding that though today's students are really good at the digital skills that will get them fired, they are not so good at the skills that will get them hired. From the budget side, administrators question the continued need of digital literacy courses and want to eliminate them. So what are some options to continue to provide training in digital literacy skills that will help students in their future careers and help administrators with budgeting of these courses? Three models will be discussed in this session: online/self-paced, emporium and flipped classrooms - as well as online products that support these courses. Attendee's participation will be encouraged during a time of sharing since there are several variations to these models that might be of interest to others.

### **Overview of Session:**

Many administrators feel that today's students are very computer savvy and therefore funding is no longer needed for the continued offering of computer application and concepts courses. So many departments are having to look at alternatives to the traditional instructor led, 3 credit courses. This session will discuss three models currently in use and will appreciate input from attendees as to what others are doing.

### **Online/Self-Paced**

The online/self-paced model has been used at one university for over 10 years. It was first proposed during severe state budget cuts. At that time, computer literacy and Office applications were being taught solely by adjuncts in 5 week courses with multiple sessions of up to 7 different courses taught during the semester. Traditional letter grades were given. The administration felt that these courses was no longer needed since students were being exposed to those skills in high school. Plus the feeling was that the only reason students took them was to boost their GPAs. So the decision was made to not offer them in the fall and the adjunct faculty were told they no longer had jobs.

However, it was soon realized that some other departments at the university had these courses listed as degree requirements so if they were going to continue to offer the courses, what other model could they use that would still give academic credit but not

impact the budget so heavily. Online/self-paced/pass-fail was decided upon and a graduate student and one adjunct were hired to get the program started.

Online was new and the publishers were all coming out with programs that provided online training and assessment at different levels. Without those online programs, this model could not have worked. It was also felt that being pass/fail and no longer GPA boosters, the registrations for these courses would eventually go away.

That was not the case at our university. The numbers have actually grown to more than the pre-online numbers though all courses are taught by one full-time faculty member so the move was successful as far as reducing budget costs.

### **Emporium Model**

In an emporium, students work at their own speed using resources that fit their needs, learning styles, and schedules. A variety of materials covering the same learning goal is available. The differing materials provide parallel pathways to successfully mastering the learning goals. The Emporium allows students to choose learning materials depending on their learning style; and then work through the materials successfully. A majority of the work for a high performing student may be completed on-line. Students may freely work ahead and complete their module in advance of the scheduled calendar, thus freeing study time resources for investment in other classes.

The Emporium model improves student success because resources are employed to identify at-risk students and provide individualized assistance. An identified at-risk student receives email, text, and phone messages from the instructor or peer tutors requiring the at-risk student to come to the emporium facility for remediation. Should the student not respond Starfish or a similar system notifies advisors, coaches or counselors.

This method of course delivery uses a staffing model combining faculty, GAs, peer tutors and others who respond directly to students' specific needs and direct them to learning resources. Faculty roles migrate to a "guide on the side" model and away from the "sage on the stage" model of instructional delivery. Three years ago this model tested the peer tutoring model during iSchool delivery of the class. Students responded positively. Emporium delivered instruction in other disciplines indicates that students benefit from individualized instruction.

### **Course Flipping**

This method of course delivery relies heavily on technology to facilitate, monitor and provide intervention (when needed) to students. Flipping the classroom forces students to perform the majority of their course work in an independent study closely monitored using technology. For example, faculty can spend less time on assignments and more time on broadening skills outside of the assignments including tips/tricks that might not be covered in the textbook assignments. Faculty still have face-to-face contact with students so budgets are not necessarily reduced. However, the technology used helps

to inform the instructor of classroom delivery so that the class time optimizes student learning and successful outcomes.

### **Online products**

All of these models have become viable because of the development and support of online training and assessment packages from the major textbooks publishers - SAM (Cengage), MyItLab (Pearson) and SimNet (McGraw-Hill). Designed to be used with either hard copy textbooks or etexts, these online products provide simulations that work as though live in the application. They provide training modules and grading of those modules. They also now provide chapter projects and some even give faculty the opportunity to create and upload custom projects. And embedded in the projects are measures to detect cheating. In addition there are linked gradebooks within the product and/or downloads are possible to other course management systems such as Blackboard.

### **Digital Literacy courses – Are they still needed?**

Faculty who teach the Office application computer concept courses still see a real need for digital literacy courses. As stated earlier, today's students are literate in many digital skills but not as knowledgeable on how to use those skills in a professional world. Many employers state communication skills are essential in their new hires. Digital literacy courses will help to fill the need to communicate both in a written format and in presentations.



## **Encouraging the Proper Communication Skills for Our Students**

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### **ABSTRACT**

The session will emphasize the importance of including communication for our graduates and the importance of making effective communication a part of each class. This may include communication focused activities but also includes being an example of effective communication. The session will encourage attendees to participate and enter into discussion about the points made.

### **INTRODUCTION**

Faculty providing classroom instruction are expected to be experts in their field of study. They have studied in their discipline for years to be able to garner the respect of their peers and the students they instruct. Very few have performed the functions required by the jobs that their students will obtain after they graduate. Their tendency is to provide the students with the knowledge about the academic discipline and to communicate that knowledge in a way that is similar to the way they received it from their instructors. Their academic preparation most likely did not include any preparation on how to communicate effectively in the classroom. As such, the instructor does not serve as an effective role model for the students relative to making a professional presentation that will be clearly understood by the target audience.

### **IMPORTANCE OF COMMUNICATION IN ANALYSIS FOCUSED CLASSES**

The American Statistical Association is creating four courses covering the topics of Presenting Skills, Influence and Leadership Skills, Personality Training and Team Building, and Career Planning. Robert Starbuck [5] reports that this is because “these topics are not routinely included in academic degree programs.” In this article, W. Scott Clark, a senior director at Eli Lilly and Company, refers to the Eli Lilly leadership development program saying, “Because of our leadership development, I’ve seen big changes from even some of my experience staff. Their conscious efforts on communication skills and improving their influence on senior leaders have really made a difference.”

Analytics and the use of Big Data are receiving a great deal of attention in the business arena. However, Kristian Hammond [3] states, “We will need systems that not only perform data analysis, but then also communicate the results that they find in a clear, concise narrative form.” This emphasizes that the usefulness of data and the analysis of that data are no better than the ability to effectively communicate the findings in a clear and concise way to a decision maker so that the decision maker feels confident in using the results to make a better decision. The bottom line value of an analysis depends on the final story that is told to the decision maker. In this process of analyzing data, it is important to get good data and have good analysis skills but a great analysis of pertinent data is no better than the ability to communicate the findings to decision maker so that it can lead to a better decision. This is another illustration of the commonly use idiom, “A chain is no stronger than its weakest link.” Unfortunately for many faculty our weakest link, and consequently that of our students, is the ability to communicate effectively to the target audience.

Hahn and Doganaksoy [2] reported on “Traits of a Successful Statistician” based on the experience of practicing statisticians. Several of these traits included things that are typically taught in statistics classes, but they also included communications and related skills that are typically not taught in statistics classes. Specifically they state, “You must speak the language of your customers and not expect them to be proficient in yours. ... You have to get across key ideas, conclusions, and recommendations succinctly and effectively in one-on-one or small-group settings, more formal presentations, and written communications. The ability to be quick on your feet is an important part of communicating effectively.”

Andrews, Custer and Gilbreath [1] reported on the faculty effort at Virginia Commonwealth University to identify a set of necessary skills for business analytics. Based a series of discussions with and feedback from analytics professionals that included representatives from IBM and Capital One, they ended up with a final essential set of five general skills. These skills were:

- Work in a collaborative environment.
- Translate a specific business question into a problem that can be solved using appropriate data.
- Acquire and organize appropriate data so that it can be used for analysis.
- Know general principles and common tools and be able to apply them to analyze specific business problems.
- Develop and effectively communicate an actionable solution for the specific business question.

Of these five essential skills the first two and the last two involve the ability to communicate effectively.

David Rodgers [4] makes comments mainly in reference to masters’ level in quantitative areas saying that students “need versatile and flexible skill sets that will not only make them employable but keep them employed. It is our duty to not only teach concepts, modeling, algorithms and solution approaches but also to emphasize communication, teamwork, interpersonal skills and applications to real-world projects. The most important of these are communication skills, and short of not offering classes in such, we can emphasize written proposals, final reports, interpersonal oral communication, and presentations skills. We can

stress appropriate virtual communication, e.g., e-mail, texting or instant messaging.” However, we believe that this statement can be made for students in undergraduate programs and for virtually all academic disciplines. He summarizes his comments on the importance of communication skills with a clear and succinct statement with which we wholeheartedly agree. “Nothing else much matters if it cannot be communicated coherently, succinctly and with confidence.”

### **REPORT ON AN EXERCISE INVOLVING CLASSROOM PRESENTATIONS**

This is a report of the personal experience of Dr. Robert Andrews. I wanted to give my students experience presenting to an audience that did not have the same level of knowledge as the presenters. Often students present to their classmates, who have the same knowledge about the class material. During the spring semester of 2013 I had two classes that met back-to-back on the same evening. My graduate introductory statistics class, had taken a quiz and some people did not do as well as they had hoped so there was a request for an extra credit assignment. The second class, an applied multivariate statistics class, was studying factor analysis and I wanted to give them an assignment having teams of students performing a factor analysis on a set of data with 21 variables. At the same time I wanted to give them experience presenting to an audience that did not have the same level of knowledge as those presenting. I gave them an assignment to report specific recommendations and factor analysis results in three-person teams. An additional component of the assignment required them to prepare a presentation to summarize their findings to present to an audience whose knowledge level of statistics was an understanding of basic statistics such as the mean, standard deviation of variables along with correlation and simple linear regression between variables. They were told that those in the audience would judge the presentation based on how well they understood what was presented.

The introductory class was given the opportunity to earn extra points by doing a short report based on the mean, standard deviation of the 15 variables and all possible correlations between the variables. In addition, they had to attend and evaluate the presentations of the other class. Having them perform the descriptive analysis for the same data set eliminated the need for using part of the presentation time for describing the data. 11 students from the introductory class choose to do the work for the extra credit, including attending the presentations.

I asked the 11 introductory students to rate each team and then asked them to tell what was the most compelling factor for assigning the best ranking. These responses are summarized below in Table 1 with the bold face font added by me to highlight points I thought were particularly important.

**Table 1: Summary of Student Responses to the First Question**

<b>What was the most compelling factor for assigning the best ranking?</b>
<b>Boiled down concepts in understandable way;</b> they did not over-explain; "less is more..."
I understood the problem as they took me through it. <b>They told the story from beginning to end and allowed me to follow it.</b> Had they gone first, I would have understood the problem much better as the other groups presented.
Group 4 was <b>personable, organized, knowledgeable and comfortable with presenting the information</b> and to an audience. I enjoyed their presentation because it was easier to understand.
<b>Bringing the data back to non-statistical terms</b> makes the info easier to understand. Instead of just stating a number they explained what that number meant.
How <b>comfortable</b> they were <b>with</b> what they were <b>presenting</b> . And the knowledge of what they were trying to explain
Spoke clearly, and seemed like they knew what they were talking about, used <b>great examples</b> , explained in <b>laymen terms</b> .
Felt they hit all the targets. Did very well in explaining the information. Offered <b>great visual aid</b> .
<b>Tell the whole story of the presentation with a conclusion.</b>
The <b>ability to understand the content</b> and how well the group performed as a whole
1) How the group/s knew the purpose of the data. 2) How the group/s, being well-informed, if they were, knew how to handle and present the data. More importantly 3) How they <b>integrated their statistical knowledge with explaining the data.</b>
<b>Explanation of the analysis at a level I could understand.</b>

Similarly I asked them to tell what was the most compelling factor for assigning the lowest ranking. These responses are summarized below in Table 2 with the bold face font added by me to highlight points I thought were particularly important.

**Table 2: Summary of Student Responses to the Second Question**

<b>What was the most compelling factor for assigning the lowest rank?</b>
No real direction - jumped right into data - did not setup what they were talking about - didn't <b>take a 30,000 foot view</b>
Not that they didn't know the material, but they <b>just didn't get the story across. I didn't understand any more when they finished than when they started</b> about what their task was, let alone how they solved the problem. The difficulty is that some people regardless of how they understand material, they have inherent personality issues that make them most uncomfortable with presentations. I noticed that even though the <b>English language was a barrier for most of the groups, group number 4 had the same issue and overcame the English language barrier with great visuals and an extraordinarily well organized presentation.</b> It requires <b>more practice with story-telling</b> than just understanding the material.
The presentation was organized, professional and clearly stated the direction/goal of the assignment.
Clarity of info.
Knowledge of what was presented.
Well organized and able to follow throughout presentation without getting lost. Seemed to be very knowledgeable about what they presented
<b>Didn't show their conclusion.</b>
<b>My ability to think back and recall something that I learned/remembered</b> from each section being ranked
The completeness as to how they conveyed this information. For example, the first person in group 3 was, I thought, the overall best. With that said, group 4 gave the best presentation, because I found it concise, informative, and deliberate. For example, they defined the statistical terms as they were used, unlike that of group 2.
<b>Delivery of the presentation and ability to understand what was being presented.</b>

This was definitely a good learning experience for the applied multivariate class and in addition to the extra points all indication was that it was a good experience for the introductory class. It was certainly an eye-opener for me. I was disappointed in how poorly the majority of the groups did in using their analysis to tell a story that the intended audience could understand. I clearly need to work on doing a better job in the future of working on developing the communication skills of my students and continuing to develop their problem solving and quantitative skills.

### SUMMARY

Our academic classes mainly focus on the specific academic area and do little to work communication skills that will most likely be more important for the future success of the student than knowledge of the specific academic area. For the sake of our students we need to do to assist them with development of their communication skills no matter how important we think the knowledge of our academic discipline is to the students. We endorse with confidence David Roger's statement, "Nothing else much matters if it cannot be communicated coherently, succinctly and with confidence."

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# ALLIANCE MANAGEMENT; A PROGRESSION TOWARDS SUSTAINABLE HIGH PERFORMANCE PARTNERSHIPS

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## ABSTRACT

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The current state of business partnerships leaves something to be desired with numbers topping 70% failure rates, it would make one wonder why a successful organization would want to partner up with others, for fear of failure. The research covered in this report is comprised of one main area, which is Organizational Behaviour. That of High-Performance Organizations and their business process and the partnering and partnership management element found in the area of Strategic Alliances, known as Alliance Management. Recently the areas of High-Performance Organization have formed their own strategic alliances known as High-Performance Partnerships (HPP's). The proposition of this paper is to support the creation of an alliance management function in High Performance Partnerships to form Sustainable High Performance Partnerships or a (SHPP) "Ship".

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<sup>1</sup> Word Count is of all pages, including Title Page, Abstract, References, Figures and Tables

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## OVERVIEW

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Business organization trends of the late twentieth century and the current twenty first century have seen a move towards High Performance Organizations (HPO's). HPO's are organizations that have been modified to deliver superior results i.e. longevity and revenue, compared to their competitors. Total Quality Management (TQM) seems to lie at its core, dedicated to improving long term success through customer satisfaction. Even though there are many structures and or processes developed recognizing elements and characteristics of HPO's all seem to agree that people (employees) are their greatest asset or element. One of the best definitions of what an HPO is provided by, Dr. André A. de Waal MBA, "A High Performance Organization is an organization that achieves financial results that are better than those of its peer group over a longer period of time, by being able to adapt well to changes and react to these quickly, by managing for the long term, by setting up an integrated and aligned management structure, by continuously improving its core capabilities, and by truly treating the employees as its main asset." (de Waal, 2007) Dr. André A. de Waal is also attributed to being the creator of the "HPO framework" and "The 5 HPO Success Factors", with its' "35 HPO aspects", (hpocenter.com, n.d.) outlined and referenced later in this paper. "An HPO is an organization that concentrates on bringing out the best in people... HPOs give employees the tools to empower themselves and make valuable contributions to the organization. Organizations who strive to maintain being an HPO also respect and encourage diversity. They recognize diversity is also an asset and the differences in backgrounds foster innovation and creativity, adding value." (Goessl, 2008).

Another emerging trend in today's tough economic times is a partnership, which is the partnering up of two or more organizations as allies to form a common goal. This partnering is generally known as a Strategic Alliance (SA). Strategic Alliances typically have 4 to 5 stages; "Selection, Negotiation, Implementation, and Evaluation (Jiang, Li, & Gao, 2008)with termination as a possible fifth stage, this is when the strategic alliances have met their objectives or goals or are no longer able to meet them. SAs are also classified in to four types these are; Joint ventures, equity strategic alliance, non-equity strategic alliance and global strategic alliances. In this study we will be looking all the types with the exception of the non-equity strategic alliance. Since revenue will be the key factor used to determine success and to save time this will be limited to publicly traded companies.

As more HPOs emerge some have recognized the need and profitability of forming partnerships in what is known as a High Performance Partnership (HPP)," it is not enough if the individual chains become HPOs, but that the links between the chains must also be HPOs. In other words, a High Performance Partnership (HPP) must be created." (HPO Center, 2012)This could be considered a form of Strategic Alliance (SA). The problem with SAs is that according to studies their failure rate is somewhere in between 30% and 70% (Bamford & Gomes-Casseres, 2002) and termination rates around 50% (Lunnan & Haugland, 2008). This leads us to a seemingly paradoxical situation, if the intentions of the partnerships or alliances are formed with success in mind, why do so many fail?

This is where we have to look at the most obvious area of the partnership and that is the management of said alliance. This is covered in an element of Strategic Alliances known as Alliance Management (AM) and is the focus of this paper, specifically forming a dedicated alliance management function, either individual or group that maintains its focus on the operations and success of the partnership. With this function in mind we will venture to posit the following propositions.

*Proposition 1:* Both High Performance Partnerships and Strategic Alliances that maintain a dedicated Alliance Management Function will outperform financially and have a longer lifecycle than those that do not have a dedicated AM Function over time.

*Proposition 2:* That the formation of a True Sustainable High Performance Partnership (SHPP) will need to establish the following life evolution or progression:

1. All partners must be recognized or characterized as High Performance Organizations.
2. These partnerships must also be considered Strategic Alliances; Complimentary, Compatible and Committed.
3. They must establish a Dedicated Alliance Management Function either individual or group that is dedicated to the partnership and unbiased in its management decisions, not showing preference to any particular partner in the alliance.

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## INTRODUCTION AND BACKGROUND TO THE TOPIC:

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The background for this research is comprised of, one main organizational behaviour, that of High-Performance Organizations and two business processes, partnering and partnership management as found in the areas of Alliance Management stemming from Strategic Alliances and High-Performance partnerships stemming from High-Performance Organizations. The Table found at the bottom of this introduction has separated the literature for this report and citations for ease in separation of the information presented.

### High performance organizations (hpo's)

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The best way to introduce this topic and its theoretical design is to look at its background which receives its roots from research in High Performance Organizations that is a Performance driven organization. HPO's are generally recognized by their characteristics rather than self-proclamation it is an organization built by focusing on the people (employees) rather than the processes. "High-performance companies are the role models of the organizational world. They represent real-world versions of a modern managerial ideal: the organization that is so excellent in so many areas that it consistently outperforms most of its competitors for extended periods of time." (Overholt, Dennis, Lee, Morrison, & Vickers, 2007) HPO's are the centrepiece and driving factor behind the literature and research outlined and entailed in this report.

### Partnering

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The next area of research moves in to the partnership phase of organizations for the purpose of this paper the focus is on two main areas, Strategic Alliances and High-Performance Partnerships. "Strategic Alliances are groups of organizations—non-profit, for-profit, and public—voluntarily working together to solve problems that are too large for any one organization to solve on its own." (Wohlstetter, Smith, & Malloy, 2005) SA's usually collaborate to create a need or service in a particular industry. They form these alliances when they know that it may not be too great of a risk to attempt these projects alone. More often than not these are cross-sector strategic alliances where a company or organization may not have the experience, know how or ability to promote or provide a particular product or service they want to offer. For example "In February 2001, The Coca-Cola Company and Procter & Gamble announced a \$4.2-billion (all currency in U.S. dollars) joint venture to use Coca-Cola's huge distribution system to increase reach and reduce time to market for the P&G products Pringles and Sunny Delight." (Gonzalez, 2001) "Alliances are widespread in today's business landscape. In the face of growing competition, the high rate of technological change and discontinuities within most industries, firms pursue a large number of alliances to access new resources, enter new markets or arenas, or minimize their risk. Yet there is a paradox: They frequently fail to reap the anticipated benefits of most of their alliances." (Kale & Singh, 2009). The reason that they fail to reap these benefits concerns the alignment of the parties. It is not "if" this alignment will break

down but more about “when” it breaks down and having a strategy in place to correct this alignment. If this is not corrected this is what causes the termination of the alliance and contributes to the overall staggering percentage of failure previously mentioned.

Another area of partnership and could be considered a form of Strategic Alliance is the High-Performance Partnership (HPP). An HPP is a partnership that is formed from two or more HPOs. “When an organization is hard at work transforming into a High Performance Organization (HPO), sooner or later the time will come when the quality of the value chain in which the organization operates will become important. After all, if the suppliers and buyers are not HPOs, the quality of the organization will be offset in full or in part by the poorer quality of the other partners in the chain. The result is that the end buyers (consumers) can never be served as effectively as possible. That is why it is important that not only the organization, but also its value chain, operate integrally at a higher level. This means that it is not enough if the individual chains become HPOs, but that the links between the chains must also be HPOs. In other words, a High Performance Partnership (HPP) must be created.” (HPO Center, 2012) In order to be considered an HPP the organizations must first meet the requirements and elements ascribed to being an HPO by achieving performance driven results and placing people first. “A high-performance partnership has two essential dimensions. First, it must have a structure for the individual organizations to share authority, resources, and accountability for achieving a mutually decided goal. Some reorganization, merger, or redefinition of authority and responsibility takes place when the partnership is formed. Second, it must produce significant results. So, the second dimension takes the partnership to a higher level. A partnership is defined by its organizational structure and approach, while a high-performance one is defined by what it produces. A high-performance partnership does not necessarily begin as a sophisticated operation. It can develop incrementally from less intensive forms of collaboration.” (Barnett, Becker, Goldberg, Hale, Melendez, & Rogers, 2003)

### **Partner management**

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The next and most critical area of the partnership is the management of the partnership. It is both the key driver to success and the largest element of failure. “Conflict in any alliance is inevitable. It is not the fact that it occurs that is a problem, but rather how it is dealt with and resolved. A conflict-management process is an important element of alliance management.” (Gonzalez, 2001) This strategic alignment within conflict management of the partners is one of the most difficult areas to overcome.

In an HPP the necessity is that the management of the partnership must be high performance as well, but it does not necessarily elaborate or designate, other than attributes as to how this will be achieved. “The following HPP factors determine whether that the collaboration is high performing:

- **Control:** supervising one another openly and honestly and confronting each other regarding performance.
- **Trust:** the expectation that the other will not behave opportunistically but will continuously consider mutual interest.

- **Involvement:** the interest and willingness to develop a long-term relationship.
- **Coordination:** tailoring one's processes to those of the other in order to improve joint performance.
- **Dependence:** mutual dependency that occurs when both parties invest an equal amount of time and money in the relationship.
- **Communication:** continuous and effective communication to ensure that both parties are always informed.
- **Conflict handling:** quickly and adequately resolving conflicts that can and do occur in any type of relationship.
- **Diversity:** recognizing and appreciating the uniqueness of the other party."

(HPO Center, 2012)

While these "factors" are crucial to overall success a strategy or formal outline as to how this will be achieved during the life of the partnership must be formed to ensure that these are met.

In the area Strategic Alliance a possible solution to this "critical area" may have been found in the form of an Alliance Management Function (AMF) that is formed from either individuals or teams from each organization, from a completely separate third party organization that manages the alliance or both. The advantage of having a third party management is that they approach this partnership as a dedicated and unbiased function allowing the other organizations to focus on their particular goals while the AMF is allowed to dedicate itself to the success of the partnership. One of the greatest assets of this third party AMF is that it approaches this partnership with everyone in mind and without any presupposed positions or agendas other than making the partnership work. The only possible downfall to third party AMF is the cost and how that is distributed among the partners involved. However, this may be a necessity cost to ensure the long term success of the overall Partnership. Research would also seem to support this statement which will be elaborated on in the body of this paper. "An alliance strategy is most effectively developed jointly by the business team and an objective third party, whether the latter is an external consultant or part of the organization." (Gonzalez, 2001)

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### **THE CURRENT STATE OF PARTNERSHIPS**

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The current state of partnerships leaves something to be desired with numbers topping 70% failure rate. It would make one wonder why an organization would want to partner up with others in the first place simply because of the fear of failure. So the next logical question or step is to look at the percentage or the sample of those who do succeed and find out what it is that makes their partnership successful. In the next area of this article we look at some of the reasons why partnerships fail. While there is no cure all or exact recipe for success it is likely by sampling and identifying the characteristics of failures and success it will lead to a greater understanding and set a foundation for those looking to succeed as partners in the future.

First to look at the reasons partnerships fail, in my studies I have identified a few key areas that can be identified as;

### **Partnerships that have developed too quickly**

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This problem can be identified when two heads of organizations cross paths and after meeting at a conference or playing a round of golf have decided to partner up in a venture with no clear direction or strategic plan. Just because you both run very successful organizations does not mean that you should partner up, there should always be an end goal in mind or purpose for the partnership.

### **Secret agendas or conflicts of interest**

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Some organizations will partner up with others to build their reputation or clean up a tarnished one. Others may do so to obtain proprietary information such as technologies, patents, processes or client information. Either way these partnerships do not usually end a good note and usually end in some type of legal conflict.

### **Power struggle**

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This is another toxic mix to look out for when there is no balance of power. One organization may feel that they are the reason for the partnerships existence and may feel because of the reputation or name associated with their organization that they should lead the partnership. Organizations should strive to have all parties and interests represented, with a fair and balanced approach to conflict resolution.

### **High expectations and unfulfilled promises**

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Difficulties arise when one organization expects too much out of another, and of course the flip side of this coin, don't promise more than you can deliver. In order to keep this from happening guidelines must be set as to the expectations of each partner with periodic updates to ensure that goals are being met.

### **Lack of communication**

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This by far is the underlying theme and possibly the biggest threat to a partnership. If partners are not kept current on the state of the relationship this is where the partnership starts to fall apart. Communication with trust is the glue that will hold a partnership together, without these two essential elements a partnership will never succeed.

### **Lack of leadership**

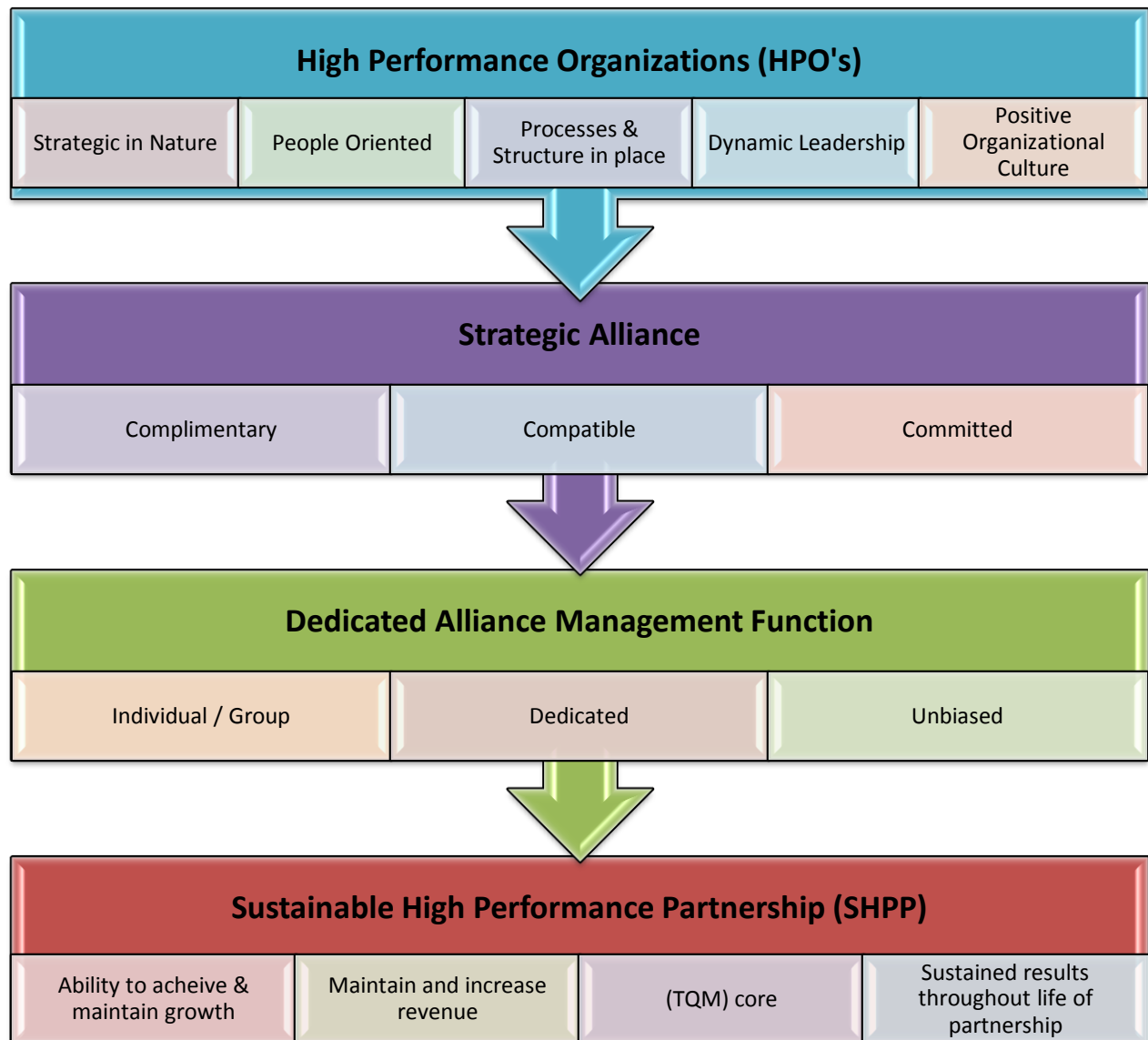
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This is probably the most detrimental flaw it falls on the heels of lack of communication and is strongly related to the power struggle. Since most of the people involved with the partnership or at least at the high levels are managers they sometimes form an elitist mind-set. This mind-set as a manager is the "I know what's best!" syndrome, and creates "glass doors" for those involved. "And in most cases, these managers will really believe what they are saying. What they don't realize, however, are the many invisible barriers — the "glass doors" — they put in place. Leaders remove these barriers and that is part of what separates them from managers... Leaders put a real effort into listening to and learning from people throughout their organization. Listening is the clearest way we can show respect and build trust." (Clemmer) Leadership of the partnership is key and the main reason for the need or creation of an alliance management function.

## METHODS: THE FORMING OF THE SHPP

The next logical step is to look at how this Sustainable High Performance Partnership might possibly be formed. The accompanying progression attached will also serve as a simpler means of explanation.

FIGURE 1: THE PROGRESSION TO AN SHPP





## HPO'S

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To begin with all parties involved in the alliance must be recognized as HPO's. In order for an organization to meet this standard they must meet the five factor test as outlined by one of the leading authorities in the field, PhD. André A. De'Waal and the founder of the HPO Center. The five factors also recognize 35 characteristics intertwined throughout.

The five HPO factors are:

1. **Management Quality.** In an HPO, belief and trust in others and fair treatment are encouraged. Managers are trustworthy, live with integrity, show commitment, enthusiasm, and respect, and have a decisive, action-focused decision-making style. Management holds people accountable for their results by maintaining clear accountability for performance. Values and strategy are communicated throughout the organisation, so everyone knows and embraces these.
2. **Openness and Action-Orientation.** HPOs have an open culture, which means that management values the opinions of employees and involves them in important organizational processes. Making mistakes is allowed and is regarded as an opportunity to learn. Employees spend a lot of time on dialogue, knowledge exchange, and learning, to develop new ideas aimed at increasing their performance and make the organization performance-driven. Managers are personally involved in experimenting thereby fostering an environment of change in the organization.
3. **Long-term Orientation.** An HPO grows through partnerships with suppliers and customers, so long-term commitment is extended to all stakeholders. Vacancies are filled by high-potential internal candidates, and people are encouraged to become leaders. The HPO creates a safe and secure workplace (both physical and mental), and lays-off people only as a last resort.
4. **Continuous Improvement and Renewal.** An HPO compensates for dying strategies by renewing them and making them unique. The organization continuously improves, simplifies and aligns its processes and innovates' its products and services, creating new sources of competitive advantage to respond to market changes. Furthermore, the HPO manages its core competences efficiently, and sources out non-core competences.
5. **Workforce Quality.** An HPO assembles and recruits a diverse and complementary management team and workforce with maximum work flexibility. The workforce is trained to be resilient and flexible. They are encouraged to develop their skills to accomplish extraordinary results and are hold responsible for their performance, as a result of which creativity is increased, leading to better results.

(Oriij, van der Veer, & de Waal, 2010)



Once the factors have been recognized and an organization can be classified as a high-performer it is understandable why these positive results can be sustainable. “High-performance companies are the role models of the organizational world. They represent real-world versions of a modern managerial ideal: the organization that is so excellent in so many areas that it consistently outperforms most of its competitors for extended periods of time.” (Overholt, Dennis, Lee, Morrison, & Vickers, 2007)

Some other areas that I have observed in my research, would be that these organizations must also be;

- **Strategic in Nature-** Organization’s must have a strategy in place and “walk the talk”. This should be evident in their vision and mission statements.
- **People Oriented-** focused on the most important people in the organization the customer and the employees that interact with them. Remembering that even if you are not a service oriented business your employees may still have networked interaction with potential customers
- **Processes & Structure in place-** Having a written plan and outlined guide for different levels of the organization to maintain the continuity of their objectives.
- **Dynamic Leadership-** Effective leaders that motivate and positively affect the organization and those they work with.
- **Positive Organizational Culture-** Values & beliefs of the employees align with those of the strategic mission set in place by the organization.

### **Forming a strategic alliance**

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The next phase of the partnership is to form strategic alliances with a partner or partners. These strategic alliances are generally formed when an organization has reached a point in their process that they cannot undertake without significant investment. Rather than invest heavily in time and resources they will tend to partner up with another organization(s) that may be better suited for this process or next step. “Strategic alliances are groups of organizations—nonprofit, for-profit, and public—voluntarily working together to solve problems that are too large for any one organization to solve on its own.” (Wohlstetter, Smith, & Malloy, 2005)

Three factors seem to be prevalent in the forming of these alliances, those involved must be;

- **Complimentary-** In other words you are both needed to make a particular project work, because your strengths make up for their weaknesses and vice versa. “Partners with available financial resources can help an organization begin, grow, or significantly innovate programs. They can also serve as coping mechanisms through which to forestall, predict, or absorb uncertainty and achieve reliable resource flow and exchange.” (Wohlstetter, Smith, & Malloy, 2005)
- **Compatible-** Compatibility will have more to do with organizational culture for this intended study all partners must be HPO’s. “The key is to determine if both

organizations are strategically aligned and culturally compatible. A Joint Strategy Session where both (or multiple) organizations articulate their vision and strategy will determine if the organizations are strategically aligned. It will also become clear whether all parties have like ambitions and are culturally compatible.” (Gonzalez, 2001)

- **Committed-** Probably the biggest factor in the alliance is that these partners must be committed in order for the alliance to be both sustainable and successful. “Firms are committed to an alliance relationship by contributing specific resources and capabilities. Commitment signals a firm's loyalty to the alliance as well as to the partners. It demonstrates a long-term orientation in maintaining the collaborative relationship long enough for partners to realize their benefits.... By contrast, if a firm is not committed to the alliance, it is less likely to cooperate closely with its partners. As a result, the lack of commitment on the part of either partner will become a destabilizing factor.” (Jiang, Li, & Gao, 2008)

The idea of being, complimentary, compatible and committed stems from the formation phase outlined by (Kale & Singh, 2009)

### **Forming the alliance management function**

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The next area we move to is the formation of the Alliance Management Function AMF. “The purpose of alliance management is to minimize the risk of failure of a partnership due to management complexity... Alliance Management is a philosophy – a way of thinking – enabled by a set of policies, processes, and tools. It is also a profession and a corporate function, requiring a defined vision and mission, structure, goals, and metrics.” (Twombly & Shuman, 2010) This role if correctly diagnosed is the main reason for success and supporting research associated with this project.

The Alliance Manager(s) represent the alliance itself. Their primary function is to support the alliance and ensure that it is successful. “The goal of the alliance manager is not to create harmony but to create a sense of dynamic tension... Think of the cathedral at Notre Dame with its flying buttresses. The equal and opposing pressure keeps it up. That is the basic architecture inside the alliance. An alliance manager must create a situation where all the different forces push inward and they are so strong that they create stability, provided, of course, they are all vectored in the right direction.” (Ranf & Todărița, 2009) They serve as an advocate for all those involved and are essentially the process through which the alliance operates. One of the unique features of the alliance manager is their impartial nature this needs to supplement their dedication to the partnership. As a third party they come into the alliance generally free of prejudices or biasness to a particular partner involved. A legal background is generally helpful tool but not necessary for the alliance manager, since most of his time will be spent in negotiation and is the instrument through which arbitration is achieved. The alliance manager should however have both experience and education in the particular field of which the alliance pertains. They will be the head diagnostician for the health of the alliance, they will know about problems or differences that may arise generally before anyone else in the partnership.

Open communication and interaction with all involved is a key area or function where the alliance manager must excel. This helps create the cohesive synergy the partnership will need to survive. Ranf & Todărița explain in their article how an alliance manager must be able to operate at three different levels, “These levels are inter-organizational, inter-organizational, and interpersonal. On the inter-organizational level, the alliance manager must balance the needs, resources, and desires of each of the partner companies. On the inter-organizational level, alliance managers must manage the needs, resources, and desires of each of their own company. On the interpersonal level, the alliance managers must manage relationships with superiors, peers, and subordinates, not only in their own firm, but also across boundaries of their various partner organizations.” (Ranf & Todărița, 2009)

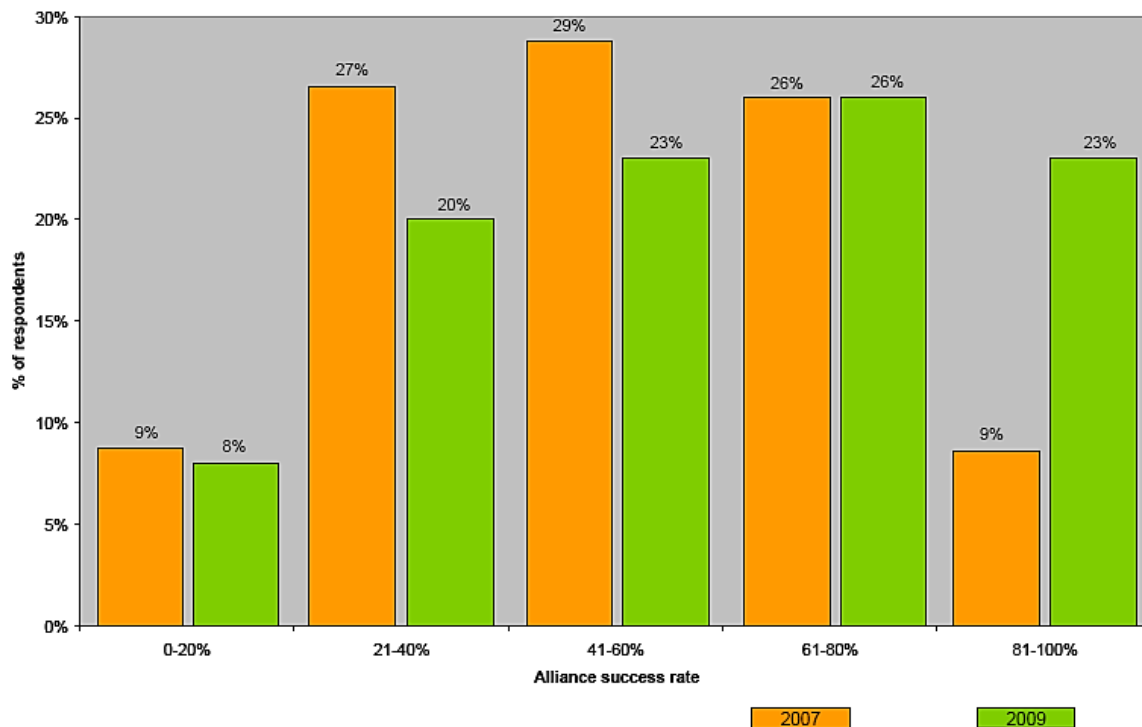
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## DATA ANALYZED

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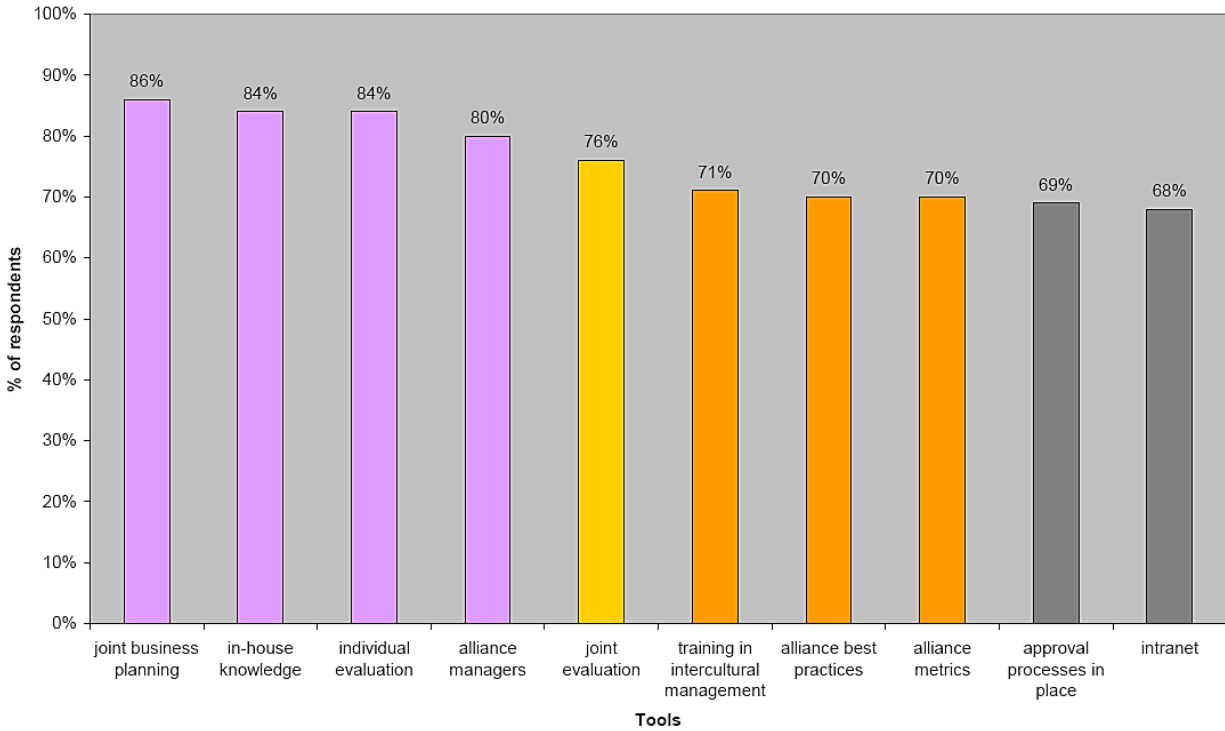
The Third State of Alliance Management Study | 2009, performed by Maastricht University has some of the most compelling evidence for the support of this theory that the secret to success and sustainability is the alliance management function.

FIGURE 2: ALLIANCE SUCCESS RATES IN 2007 AND 2009



(Figure 2) Shows that 23% of the companies now have alliance success rate of more than 80%, compared to 9% of the companies in 2007. However there remains a small group of companies (8% in 2009 versus 9% in 2007) that is unsuccessful. Their Alliance success rate lies below 20%. The Increase in success rate has mainly been achieved by companies moving through the successfully categories step-by-step, Rather than jumping at once from a low to a high success rate. Growing experience backed up by investments in alliance management tools (Figure 2) and processes make companies successful. The first important result of this study is that the alliance success rate has increased to 57%. In the earlier studies the success rate was around 50%. The increase could have been expected based on the previous study, which showed that investment in alliance management had increased substantially in 2007. In 2009 Companies are reaping the fruits of the investment. (NSI/Universiteit Maastricht, 2009)

FIGURE 3: THE TOP 10 MOST FREQUENTLY USED TOOLS



(Figure 3) shows which alliance management tools were the most implemented. Except for some minor differences, this list is the same as in 2007. This is an indication that companies have not radically changed their investment in the number and type of management tools and processes they invest in. The least used tools were: alliance management as a part of the management development program (36%), gatekeepers (35%), culture programs (30%), financial experts (27%), and mediators (13%) (NSI/Universiteit Maastricht, 2009)

## **Limitations & further directions for proposed research**

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There have been certain limitations or barriers in the research conducted. Mainly being that of time to compile sufficient organizational and financial data to prove a hypothesis hence the reason for propositions earlier in the paper.

The suggested route or experiment to prove or disprove these propositions would be to;

1. Research and find business partnerships or Strategic Alliances.
2. Of those samples, establish those that can be considered both High Performance Organizations & High Performance Partnerships.
3. Of those selected that would be considered High Performance Partnerships or HPPs, establish how the alliance was managed, particularly whether or not an Alliance Management Function (individual or group) was present.
4. Once the presence or non-presence of the AMF could be established test for:
  - a. Whether or not the partnership is on-going or has it been terminated?
    - i. If terminated or ended
      1. How long was its lifecycle?
    - ii. Did the partnership achieve its' end goal, mission?
  - b. Observe selected financial ratios.
    - i. Profitability
    - ii. Liquidity
    - iii. Debt
    - iv. Market (if publicly traded)
5. Determine statistical significance of whether or not the AMF played a key role in the success and sustainability of the partnership

## **Implications / significance of the study**

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It is my hope or belief in the implications and importance of this study to progress in the field of business research and attain a better understanding of organizational behaviour as it pertains to maintaining and establishing a successful and sustainable business partnership.

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## **CONCLUSION: WHY THE NEED FOR AN ALLIANCE MANAGEMENT FUNCTION**

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The alliance manager may be more easily viewed as a coach that gets his team working together. “Attitudes and knowledge, while the foundation of effective alliance management, are not sufficient to guide alliances to consistent success. Top performing alliance managers also act as great coaches to all parties in the alliance.” (Seidman & McCauley, 2005)

As an analogy consider the coaches of the NFL all-star teams for the Pro-Bowl. Every person on their team is a leader hence their all-star status, most likely they have spent the entire season in the spotlight for their respective teams. Now in this final game of the season they are a star amongst stars and will need to work together with other “stars” in order to bring their side (AFC or NFC) the victory. I’m quite sure that most of these players, even though modest and humble in interviews have their own idea of how things should work, after all it was their “high performance” that got them where they are.

Now they must form new alliances and a team in order to achieve a common goal. However forming a team is not enough, someone must lead. As a team these guys could probably go out on the field and play football and possibly win, without the leadership and perspective of a coach, but the question would still remain, who leads? On the offensive side, is it the Quarterback, wide receiver, center or the tight end? Or how about on the defensive side one of the line-backers, defensive end, cornerback or how about defensive tackle? Any one of the players probably could take the leadership role but there is no doubt that this could result in some contention between players they only have a narrow view of the playing field and cannot focus simultaneously on all other positions, their main objective is to focus on the area where they excel. If this team were to take the field without a coach and only one of the players as a leader, and the other side did have a coach to guide and lead their team, then there would be no question that this would more than likely be a very one-sided football game.

The next scenario involves being able to manage all of these leaders to victory & deciding which ones will play as starters, reserves and alternates, because not everyone can be in the game at the same time. This is where the need for a coach comes in to play some one, who can see the entire field of play and see where strengths and weaknesses are on both sides, one who knows the strengths and weakness of the other team (competition) as well, either through observation or research.

Then comes the greatest challenge for the coach to decide who the best is and which of the players would he want on the field at a given time, considering whether the group that takes the field is offensive or defensive team? A great coach is a coordinator, an arbitrator and negotiator, he not only observes what is going on out on the field but also listens and takes suggestions from his players, after all they are the ones in the trenches. In the end the coach looks to his players and says, “Great job, YOU did it!” the team and the players receive the notoriety and honour of having won the game but in actuality this success would have

been very hard to accomplish were it not for the efforts and the coordination of the coach the “alliance manager”

So to explain the analogy is easy enough, the partner or partners that team up generally will have already formed a team of their top executives to work on the alliance their “stars” so to speak. As stars they were picked because they are leaders and experts in particular areas of their home organization. In the initial phases of the alliance it is very difficult to refrain from trying to “shine” or share ideas or best practices that may have worked in your organization, but may not work in this alliance. This is the creation of the need for an alliance management function AMF or a “coach” or “coaches” to oversee or direct the alliance, to make it their main priority so that the “stars” can focus on their areas of expertise. In the end if they successful in creating a sustainable partnership these alliance managers are able to look at those involved and say, “Great job everyone, YOU did it!”



## Acknowledgements

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I would also like to give special thanks to Professor **John Fazio A.B.D.** for his time, patience and guidance throughout my research.

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## **The Evolution of Sustainability as a Corporate Imperative**

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### ABSTRACT

While the environmental movement and the concept of sustainability have been part of public discourse and government policy for more than 50 years, widespread corporate interest in sustainability has intensified only over the past 5 to 10 years. The definitions, scope and rationalization of sustainability differ considerably among companies, customers and shareholders. In this paper, we examine these differences and discuss the evolution of sustainability as a corporate imperative. Specifically, we address sustainability as a factor of production, a corporate social responsibility, a source of competitive advantage, a key driver of innovation, an avenue for mitigating risk, and a means of survival. We also discuss the compatibility of sustainability with corporate growth strategies and consumer economies.