



*Southeast
Decision Sciences Institute
2013 Conference Proceedings*



*Charleston, South Carolina
Forty-Third Annual Meeting
February 20 - 22, 2013
DoubleTree by Hilton - Charleston*

*Kellie B. Keeling
Program Chair
University of Denver*

*Albert E. Avery
Proceedings Editor
Towson University*

MARRIAGE PENALTY: INTENDED, OR NOT, IS THIS EFFECTIVELY A FEDERAL TAX ON MARRIAGE?

*Steve Gill, sgill@mail.sdsu.edu
Nathan Oestreich, drno@sdsu.edu
James E. Williamson, William6@mail.sdsu.edu*

*Charles W. Lamden School of Accountancy
College of Business Administration, San Diego State University
5500 Campanile Drive, San Diego, CA 92182-8221*

ABSTRACT

Marriage penalty, and what is sometimes called singles penalty, is present in the federal income tax system, and can be fully removed only by giving married people the choice to file as married or unmarried. This, too, leaves some perceived inequities. Marriage penalty, it seems, is in the eye of the beholder. This research identifies an extreme example of marriage penalty that a couple could encounter without understanding it or knowing about it. They will, however, notice that their taxes have increased substantially.

INTRODUCTION

While we publicly state that we support family values and the institution of marriage (Oh! But, perhaps not for everyone.), at times, our tax laws appear to contradict this premise, especially in the case of two young professionals who have similar incomes and deductions.

Further, under our legal system, contract law is under the purview of the states. But, does the federal government effectively tax marriage?

This research, although in no way a comprehensive review of marriage penalty, identifies some key components that Congress has not addressed, as well as those that they have. This topic is especially relevant because the partial marriage penalty fix included in the Bush tax cuts is scheduled to expire at the end of 2012.

MARRIAGE PENALTY RELIEF, OR NOT

In a New York Times article, on February 26, 1995, entitled “Your Taxes; Marriage Penalty Likely to Decline, if Not Disappear,” Nick Ravo [1] wrote the following:

Few inequalities in the Federal tax code strike as many people as the marriage-tax penalty, which may be reduced this year if Republicans in Congress have their way. The outcry for repeal among taxpayers, even those adversely affected, appears more muted than for other types of tax relief, however.

"People tend to think that it only affects a narrow group of people, so there may not be the vox populi behind it," said Anthony J. Ogorek, a financial planner and investment manager in Buffalo.

Sharon L. Kreider, an accountant in Santa Clara, Calif., said, "You would be surprised how many couples with two incomes don't know about it, and when we tell them, they usually don't want to know how big the penalty is because they say they can't do anything about it anyway." How bad does it get? The penalty can amount to 3 percent of a couple's taxable income, with a maximum penalty of \$15,025. As part of its Contract With America, the Republican majority in the House has promised to introduce legislation within the first 100 days of the current session to repeal the marriage-tax penalty. Exactly what form this relief would take is still a matter of discussion, but complete elimination of the penalty is unlikely in the near term.

Rather than going through the detailed statutory construction, we rely on an overview of the relevant part of the Bush tax cuts. Jim Helm, CPA, wrote a summary entitled "Is the Marriage Penalty Coming Back?" which was posted at Tax Insights on October 28, 2010 [2], right before the Bush tax cuts were scheduled to expire. The sunset has been extended to December 31, 2012.

The Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA) was a ten year sunset provision set to expire December 31, 2010. Some of the tax laws of this Act were made permanent through further legislation, however, many will conclude at the end of the year unless new legislation is passed. Part of these provisions set to expire is relief of the so-called marriage penalty.

The marriage penalty refers to higher taxes resulting from a married filing jointly tax return rather than two single tax returns. The EGTRRA relieved some of this marriage penalty by raising the standard deduction for married taxpayers to double that of single filers. In 2011, the standard deduction for married filing jointly taxpayers will go back down to approximately 1.67 times that of a single taxpayer. Also, the size of the 15 percent tax bracket for married filing jointly was increased to double that of single filers. This will revert back to a width closer to 1.67 that of the bracket for a single filer in 2011.

In addition, the phase out repeal of the personal exemptions and itemized deductions will be repealed. This means that in 2011, married filing jointly taxpayers with adjusted gross income above \$256,700 (\$171,000 for single) may lose some of the value of personal exemptions and itemized deductions.

Of course, there is a lot to consider when determining how the marriage penalty may affect you. Typically, couples with similar levels of income may feel the impact of the marriage penalty, while those with different levels of income may actually benefit from a married filing jointly return. Other factors to consider are work health benefits, insurance, social security, and inheritance rights.

SOME TAX PROVISIONS WITH MARRIAGE PENALTY

There are numerous provisions that one might argue have an element of marriage penalty. A comprehensive list is not appropriate here, but some the following are identified.

Tax Rates and Standard Deduction

The federal tax system follows state law. There are nine states in which earnings of husbands and wives belong to the community (“community states”). In the other forty-one states, earnings by husbands and wives are separate (“separate states”). In the community states, when a spouse works, half of the earnings legally belong to the other spouse; in the separate states, the earnings are all his/hers. As a result, in nine states, the working spouse pays tax on one-half of her/his earnings; in forty-one, all.

With progressive tax rates, a couple can be driven into higher tax brackets in separate states, than they would in a community state. In the simplest case, assume a wife has earnings of \$100,000, and her stay-at-home-dad husband has none. In a community state like Texas, she legally has income of \$50,000 and he has income of \$50,000, while in a separate state like Florida, she legally has income of \$100,000. Because the \$100,000 throws her into a higher tax bracket, the couple in Florida would pay more federal income tax than the couple in Texas.

Congress legislated the filing status of married filing jointly in order to mitigate this perceived inequity,. By adjusting the rates, and making other changes, Congress intended to make the tax paid by the Florida couple the same as that paid by the Texas couple, and effectively they did. Due to political pressure, Congress later extended tax concessions, in the form of reduced tax rates, to households of unmarrieds in the form head or household and single (really, not married and not a head of household) status. A head of household, of course, is an unmarried individual who provides support for certain dependents.

The Congressional actions described here were intended to remove some inequities. Almost of necessity, other inequities were created. For purposes of this paper, “marriage penalty” refers to a situation where a couple pays more tax as married persons than they would if they had the same income and family makeup, but were not married.

The most extreme marriage penalty caused by the tax rates may be for some of those taxpayers who would qualify for the filing status of head of household. When the couple marries they give up the benefits of the lower tax rates for head of household. If they do not itemize, they give up larger standard deduction amounts as well, and if only one itemizes, they lose the benefit of the other’s standard deduction. These concepts are developed in the comprehensive example to follow, so further explanation is not necessary here.

Deduction for Residence Interest

For the individual taxpayer, one classification of deductible interest is residence interest. Section 163 [4] specifies exactly what interest is deductible. Residence interest consists of acquisition interest and home equity interest. Acquisition interest is interest on debt incurred to purchase,

build, or substantially improve one's principal residence and one other personal residence. Home equity interest is interest on debt almost regardless of the use of the borrowed funds.

There is a limit on each classification: Acquisition debt is considered up to \$1,000,000; Home equity debt, \$100,000. The limits are the same for an unmarried individual and for a married couple.

Earned Income Tax Credit [EITC]

The EITC is perhaps the most punitive for married couples. Without going into detail, just a couple of examples illustrate how the penalty arises. A married couple with two children would receive a maximum credit of \$5,236; while if they were not married, they would get a maximum of \$3,169 each, for a total of \$6,338. Of course, both must have earned income and they must arrange their affairs so they can claim one child each to get the maximum credit.

A more extreme case occurs when a couple has three children. A married couple would get a maximum credit of \$5,891. If they could arrange their affairs so one could claim two children, and the other one, the maximum credits would be \$5,236 and \$3,169, respectively, for a total of \$8,405.

Actively Managed Rentals

The passive activity limitation [§ 469] restricts deductions for taxpayers' net passive activity losses against their portfolio and non-passive business income. Generally, no deduction is allowed, but an exception applies to actively managed rentals. Under this exception, up to \$25,000 can be deducted, but this \$25,000 amount is reduced by 50% of any adjusted gross income in excess of \$100,000. These \$25,000 and \$100,000 amounts are the same for a married couple and an unmarried individual. So, a married couple gets one \$25,000 deduction, while two unmarried individuals can take two \$25,000 deductions. Further, the phase out starts at \$100,000 for an unmarried individual, while it starts at \$100,000 of combined income (i.e., adjusted gross income) for a married couple.

SINGLES PENALTY

In fairness, there are a number of provisions that are marriage-neutral and even situations where there is a singles' penalty. Generally this occurs when a couple has only one earner, or one person earns substantially more than the other. In such cases, the status of married filing jointly has the effect of applying a lower "average" rate. Other situations where Congress actually provided marriage benefits include these:

Filing Status and Tax Rates

While there can be a marriage penalty when both parties have substantial income, there is a singles penalty when only one has income, or one has much more income than the other. The "penalty" results because the one with higher income is driven into higher marginal tax brackets, while this would not happen if they filed as married taxpayers filing jointly.

Exclusion of Gain on Sale of Personal Residence

The law is generally marriage neutral with regards to the sale of a personal residence. A homeowner who disposes of his or her primary residence can exclude up to \$250,000. A married couple, however, can exclude up to \$500,000. Several requirements must be met, primarily that the residence must have been owned and used as the principal residence for two of the five years preceding the sale [4, § 121].

TAX REFORM

The *American taxpayer Relief Act of 2012* [5] continues the effects of marriage and singles penalties. In particular, the increase of rates from 35 percent to 39.6 percent applies to married couples with income over \$450,000 and other individuals with income over \$400,000.

Add to this, the permanent patch for the alternative minimum tax that raises the exemption amounts to \$78,750 for married couples and \$50,600 for other individuals. These exemptions are indexed for inflation for 2013 and beyond.

Similarly, the *Patient Protection and Affordable Care Act* [6] imposed new taxes on earned income (0.9 percent) and investment income (3.8 percent) for higher income taxpayers. For each of these levies, which were intended to help fund health care under the act, the higher income levels over which the taxes apply are \$250,000 for married couples and \$200,000 for other individuals. These are often referred to as additional medicare taxes.

AN EXTREME EXAMPLE

Maria Schicklgruber and Hermann Einstein both work in similar positions for the Wall Street firm Goldrock Bags. During 2012, each of them earned \$103,000, including bonuses. Their other sources of reportable income (loss) are from a rental property that they co-own and were both active in the management of the property, and from trading activities in the securities markets. During 2012, the rental property reported a tax loss of \$50,000; one half of which is included in each of their individual tax returns. Because they were no more successful than the rest of us, they each had net capital losses of more than \$3,000 in 2012.

Both Maria and Hermann had two children, under the age of 17, from prior marriages and were raising them as heads of household. As single individuals, each of their tax returns, for 2012, would have appeared as follows:

Tax Return of Either Maria or Hermann

Salaries and Bonuses	\$103,000
Allowable Rental Loss	(25,000)
Allowable Capital Loss	<u>(3,000)</u>
Adjusted Gross Income	\$ 75,000
Standard Deduction (Head of Household)	(8,700)
Personal and Dependent Exemptions (3)	<u>(11,400)</u>
Taxable Income	<u>\$ 54,900</u>
Income Tax (Head of Household Rates)	\$ 8,370
Less: Child Credits (2)	<u>(2,000)</u>
Income Tax Payable	<u><u>\$ 6,370</u></u>

The total 2012 tax that would have been paid by both of them would have been (2 x \$6,370) \$12,740. However, because they had fallen in love and felt it would be better for the children if they married and all of them lived together in the same house, on December 31, 2012, they got married in a beautiful little wedding chapel in the charming village of Las Vegas.

As a result, because an individual's filing status is determined by their marital status at the end of their tax year (December 31 for calendar year individuals), they filed a tax return as married filing jointly, which appears as follows:

Joint Tax Return of Maria and Hermann

Salaries and Bonuses	\$206,000
Allowable Rental Losses (Completely phased Out for AGI greater than \$150,000)	-0-
Allowable Capital Losses (Married taxpayers are allowed only one \$3,000 together)	<u>(3,000)</u>
Adjusted Gross Income	\$203,000
Standard Deduction (Married filing Jointly)	(11,900)
Personal and Dependent Exemption (6)	<u>(22,800)</u>
Taxable Income	<u>\$168,300</u>
Income Tax (Married Filing Jointly Rates)	\$35,446
Less: Child Credits (Phased out at the rate of \$50 for each \$1,000 over AGI of \$110,000)	<u>-0-</u>
Income Tax Payable	<u><u>\$34,903</u></u>

As you can see, although we have selected data to maximize the effect, the cost of getting married for Maria and Hermann is more than \$22,000 (\$34,903 - \$12,740).

CONCLUSION

The primary question raised by this paper is whether the federal income tax system should be marriage neutral. Although no position is taken in this regard, policy makers should be clear, and perhaps consistent, on this issue. It is clear that no system will satisfy all observers' equity preferences.

The second, and perhaps more important, question involves whether people be able to easily assess the tax impact of a decision like that to marry. The authors' conclusion is that if they cannot, then tax distribution is random. The unintended result is significant inequity.

REFERENCES

- [1] Ravo, Nick. **New York Times**, February 26, 1995, "Your Taxes; Marriage Penalty Likely to Decline, if Not Disappear." [HTTP://WWW.NYTIMES.COM/1995/02/26/BUSINESS/YOUR-TAXES-MARRIAGE-PENALTY-LIKELY-TO-DECLINE-IF-NOT-DISAPPEAR.HTML?PAGEWANTED=ALL&SRC=PM](http://WWW.NYTIMES.COM/1995/02/26/BUSINESS/YOUR-TAXES-MARRIAGE-PENALTY-LIKELY-TO-DECLINE-IF-NOT-DISAPPEAR.HTML?PAGEWANTED=ALL&SRC=PM).
- [2] Helm, Jill. **Tax Insights**, October 28, 2010. "Is the Marriage Penalty Coming Back?" www.hhcpa.com/blogs/income-tax-accountants-cpa/is-the-marriage-penalty-coming-back.
- [3] Internal Revenue Service. "Preview of 2012 EITC Limits, Maximum Credit Amounts and Tax Law Updates." <http://www.irs.gov/Individuals/Preview-of-2012-EITC-Income-Limits,-Maximum-Credit--Amounts-and-Tax-Law-Updates>.
- [4] **Internal Revenue Code of 1986**, Title 26, U. S. Code.
- [5] *American Taxpayer Relief Act of 2012*, H.R. 8 (January 1, 2013).
- [6] *Patient Protection and Affordable Care Act*, Public Law 111-148 (March 23, 2010).

EXPLORING THE NEED FOR SELECTIVE ACCOUNTING AND AUDITING STANDARDS IN SMALL AND MEDIUM BUSINESS BEYOND THE UNITED STATES

Maria L. Bullen, Dominican University of California, maria.bullen@dominican.edu
Gregory S. Kordecki, Clayton State University, gregkordecki@clayton.edu

INTRODUCTION

This paper begins with a descriptive exposition of trends that are developing world-wide in efforts to provide meaningful accounting and assurance standards. The paper does not argue for or against the application of International Financial Reporting Standards (IFRS and IFRS SMEs) promulgated by the International Accounting Standards Board (IASB), nor does it take a position on what accounting guidance is best for any given country. The paper does attempt to distinguish between relevant and irrelevant standards for those economies that are forced to comply with models that are overly general and fail to deliver the user-orientation which is generally assumed when financial statements are generated for external stakeholders.

The paper examines several well-developed as well as emerging economies where there have been efforts to develop their own specific standards for accounting and assurance services based upon the markets served, and with consideration for entity size and ownership. Comparisons are made to the United States in an attempt to assess the richness of each effort, rather than evaluate the propriety of what makes up good or poor GAAP. The paper concludes with suggestions for further research in accounting and auditing in various countries as more economies are beginning to recognize the importance of small and medium businesses.

HISTORICAL DEVELOPMENTS IN THE UNITED STATES

The accounting profession is in a bittersweet position when it comes to financial reporting for privately-held companies. On the one hand, having active, authoritative bodies in place to regulate and propose updated standards for financial accounting and reporting would appear to provide objective guidance. On the other hand, the profession is also plagued with the existence of multiple reporting jurisdictions and the multiplicity of the authoritative bodies. In Georgia, as in most U.S. states, a wide range of private companies exist, and they can vary significantly in size and complexity.

In developed economies such as the United States, the absence of clear guidance on issues specific to some of these private companies can make for painstaking financial reporting, and in some cases, additional effort in rendering audit and other attest services. Those who favor specialized reporting for private entities argue that public company financial reporting and disclosure is focused on compliance with the United States SEC and federal regulations. When the same accounting standards are applied to private concerns, the orientation to the user market is lost. The user needs of private companies can be different from the public companies.

The dichotomy that emerges between the need for accounting principles for different types of entities, sometimes misleadingly identified as “big GAAP v. little GAAP,” is one of increasing interest both theoretically and practically. Private company financial statement users such as owners and bankers, insurers and venture capitalists, may not be provided with the most useful information about private companies through the “usual/typical” financial reporting standards followed by public companies. In addition, financial reporting and disclosures required of public companies may not be cost effective for private companies.

Will two sets of GAAP confuse users and result in less useful financial statements to those users? Most users of financial statements have some minimum level of sophistication. If the base pronouncements are essentially similar, then various interpretations and practice implementation guides would be able to assist users and preparers on differences, just as being done today on EPS, segment reporting, and pension disclosures. The Blue Ribbon Panel recommendations concluded that the information to the users will be far more, rather than less, useful [Report... Blue-Ribbon, 2011].

Would differential standards for private companies take longer to be created under a separate Board on under the FASB? The private company proposal by the Financial Accounting Foundation (FAF), parent to the FASB, contained constraints that would create a structure that allows for deliberation, but could also lead to delay—such as acting on key issues only four to six times per year. A separate board or committee autonomy, of course, could accelerate decision making but this would be subject to board organization, authority, and funding. With over three thousand responding affirmatively to the Blue Ribbon Panel’s January, 2011 report, the expectation was reasonable for the Plan to call for the creation of a fast-acting, private company focused, separate board.

Although the FAF's Plan to improve standard setting for private companies made some progress, many believe it did not go far enough to create an independent, authoritative standard setting board for private companies [Kordecki and Bullen, 2012]. A number of constituents believed that the proposed Private Companies Standards Improvement Council (PCSIC) would essentially report to the FASB--and not providing any substantive change from the previous committee structure. Concerns were voiced that no real efficient and effective progress would be made in the US toward solving the private company standard setting problems.

Other countries have gone to two or more sets of GAAP. For example, the UK provides reporting relief for smaller entities. In Canada, private entities are given the choice of applying either full International Financial reporting Standards (IFRS) or a new GAAP. Would two sets of GAAP make initial public offerings (IPOs) more difficult? If an entity has been relying on some alternative and reduced form of accounting and reporting prior to IPO, then additional costs will be incurred. Reconciliations can be derived, and this is an expected cost in capital market formation. The FASB should continue to do what it does best—provide standards for public companies—permitting the markets in private arenas to flourish under appropriately set standards.

APPROPRIATENESS FOR OTHER ECONOMIES

Emerging markets, including those in China, may be slow in arriving at accountability maturity, as long as low levels of disclosure persist [Epstein, 2012]. Brazil seems to out-perform China on application of state-supported companies' profitability and innovation; however, China's score has steadily risen on the global competitiveness Index, while the score of U.S. has dropped in recent years [Kurlantzick, 2012].

Table 1 SOE Assets (data drawn from Kurlantzick, 2012)

	2002	2010
Total assets of China's 121 largest state-owned enterprises	\$360 Billion	\$2.9 Trillion

As the accompanying table (1) illustrates, investments in China state-owned enterprises have significantly increased in recent years.

“One size does not fit all” in either the United Kingdom or New Zealand. In the U.K., its Accounting Standards Board (ASB) has arrived at a 3-tier system ranging from those listed on exchanges to medium-sized, down to smaller entities, while the New Zealand External Reporting Board (XRB) separates entities on the basis of public accountability, with significantly more disclosure for the large issuers [Kamnikar, Kamnikar, and Burrowes, 2012].

Millions of companies--more than 95% of the companies in the world--are eligible to use IFRS for SMEs, but only 45,000 listed companies on the 52 largest stock exchanges in the world would meet the design of the full SMEs according to the IASB's own *A Guide to the IFRS for SMEs*. The following table (2) provides some summary numbers on the importance of providing for a financial reporting mechanism for private-sector enterprises:

Table 2 Private Companies (data drawn from Kurlantzick, 2012)

Country	Private-Sector Enterprises
United States	28 million
Europe	28 million
United Kingdom	4.7 million
Brazil	6 million

Brazil has to its advantage an active Institute of Independent Auditors (IBRACON), which has been instrumental in the implementation of IFRS for SMEs, and since many of the country's entities are very small, the decision to allow adoption of this alternative set of GAAP provides for reduced complexity, and greater transparency, comparability, and efficiency [James, 2011]. Similarly, in Iran, there are many small operating entities, most of which do not enjoy an appropriate financial information system, and suffer from ineffective and inefficient accounting [Yaghubi, Moradi, and Mazaheri, 2011].

Lawrence Herman writes that the Canadians' use of private-sector standards and best practices is really an extension of European medieval *lex mercatoria*, a major practice and increasing factor in international business [Herman, 2012]. His thesis continues with the argument that in the medieval trade community the fragmentary and obsolete rules of feudal and Roman law were not responsive to local and international commerce. What then arose was a creation by merchants of a "superior law."

The argument can be extended—pure private sector rule making exists to the extent that the International Financial Reporting Standards (IFRS) generated by the IASB are adopted by more and more countries. As one pundit points out, this is a growing trend in the delegation of regulatory authority from governments to a single private-sector body [Haufler, 2005]. Then, drawing upon both Herman and Haufler, the further argument surfaces that several private-sector bodies may be even more advantageous than only one from a consortium of centralized governments: the implication being that "one size does NOT fit all," and that the needs of the emerging small business otherwise may still be neglected.

World economic growth is concentrated in key developing countries, especially the "BRIIC" nations of Brazil, Russia, India, Indonesia, and China. Foreign direct investment in China for 2011 was \$124 billion, increasing 8% over the prior year [Schuman, 2012]. Extension of legal and perhaps accounting governance mechanisms from an Anglo-American context to these economies may not be the most effective track [Carcello, Hermanson, and Ye, 2011]. How should a prosperous economy proceed if it has the ability to structure its own accounting and auditing standards?

Chinese historical GAAP development can be traced in the immediate short run to the development of the founding of the People's Republic of China (PRC) in 1949, and the requirement that resources essential to production be garnered under state-owned enterprise (SOE) system. Departures from this tradition came in 1993 with the assistance of Deloitte Touche Tohmatsu as consultant to the Chinese government [Ibarra and Suez-Sales, 2011]. Numerous exposure drafts of standards for "Chinese Accounting Standards" were published and then in 2001 the Ministry of Finance (MOF) issued a new comprehensive "Accounting System for Business enterprises" seeking to provide comparability among enterprises. Accordingly, China's development of standards was very methodical and deliberate, including forward looking views in harmony with IFRS. However, there were no significant distinctions among the standards between entities of various sizes or other classifications.

Corporate governance in China through accounting and oversight is seen in the requirement of the need to rotate external auditors at least every five years, and at least one-third of company

boards must comprise independent members, and these and other rules for standard accounting practices have filtered down from listed companies to rural financial institutions and asset-management companies [Country Finance China, 2011]. With China’s fast growing economy and the increased demand for accountants, the government has made a commitment to spur specific development in the accounting profession on the basis of scale—to build 10 large CPA firms and 200 mid-sized, home-grown accounting firms by 2015 [Lamoreaux, 2011].

The Chinese government proceeded with rapid development of its own specific Chinese accounting firms. The following table (3) illustrates this growth.

Table 3 CPA Growth (data drawn from Zhou, 2012)

	1988	1993	1997	2006
Chinese Accounting Firms	200	2,400	6,900	5,600
Chinese Certified Public Accountants	2,000	10,000	62,460	69,700

Zhou explains that the dampening between 1997 and 2006 is attributable to the central government’s plan to develop those 10 large and 200 medium sized domestic accounting firms over a five year time horizon in order to compete with foreign firms [Yuhao Zhou, 2012]. This centralized plan is one that focused on the largest firms, but made no provisions for the smallest. Dissolutions and mergers of firms were undertaken to increase firm size. Also, Zhou points out that in 2002, the Ministry of Finance reasserted oversight responsibility for the accounting and the auditing professions, so standard-setting was not clearly distinct from centralized government authority. Problems of independence continue as the Chinese Institute of CPAs (CICPA) must serve a dual role—being responsible to the Ministry of Finance, because in reality it is an agent of the MOF, while trying to be an advocate for the professionalism of its CPA members.

China established in 2005 a Company Law reform, providing the setting for Chinese courts to interpret derivative suits, which would appear to be a positive for increased corporate governance [Hui Huang, 2011]. Huang’s study found that in all reported derivative action decisions that the entity involved was an LLC which are privately held companies, meaning there has been no action against public companies and state-owned enterprises. This imbalance may create a risk v. return inversions that could impede the development of capital markets. The majority of the defendants included managers, owner-operators, and a few limited third parties. It is not clear what the potential exposure has been to external auditors, but the actions so far seem to be stressing breach of contract between the entity and the outsiders, but not directly involving the outside expertise of professionals such as accountants and auditors. If the stakeholders view the auditors as not independent from the state, this may be a reason for not directing action against them, and a symptom of impediments to progress and advancement.

SUGGESTIONS FOR FURTHER RESEARCH

Further work could be done inside the University classrooms. Educators and practitioners should become familiar with efforts to achieve international convergence of accounting education standards. Developing international education standards (IES) and implementing them in various countries would contribute to a common base of education and practical experience for all professional accountants, and facilitate mobility of professional accountants [McPeak, Pincus, and Sundem, 2012]. Moreover, with a global view of understanding in principles, then each individual economy would be better able to select the most appropriate type of GAAP.

Academicians and practitioners should work toward encouraging greater development of private standards that satisfy the special needs of business in developing countries and emerging economies. The models developed in western industrialized countries should neither be totally accepted, nor totally abandoned, but should be tailored to adapt to local needs. In many cases, this will require the development of a two-tier system, since the larger, publicly held entities have a different set of stakeholders. In financial accounting terms, the users of the financial statements are far different and their analyses are different. Carefully identified underlying generally accepted accounting principles should be modified to build overall synergies in local markets, just as the broader principles provide guidance in the larger capital markets. While some developing economies are still years away in differentiating their markets by firm size and complexity, the time is now to plan for the accounting and auditing platforms that will enhance those positive developments.

REFERENCES

- Blue-Ribbon Panel on Standard Setting for Private Companies (2011). *Report to the Board of Trustees of the Financial Accounting Foundation*. 2011: January 11.
- Carcello, Joseph V., Dana R. Hermanson, and Zhongxia (Shelly) Ye (2011). Corporate governance research in accounting and auditing: Insights, practice implications, and future research directions. *Auditing: A Journal of Practice & Theory*, 2011, 30(3): 1-31.
- Country Finance China 2011* (2011). New York, United States, NewYork: Retrieved from <http://search.proquest.com/docview/887722073?accountid=10139>
- Epstein, Marc J. (2012). Challenges of governing globally. *Strategic Finance*, 2012, 94(1): 26-34.
- Haufler, V. (2005). *A public role for the private sector: Industry self-regulation in a global economy*. Washington, DC: Brookings Institute Press, 2005.
- Herman, Lawrence L. (2012). The new multilateralism: The shift to private global regulation. *C.D. Howe Institute Commentary No. 360, 2012, Trade and International Policy*, ISBN 978-0-88806-880-4.

Hui Huang (2011). Shareholder derivative litigation in China: Empirical findings and comparative analysis. *Banking & Finance Law Review*, 2011, 27: 619-654.

Ibarra, Venus, and Martha G. Suez-Sales (2011). A comparison of the International Financial Reporting Standards (IFRS) and Generally Accepted Accounting Principles (GAAP) for Small and Medium-Sized Entities (SMES) and compliances of some Asian countries to IFRS. *Journal of International Business Research*, 2011, 10 Special Issue (3): 35-54.

James, Gary (2011). Business basics in Brazil: Big opportunities, challenges go hand in hand. *Journal of Accountancy*, 2011, 212(5), 35-41.

Kamnikar, Judith A., Edward G. Kamnikar, and Ashley Burrowes (2012). One size does not fit all: A look at private company financial reporting in the U.S. and tiered GAAP alternatives being considered abroad. *Journal of Accountancy*, 2012, 213(1): 46-49.

Kordecki, Gregory S. and Maria L. Bullen (2012). The FAF plan for standard setting improvement—Is it viable for private companies? *Current Accounts*, 2012, May-June, 2012: 31-32.

Kurlantzick, Joshua (2012). Opening remarks: Innovation's long march. *Bloomberg Businessweek*, 2012, July 2-July 8: 45-46.

Lamoreaux Matthew G (2011). Business basics in China: Currency regulations, intellectual property threats add to challenges. *Journal of Accountancy*, 2011, retrieved from <http://www.journalofaccountancy.com/Issues/2011/May/20113840.htm> 1-5.

McPeak, David, Karen V. Pincus, and Gary L. Sundem (2012), The International Accounting Education Standards Board: Influencing global accounting education. *Issues in Accounting Education*, 2012, 27(3): 743-750.

Schuman, Michael (2012). The new great wall of China. *Time*, 2012, 180(13): 1-8, 18.

Yaghubi, Fateme Soghra, Mohammad Ali Moradi, and Mehrdad Mazaheri (2011). Pathology of accounting systems and financial reporting of small business. *International Journal of Business Administration*, 2011, 2(4): 75-83.

Yuhao Zhou (2012). The role of external auditors in detecting and reporting corporate fraud in public listed companies in China. *International Journal of Business Administration*, 2012, 3(1):2-15.

COMPILATION AND REVIEW ENGAGEMENTS: NEW DIRECTIONS IN NON-AUDIT SERVICES

Maria L. Bullen, Dominican University of California, maria.bullen@dominican.edu
Gregory S. Kordecki, Clayton State University, gregkordecki@clayton.edu

INTRODUCTION

The American Institute of CPAs' Accounting and Review Service Committee (ARSC) issued in 2012 two extensive exposure drafts—one on compilation services and one on review services—with far reaching implications for the compilation and review practices of external accountants' association with the financial statements of clients. While the Committee is currently reviewing comment letters, the issues are likely to be hotly contested prior to the proposed effective date of December 15, 2014. The traditional distinctions between audits and various non-audit services may become blurred. This paper attempts to enumerate the key issues and suggest measures that would help the practicing profession, as well as preparers and users of financial statements for closely-held businesses.

The paper describes the general thrust of both exposure drafts but focuses primarily on the earlier paper dealing with compilations, which carries a comment deadline of November 30, 2012. The review exposure draft is more recent with a comment deadline of April 30, 2013. Important trends in compilation engagements are described, including standard-setting, nuances of practice, and concerns of how the theme of compilation with no assurance varies from the other attest engagements of reviews and audits which carry some degree of assurance. The role of the attest function is questioned, and the need for independence of the external accountant from management, the entity, and its governance, challenged. The paper concludes with examples of practical implementation concerns.

BACKGROUND

In 2011, the Auditing Standards Board (ASB) of the AICPA achieved ability to redraft all of the auditing sections in *Codification of Statements on Auditing Standards* contained in the AICPA's *Professional Standards*. In 2012 the Accounting and Review Services Committee (ARSC) of the AICPA reached out to the public with the issuance of two Exposure Drafts attempting to establish similar clarity in compilation and review engagements, and with an effective date for unaudited financial statements with which the accountant is associated of "on or after December 15, 2014" [ARSC 2012-C, 2012-R].

In addition to having the compilation and review standards easier to read, understand, and apply, the similar conventions of the auditing literature makes for more uniform standard setting [Glynn & Gloria, 2012]. The critical differences however between the ARSC and the ASB efforts were determined to be that governmental entities and smaller, less complex entities would not be receiving the specific application guidance by the ARSC. The ARSC established the following clarity drafting conventions:

- Objectives for each clarified AR section
- A definitions section, as relevant, for each clarified AR section
- Separating requirements from applicant and other explanatory material
- Numbering application and other explanatory material paragraphs using an A- prefix and presenting such is a separate section that follows the requirements section
- Bulleted lists and other formatting techniques to enhance readability [Editor's Comments, 2012].

The first of the two exposure drafts proposes three new standards for compilation engagements: *Association with Unaudited Financial Statements*, *Compilation of Financial Statements*, and *Compilation of Financial Statements—Special Considerations*. Comments were originally due August 31, 2012, but extended to November 30, 2012. The second exposure draft proposes two new standards for review engagements: *Review of Financial Statements*, and *Review of Financial Statements—Special Considerations*. Comments on this second exposure draft are due April 26, 2013.

SIGNIFICANT OVERALL CHANGES

Adoption of the proposed standards for both compilation and review engagements would lead to some significant changes in approaches to viewing the external accountant's work on the client's financial statements, and also the various perspectives of not only the external CPA, but also the management preparer, and the financial statement user. The following areas of change would affect both compilation and review engagements.

Professional Judgment—explicit statement is made that an accountant should exercise professional judgment; the extant call for judgment is only implicit.

Signed Engagement Letter—requirements would begin that both parties to the engagement have signed written communication by (a) the accountant or the accountant's firm and (b) management or, if applicable, those charged with governance.

Accountant's Compilation (or Review) Report—clarified headings throughout the report would be required to clearly distinguish each section of the accountant's report. City and state of issuing office also must be included in the report

Special Purpose Framework (SPF)—replaces other comprehensive bases of accounting (OCBOA), such as cash, tax, contractual, and regulatory bases, with SPF, and following requirements—

- Suitable financial statement titles and adequate description of how the SPF differs from GAAP.
- Any disclosures that would be required resulting from application of the SPF.
- Compilation (or review) report to state that management has choice of financial reporting frameworks, and if regulatory or contractual, then statement in the report, or reference to a note to the financial statements that contains such information. If the

engagement is a compilation where management has omitted substantially all disclosures, then that must be described in the report.

- Inclusion in the accountant's compilation (or review) report of an "emphasis-of-matter" paragraph under appropriate heading that the financials are prepared in accordance with the applicable financial reporting framework, reference to a note in the financials that describes the framework, and a statement that the SPF is a basis of accounting other than GAAP.
- Inclusion in the accountant's compilation (or review) report of an "other-matter" paragraph under appropriate heading, any restrictive usage of the compilation (or review) report when under contractual or regulatory basis of accounting.

Emphasis Paragraphs—extant standards do not require any emphasis paragraphs. New standards would require if SPF financial statements were prepared or when there have been management revisions to the financials for a subsequently discovered fact. If accountant expects to include an emphasis paragraph in the compilation (or review) report, the proposed standard for Special Considerations requires to accountant to communicate with management regarding the expectation and the wording of such paragraph. "Emphasis-of-matter paragraph" is report wording by the accountant to draw users' attention to a matter appropriately presented or disclosed, while "other-matter" paragraph is used to communicate a matter that is not being adequately presented or disclosed.

Required Supplementary Information (RSI)—is information that a designated accounting standard setter requires to accompany an entity's basic financial statements but the information is not part of the basic finance financial statements, and that the account include an other-matter paragraph I the accountant's compilation (or review) report and the extent of any compilation, review, audit, or other prescribed guidelines work performed.

SPECIFIC PROPOSALS FOR COMPILATIONS AND REVIEWS

With respect to compilations, the new standard would clarify the "submission" argument, in that the preparation of financial statements is specifically defined as a nonattest service. Preparation of financial statements is a responsibility of management and an essential part of an entity's system of internal control. A compilation service would no longer include the preparation of financial statements which in whole or in part, would be a nonattest service. Compilation is an attest service, but not an assurance service. The compilation standards would go further on consideration of the effect of new or revised information. An explicit statement would require the accountant to consider the effect of such additional or revised information on the financial statements, including whether the financial statements are materially misstated.

With respect to reviews, the new standards would clarify the broad scope of a review, still limited assurance, and short of an audit in the attest hierarchy, but with specific examples of information that the external accountant may report on. The scope would consider specified elements, accounts, or items of a financial statement, supplementary information, required supplementary information, and financial information included in a tax return, or other historical

financial information for inclusion of information subject to a “review” in accordance with the SSARS.

DISCUSSION ON PROPOSED COMPILATION STANDARDS

The clear explanation of requirements relative to the accountant’s *Association with Unaudited Financial Statements* is long overdue. The suggested wording for inclusion in a report makes it clear that the service provided was not only not an audit, but also, was not a review, and was not a compilation. This delineation does much for definition of various practitioners’ work and elevates the notion in general that the work performed in a compilation to be truly an attest engagement. The proposed statement provides practitioners with guidance for performing services other than compilations, reviews, and audits, and further establishes the framework in a more logical fashion as to what type of work constitutes the various engagements, and yields an approach toward more clear differentiation between assurance, non-assurance, attestation, and non-attestation engagements [Landes, 2012].

Unfortunately, SSARS does not adequately address an important term, “prepare,” which is neither defined nor referenced to another standard where it is defined. This term should be defined in the proposed standard to prevent misinterpretation, such as questions regarding whether an accountant has “prepared” financials when he or she has recorded necessary journal entries in a client’s accounting system during month-end bookkeeping work but has not actually printed the financial statements from the system. Inclusion of “preparation” as a formal term in the *Definitions* section may strengthen the overall document.

The proposed statement on *Compilation of Financial Statements* clearly states that a compilation is not an assurance engagement, but is an attest engagement [Reinstein & Weirich, 2012]. In the *Definitions* section the term “assurance” is clearly identified, but not “attestation.” Footnote reference is provided to paragraph .01 of ET section 92, Definitions (AICPA *Proposed Standards*) of the AICPA Code of Professional Conduct for the definition of attest engagement—any engagement that requires independence—but if one is interested in clarity, why not apply the clarity conventions and include the term “attestation” in the formal *Definitions* sections of the SSARS literature? The common notion that attestation is a subset of assurance must be destroyed, if the spirit of the Exposure Draft is to prevail. As a considerable amount of the general literature outside of the AICPA is very much muddled on specifically what a compilation is, the *Definitions* section of the document should be expanded to include the sharp demarcations.

The proposed statement goes further in treatment of special purpose frameworks, and the inclusion in the report of an “emphasis-of-a-matter” or “other-matter” paragraph will be of significant benefit to most users. The report drafting illustrations are good summaries of the preceding proposed requirements. Several illustrations, examples of cash basis and tax basis, stress such a basis not only in the introductory paragraph, but also in the management’s responsibility paragraph, and in an additional paragraph carrying the heading “Basis of Accounting.” With the current movement, including the AICPA’s outstanding ED on *Proposed Financial Reporting Framework for Small- and Medium-Sized Entities*, to transition away from

OCBOA language toward reference of alternative reporting frameworks, the Committee may wish to revisit how specific language and wording is best applied in the accountant's report.

In *Compilation of Financial Statements—Special Considerations*, the extensive examples of how an “emphasis-of-a-matter” paragraph differs from an “other matter” paragraph are very helpful, and the report drafting illustrations will be a strong aid to the practitioner. Inclusion of the going concern bright time line of not exceeding one year is helpful guidance. An accountant should communicate with management regarding emphasis-of-matter and other-matter paragraphs, including proposed wording; however, ARSC does not provide guidance regarding actions the accountant should take if management has objections.

The proposed standard also indicates that there are exceptions to the general rule prohibiting an accountant from issuing a compilation report when the accountant had been engaged to audit an entity's financial statements but has been prohibited by the client from corresponding with the entity's legal counsel. Clarification of “rare circumstances” needs to follow. The reporting language for inclusion of required supplementary information is clear and will help many preparers and users as well as the accountant.

IMPLEMENTATION CONCERNS FOR REVISED STANDARDS

Finally, the proposed compilation standards carry some helpful guidance for instances when the accountant is faced with reporting on going concern issues during a compilation of financial statements that omit substantially all disclosures. Since disclosures are frequently omitted in practice, this standard might address other instances where an emphasis-of-matter paragraph is necessary (e.g., extensive related party transactions, unresolved litigation) but considered inappropriate because the underlying disclosure has been omitted.

Overriding concerns on the proposed statements include any additional burdens that would be placed on the accountant in compilation engagement work. While the clarity, organization, and exhibits are helpful, some dangling concepts such as thorough written documentation of the engagement via an engagement letter or some other written form could be expanded. Illustrations of those types of writing, including a single document covering scope of services requested for engaging in regular monthly work, would be helpful. If ARSC's exposure draft on review engagement modifications is received with the clarity provided by the exposure draft on compilation engagement, management, the external accountant, and the financial statement user will all be well served.

REFERENCES

ARSC--Accounting and Review Services Committee of AICPA (2012-C). Exposure draft—Proposed statements on standards for accounting and review services: *Association with unaudited financial statements, Compilation of financial statements, Compilation of financial statements—special considerations*, June 29, 2012, comment deadline August 31, 2012, extended to November 30, 2012.

ARSC--Accounting and Review Services Committee of AICPA (2012-R). Exposure draft—Proposed statements on standards for accounting and review services: *Review of financial statements, Review of financial statements—special considerations*, November 15, 2012, comment deadline April 26, 2013.

Editor's Comments (2012). News digest on accounting matters, *Journal of Accountancy*, Vol 214(5), November, 2012, pp. 17-21.

Glynn, Mike, and Ellen Gloria (2012), Proposed revisions: Clarify responsibilities for preparers, *Journal of Accountancy*, Vol 214(2), August, 2012, pp. 50-53.

Landes, Charles E. (2012). Preparation as a nonattest service: What does it mean and why should I care? *AICPA Whitepaper*, September, 2012.

Reinstein, Alan, and Thomas R. Weirich (2012). New ethics guidance for CPAs in public practice and business, *The CPA Journal*, March, 2012, pp. 59-64.

**ACCOUNTING AND BUSINESS LAW:
ARGUMENTS FOR GREATER LEGAL SCOPE AND DEPTH
IN THE ACCOUNTING CURRICULUM**

Lawrence Menter, Clayton State University, lawrencement@clayton.edu

Dustin M. Grant, Clayton State University, dustingrant@clayton.edu

Gregory S. Kordecki, Clayton State University, gregkordecki@clayton.edu

ABSTRACT

In recent years, accounting majors in baccalaureate degree programs tend to be receiving a superficial dose of business law, and by delivery primarily through parts of one or two courses. This paper analyzes this trend and discusses some implications that diminution of the business law component in higher education has for both the curriculum and the practicing profession. What has happened to the legal environment and business law courses over the past 50 years?

Constraints may be self-imposed by faculty, or possibly externally generated by accrediting bodies. Business law seems to be brow-beaten and has become a poor step-sister to the overall highly regarded curriculum of the accounting major. This paper reviews some classic arguments on inclusion of business law in the accounting curriculum both from the views of greater and less involvement and concludes with some suggestions for future directions.

ARGUMENTS FOR MORE BUSINESS LAW

Colson, et al. (2002) point to the critical nature of ethics and the business law component for the professional development of the CPA. Chandra and Hock (1992) remind us that in the 1990s the AICPA, as well as various state societies, viewed the business law component to the curriculum to be integral to the future accounting major, especially as many states were rolling in a 150 semester hour education requirement for CPA certification.

Support of business law for the variety of majors exists in AACSB schools, and as one researcher found a very heavy interest in business law for the accounting major with over 22% of his respondents favor greater influence of business law in the curriculum for accountants (Daughtrey, 1977). Fuller and Hargadon (2008) further demonstrate the relative importance of business law for anyone interested in maximizing potential with MBA, CMA, and CPA. A major common course is business law in the theoretical framework. In Hargadon and Fuller (2010), the authors point out that business law should be part of a candidate's academic study, and that course is best scheduled during the second semester of the senior year along with tax, and advanced financial accounting courses.

Baylor University fosters opportunities for career development for its students by having students meet with members of the Accounting & Business Law Department Advisory Board to discuss different career tracks (Krell, 2007). King, Cecil and Andrews (2009) show how deeply coupled business law is with financial accounting in the preparation for approaching the contents

specifications outline of the AICPA's model study preparation for the CPA examination. Business ethics, independence, attestation and regulatory issues of financial reporting are all deeply intertwined.

Finally, Frumer (1963) wisely pointed out that the pundits who rally for excessive "liberal education" and wanting to minimize the accounting course work specializations are the same ones who fail to recognize that the accounting courses do contain "liberal" ideas, and as business law is integrated, the curriculum becomes more liberal.

ARGUMENTS FOR LESS BUSINESS LAW

Clevenger, et al. (2006) look to a series of studies that pointed to the decline in studying accounting as a professional major, including the historical comments of the *Bedford Report*, and the *Big 8 White Paper*, and even advocate a proactive measure of promoting joint degrees and secondary interests in other professions. Unfortunately, they do not specifically state the significance of business law in this development. Other researchers are also remiss in not attaching importance to business law in the curriculum development for accounting majors. For example, Doyle and Wood (2005) performed an elaborate student regression on numerous other independent variables as SAT, GPA, Race, and select courses in management, accounting, finance, and economics, but fail to include a provision for business law in evaluating the dependent variable, successful program outcomes.

In Siegel, Sorensen, Klammer, and Richtermeyer, (2010), the importance of business law is neglected, where in their study of 408 accounting programs schools business law never appears as a requirement, and in no case was it listed as a recommended or available elective. Even given the heavy percentage on content specification outline for the CPA exam, many state boards do not carry a specific weight for business law, and lump it in with the study of economics, statistics, finance, and other business management (Wolfe, 1993).

OTHER VIEWS ON BUSINESS LAW IN ACCOUNTING MAJOR

Ferrara and Fess (1962), writing in the decade following Sputnik and other competitive advances, illustrate the need for numerous integration with other disciplines into the study of accounting. With an infrastructure of finance and business law along with accounting, then other disciplines should be brought in for holistic development. Franscona (1977) states "Business Law is a professional legal discipline, but it does not train a student to be a lawyer." The critical idea according to Franscona is to make sure that parties have sufficient knowledge about transactions and legal rights and remedies—essential aspects for management and overall decision-making.

In some interesting studies on the effect of various curricula, Bealing and Baker (2011) found that only the Business Law and Principles of Management courses were helpful in predicting success in non-accounting, non-quantitative courses in the B-School. But there are also studies that show strong relationships between Business Law and Accounting. Tinkelman (2011) finds

that the most basic accounting question is “what entity should be measured?” and the most related field of study is law. An earlier study suggested that model curriculum might be one where a parallel program is applied such as what had been done in law schools, such a 3-year program on top of some base (Flewellen,1959).

Hutchings and Brown (2009) charge that university departments have not in general accomplished much in developing pedagogy to challenge, stimulate or motivate students. They suggest that academic-practitioner teaching collaborations, including accounting and business law, might be an effective approach. Lakin (1971) provides a classical analysis of the importance of business law as he writes on the business law component of professional certification examinations. Unfortunately, in many universities the business law course(s) do not carry the sufficient breadth of topics. Furthermore, the question emerges as to whether the appropriate depth is reached on the few topics that might be covered.

McGuire (1986) discusses four basic “approaches” to designing the undergraduate law curriculum—(1) considerations of what business people think they need to know about the law, (2) considerations of what business school faculty colleagues believe we should be teaching, (3) considerations of student interests and demand, and (4) considerations of what other institutions are teaching. McGuire argues that all four of these approaches are deficient in that none really addresses what should be the ideal curriculum. He further argues that logical frameworks are needed and that universities will be far better off if their curriculum were modeled logically.

SUGGESTIONS FOR FURTHER RESEARCH

Written background information on business law and the accounting major is sparse. We believe our next step will be to examine institution websites and catalogs to sample business law composition of various accounting curricula. The positions of professional examinations such as those offered in conjunction with the American Institute of CPAs should also be examined, and perhaps suggestions for a new model curriculum may emerge.

REFERENCES

Bealing, William E. and Richard L. Baker (2011). Student performance in their first accounting course: Accounting 101 is key to future success in the classroom, *The Business Review*, 18(1), Summer, 2011, pp. 76-82.

Colson, Robert H, Paul R. Brown, Brent Inman, Victor S. Rich, and G. Peter Wilson. (2012). CPA Journal education forum anticipates future, *The CPA Journal*, 72(8), August, 2012, pp. 20-28.

Chandra, Gyan, and Clayton A. Hock (1992). The 150-hour education requirement: An opportunity for accounting curriculum change, *The Ohio CPA Journal*, 51(5), October, 1992, pp. 13-20.

Clevenger, Novella Noland, Thomas B. Clevenger, and John McElroy (2006). Shortage of accountants: Is education to blame? *Journal of Government Financial Management*, 55(2), Summer, 2006, pp. 14-19.

Doyle, Joanne M., and William C. Wood (2005). Principles course assessment, accreditation, and the depreciation of economic knowledge, *Journal of Education for Business*, 80(3), January/February 2005, pp. 165-171.

Daughtrey, William H. (1977). Surveys and descriptions of current courses: Report on a survey of topic preferences of students in the business law area, *American Business Law Journal*, 15(1), Spring, 1977, pp. 71-81.

Ferrara, William L. and Philip E. Fess (1962). Business education, accounting and interdisciplinary dialogue, *Journal of Accountancy*, 113(4), April, 1962, pp. 85-87.

Flewellen, Jr., William C. (1959). The road to better collegiate education for accounting, *National Association of Accountants, NAA Bulletin*, 41(3). November, 1959, pp.31-38.

Frascona, Joseph, L. (1977) Business law is business law, *American Business Law Journal*, 15(1), Spring 1977, pp.7-10.

Frumer, Samuel (1963). Business environment: A part of liberal education, *National Association of Accountants. NAAA Bulletin*, 44(8), April 1963, p. 64.

Fuller, Lori R., and Joseph M. Hargadon (2008). MBA, CMA, and CPA: Natural partners in the 150-hour requirement, *Management Accounting Quarterly*, 9(2), Winter, 2008, pp. 39-49.

Hargadon, Joseph M., and Lori R. Fuller (2010). Certification: Take less—and earn more, *Strategic Finance*, 91(9), March, 2010, pp. 47-53.

Hutchings, Glen, and Alistair M. Brown (2009). Collaborative industry based case studies and their moderating influence on the development of non technical skills and student perceptions, *Journal of International Business Education*, Vol. 4, 2009, pp. 175-192.

Krell, Eric (2007). The business of business schools is changing, *Baylor Business Review*, 25(2), Spring, 2007, pp. 4-11.

King, Teresa T., H. Wayne Cecil, and Christine P. Andrews (2009). Upcoming changes to the CPA exam, *The CPA Journal*, 79(5), May, 2009, pp. 58-62.

Lakin, Leonard (1971). Research and teaching department: An analysis of the business law examination part of the uniform CPA examination, *American Business Law Journal*, 9(1), Spring, 1971, pp. 65-82.

McGuire, Charles R. (1986). Logic and the law curriculum: A proposed conceptual framework for "The legal environment of Business," *American Business Law Journal*, (15(1), Winter, 1986, pp. 479-507.

Siegel, Gary, James E. Sorensen, Thomas Klammer, and Sandra Richtermeyer (2010). The ongoing preparation gap in accounting education: A call to action, *Management Accounting Quarterly*, 11(3), Spring 2010, pp. 41-52.

Tinkelman, Daniel P. (2011). An imperfect measurement system introduction to accounting, *Issues in Accounting Education*, 26(4), November, 2011, pp. 845-857.

Wolfe, Lou Anne (1993). Bill filed to alter public account education rules, *Journal Record*, (Oklahoma City, OK), January 12, 1993.

**THE FRAUD DIAMOND vs. FRAUD TRIANGLE ANALYTICS: EVALUATING
“CAPABILITY” AS A MODIFICATION FOR AUDITING UNSTRUCTURED
ENTERPRISE DATA**

Joseph B. Gilmore, CPA; CFE; MBA

Frostburg State University

336 Framptom Hall

Frostburg, MD 21532

301-687-4063

jgilmore@frostburg.edu

Dr. Richard Johnson, CPA

Frostburg State University

334 Framptom Hall

Frostburg, MD 21532

301-687-4452

rjohnson@frostburg.edu

TABLE OF CONTENTS

1. ABSTRACT
2. INTRODUCTION
3. ANALYZING STRUCTURED ENTERPRISE DATA
4. DR. DONALD CRESSEY'S "FRAUD TRIANGLE": A BRIEF HISTORY
5. ANALYZING UNSTRUCTURED ENTERPRISE DATA: USING FRAUD TRIANGLE ANALYTICS (FTA) TO MINE ELECTRONIC COMMUNICATIONS
6. A DISCUSSION OF "CAPABILITY" AND ITS IMPACT ON THE FRAUD TRIANGLE
7. "CAPABILITY"'S IMPACT ON THE DESIGN AND EFFECTIVENESS OF FRAUD TRIANGLE ANALYTICS (FTA)
8. CONCLUSIONS
9. REFERENCES

ABSTRACT

Current economic and employment (unemployment?) conditions have contributed to an environment that is very conducive to fraudulent activity. Many companies are being asked to do “more with less”---less marketing, less R&D, less internal auditing staff and so on. These circumstances also contribute to an employee’s ability to rationalize his/her behavior---even if that employee realizes that the behavior he/she is about to engage in is unethical, illegal or fraudulent. Motivation/Pressure plus Opportunity plus Rationalization = Dr. Donald Cressey’s “Fraud Triangle”. “Fraud Triangle Analytics” (FTA) involves data-mining key employee’s electronic communications in an effort to reveal key words and phrases that may identify planned or ongoing fraudulent activity. FTA presents a new approach to proactive, rather than “after the fact” (forensic) auditing for fraudulent behavior. This paper briefly discusses the history of the “Fraud Triangle” (and its three components which include Rationalization, Opportunity and Pressure/Incentive), and also discusses auditing of both structured and unstructured enterprise data.

After introducing the Fraud Triangle, the paper considers the additional element “Capability” and the formation of the “Fraud Diamond”. The new element, “Capability” (also known as “Criminal mindset” and “Ego/entitlement”), expands the traditional fraud model by including a psychological element to the analysis. Personal traits, character, learned behavior, confidence in one’s ability to commit fraud undetected or to talk one’s way out of trouble, sociopathic tendencies and other aberrant personality traits all contribute to a fraudster’s willingness to behave unethically. A criminal mindset combined with arrogance can minimize and even replace the requirements for Pressure, Opportunity and Rationalization.

Although Opportunity reveals the path for fraud, and Rationalization and/or Pressure may lead a person to approach that same path, only a certain state of mind will allow or even encourage a fraudster to actually walk down that path. This paper will investigate the impact on Fraud Triangle Analytics caused by adding “Capability” to Cressey’s model and the resultant design changes that should be considered when modifying FTA to include the new element of fraud.

INTRODUCTION

Current economic and employment (unemployment?) conditions have contributed to an environment that is very conducive to fraudulent activity, whether it be asset misappropriation (embezzlement), corruption (using one's position to benefit one's self in violation of one's fiduciary duty to his/her employer), or fraudulent financial reporting. Financial pressures on individuals and/or pressure for a firm to hit specific numerical targets, in conjunction with cutbacks that have weakened internal control, have created both motivation and opportunity to engage in unethical behavior. When combined with increased workloads and lower bonuses and/or compensation, some employees may consider unethical behavior.

Many companies are being asked to do "more with less"---less marketing, less R&D, less internal auditing staff and so on. These circumstances also contribute to an employee's ability to rationalize his/her behavior---even if that employee realizes that the behavior he/she is about to engage in is unethical, illegal or fraudulent. Motivation/Pressure plus Opportunity plus Rationalization = Dr. Donald Cressey's "Fraud Triangle", which describes the conditions that, if they exist, encourage and enable fraud. (1) Albrecht, *et al*, (2) made an interesting comparison to the "fire triangle" where fire exists if you have fuel, oxygen & heat. In both triangles, where all three conditions exist simultaneously, the outcome is nearly inevitable.

The Association of Certified Fraud Examiners (ACFE)(3) estimates that 5% of business revenues are lost to fraud, and that fraudulent behavior lasts a median of 18 months before being discovered. Applying this percentage to the global economy, fraud costs about 2.9 *trillion* dollars per year! Furthermore, most discoveries occur more by luck than design. Fully 48.5% of fraudulent activity is discovered by either employee tips or by accident.

"Fraud Triangle Analytics" (FTA) presents a new approach to proactive (rather than forensic) auditing for fraudulent behavior. FTA involves mining electronic communications for "key words". These key words, when appearing in emails, text messages etc. may indicate that the sender (and possibly the recipient) are engaging in some method of fraudulent behavior. Depending upon the key words & their frequency, that auditor is able to develop an "O-score" (for key words related to "Opportunity"); a "P-score" (for key words related to "Pressure/Incentive") and an "R-Score" (for key words related to "Rationalization"). These three scores are squared and then summed. The square root of the sum is known as the "Fraud Score" for an individual and the higher the score, the more likely that this individual is engaging in fraudulent acts. "Key word" lists are part of the proprietary software that firms employ to analyze electronic communications.

ANALYZING STRUCTURED ENTERPRISE DATA

Torpey, Walden and Sherrod (4) report that “Eighty percent of ‘enterprise data’ (for example, company documents, presentations, Web, e-mail, etc) is unstructured in nature...”. However, auditing software, such as ACL or spreadsheet analysis, focuses almost exclusively on analyzing structured data (journal entries, spreadsheets, schedules etc.)

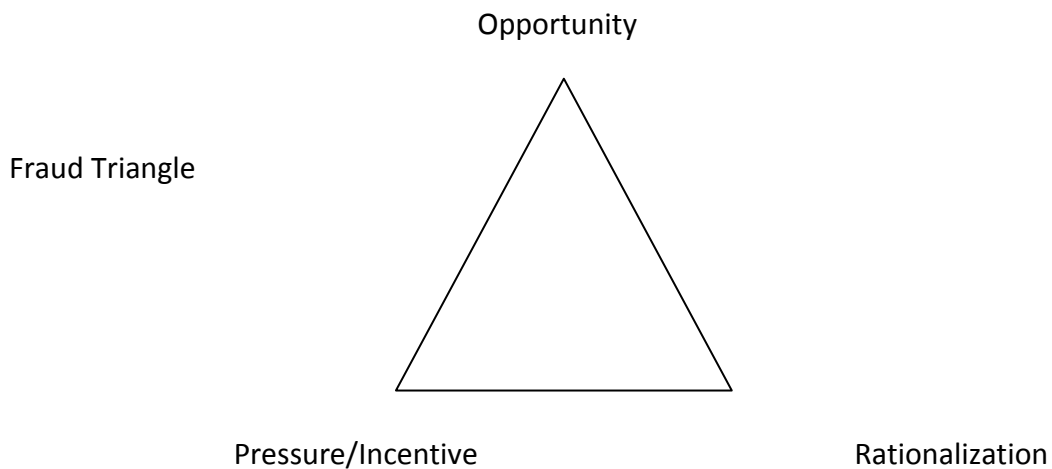
Evaluating, analyzing and questioning works fairly well for discovering fraud, especially if the auditor’s suspicions have already been raised regarding a specific transaction or potential violator. Unfortunately, auditing an enterprise’s structured data almost always entails a reactive approach, rather than a proactive approach. Per Crumbley, *et al*, (5) many standards and articles have been published detailing what an auditor should be aware of and look for regarding the existence of fraud.

But should the auditing process concentrate primarily on databases, transactions, accounting systems, reporting and presentation criteria, and representational faithfulness? This is an entirely reactive “after the fact” approach. This approach ignores the value of proactive methods for preventing fraud.

Fraud Triangle Analytics (FTA) is a process where auditors attempt to discover plans for fraud---before the fraud actually takes place (or at least discover and halt the activity very early)---rather than finally uncover the fraud a year or two (or even longer) after it begins.

DR. DONALD CRESSEY'S "FRAUD TRIANGLE": A BRIEF HISTORY

Before continuing, a brief review of Cressey's "Fraud Triangle" may be helpful.



Cressey's research on white-collar criminals convinced him that if all three factors were present, then fraudulent behavior was nearly inevitable. (1) Fraud could also occur if only two or even one factor existed, but was not as likely to occur.

The Fraud Triangle has been modified and enhanced over the ensuing four decades. Cressey's research was concentrated on individuals, and he identified an "...unshareable financial pressure". This component has been expanded to include management's incentives to commit fraud ("Hit the numbers!").

Albrecht, *et al*, (6) introduced their "Fraud Scale" and stated that identifying perpetrators of fraud was difficult and that substituting "Integrity" for "Rationalization" was helpful when trying to anticipate fraud. Rezaee and Riley (7) expanded on the topic of deterrence, agreeing that "Integrity" was critical for reliance upon personal decision making and responsibility.

Earlier, Rezaee (8) postulated the "3-C" model for explaining how the Fraud Triangle can be used to predict a corporation's unethical behavior. "Conditions"---a business downturn increases the likelihood of fraud. "Corporate structure"---irresponsible or ineffective corporate governance also increases the likelihood of fraud. "Choice"---between legal/ethical and illegal/unethical behavior.

Wolfe and Hermanson (9) proposed the “Fraud Diamond” where a fourth side was added. This new factor is “Capability” and addresses the reality that some people won’t commit fraud even if all three original factors are strongly present. An individual’s personal traits are the deciding factor. They play a major role in whether or not the person will actually go ahead and commit a fraudulent act.

Kranacher, *et al*, (10) discussed their “**MICE**” concept for elaborating on motivation (pressure). “**M**oney, **I**deology, **C**oercion, and **E**go/Entitlement” are the primary motivating factors for committing fraud. They also illustrated a conjoined triangle (yes---it looks like a diamond) for fraud factors. The original fraud triangle is retained. Now, however, it shares a side (“Opportunity”) with a new triangle. The two new sides on this attached triangle are “Criminal Mindset” and “Arrogance”. Essentially, the authors distinguish between those individuals whom they deem “Accidental Fraudsters” and those that they deem to be “Predators”. This is an interesting theory in that it makes a distinction between those hapless souls who are caught up in fraud vs. those “career criminal” types who are always on the lookout for easy prey.

ANALYZING UNSTRUCTURED ENTERPRISE DATA: USING FRAUD TRIANGLE ANALYTICS (FTA) TO MINE ELECTRONIC COMMUNICATIONS

The “unstructured data” that FTA is most concerned with includes emails and text (“instant”) messages---especially those communications that are saved on a firm’s central server. By accessing the server, auditors avoid the complicating factors and logistics attached to collecting electronic devices from all of those employees that are in sensitive and/or critical positions within a firm (i.e. those employees most likely to be investigated).

Although standard internal auditing procedures for structured data discovered almost 14% of occupational fraud (3), that is a woefully small percentage when one considers internal auditing’s primary focus. We can further criticize this lackluster performance when we point-out that all of these frauds are discovered *after* the perpetrators have been engaging in them for awhile!

Torpey, *et al*, (11) have attempted to link prior behavior with subsequent fraudulent acts. Their research indicates that certain language contained in email communications can signal information about the fraud factors that may be present for specific individuals within a company. They refer to certain terms and phrases as “keywords”, and they have accumulated, organized and tested a proprietary library list exceeding 3,000 keywords. These keywords help auditors analyze the language in employee’s email communications.

Keyword examples for “Pressure” include “Meet the deadline”, “Make sales quota”, and “Under the gun”. For “Opportunity”, “Override”, “Write-off” and “Recognize revenue” represent red flags. Finally, “I think it’s OK”, “Sounds reasonable”, and “I deserve...” are suspicious key words regarding the “Rationalization” element. Add 3,000 more keywords and then let the software analyze and report on the content of literally millions of emails. We all know how quick and simple it is to apply the “Search” function to a MSWord document. FTA software does much the same thing, only on a much grander scale!

Each keyword is associated with specific element in the fraud triangle. Each person whose emails are analyzed (unbeknownst to him or her---be aware of the jurisdiction that you are operating in and be careful not to break any laws or regulations related to privacy and/or warrantless searches) receives an individual score for each fraud triangle element.

FTA attempts to answer questions. *Who* is involved? *What* are they up to? *When* did they start? The researchers started with fraudulent situations where they already knew who the perpetrators were, the time line, and the outcome. Corruption/bribery and fraudulent financial reporting problems had already been discovered via standard auditing methods. The researchers ran the guilty executives emails through the FTA software and made an interesting

discovery. For *every* executive involved, there was a sharp spike in the frequency of keywords in their emails prior to and during the fraudulent behavior! (11) They also submitted the emails from many more executives from the same company and for the same period. Emails from executives not entangled in the fraud did not spike regarding keywords.

There are some basic steps to implementing FTA. After conducting a basic fraud-risk assessment, identify any major risks and key employees in those high-risk operations. With IT's help, copy the key employee's emails & submit them to the appropriate analysis search engine. Depending upon who you use, you may also have to submit a keyword library. You will be rewarded with a chronological keyword analysis, which you can then use to "zero-in" on specific individuals. Remember to follow any applicable laws and to also apply the rules of due process.

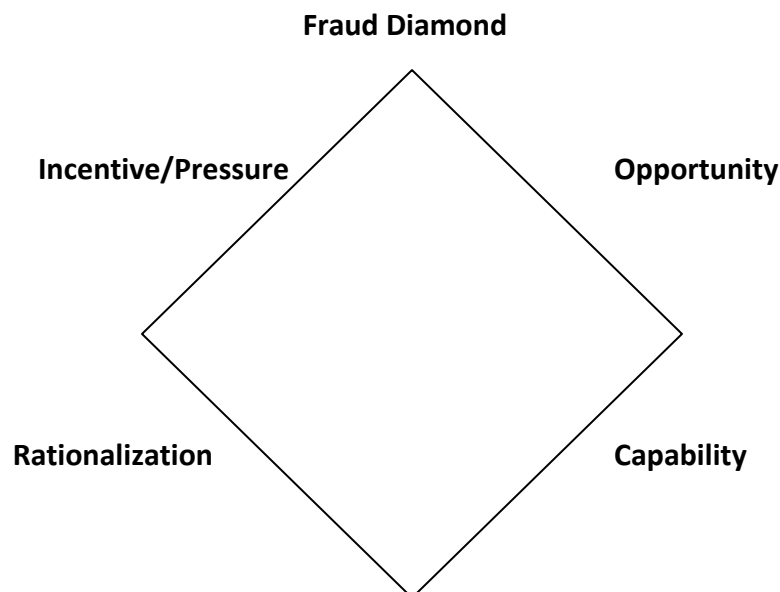
As discussed earlier, the software will develop three scores for each individual. The "O-score" evaluates the opportunity that an employ has to commit fraud. The "P-score" relates to pressure or incentive that the employee may be experiencing. The "R-score" analyzes the employee's propensity to rationalize his/her behavior. These three scores are squared and then summed. The final "Fraud Score" is the square root of the sum and a higher score indicates a stronger possibility that fraud exists.

A DISCUSSION OF “CAPABILITY AND ITS IMPACT ON THE FRAUD TRIANGLE

Until now, this paper has merely reviewed/repeated information from the paper that we submitted in 2012 (See “Fraud Triangle Analytics: An Auditing Technique For Unstructured Enterprise Data” SEDSI *Proceedings* 2012). The authors would like to add “Capability” to the Fraud Triangle and then discuss potential ramifications for FTA. This topic was mentioned in our 2012 paper’s “Suggestions for further research” section.

“Capability” refers to one’s *personal* traits, abilities and character. In the presence of (to varying degrees) Opportunity, Pressure/Incentive, and Rationalization, we need to consider this additional factor regarding an individual’s mental attitude(s) about committing fraud. One’s sense of responsibility (fiduciary or otherwise) will have an impact on one’s behavior. A large ego may convince someone that he or she won’t get caught committing fraud or will be able to talk his/her way out of trouble. A sense of entitlement will make committing fraud easier to engage in. Unless the fraudster is a sociopath, there should be feelings of stress and guilt while engaged in fraudulent behavior. Some people are better equipped to deal with these emotions than others are. From a mental standpoint, these individuals will be more “capable” of committing fraud.

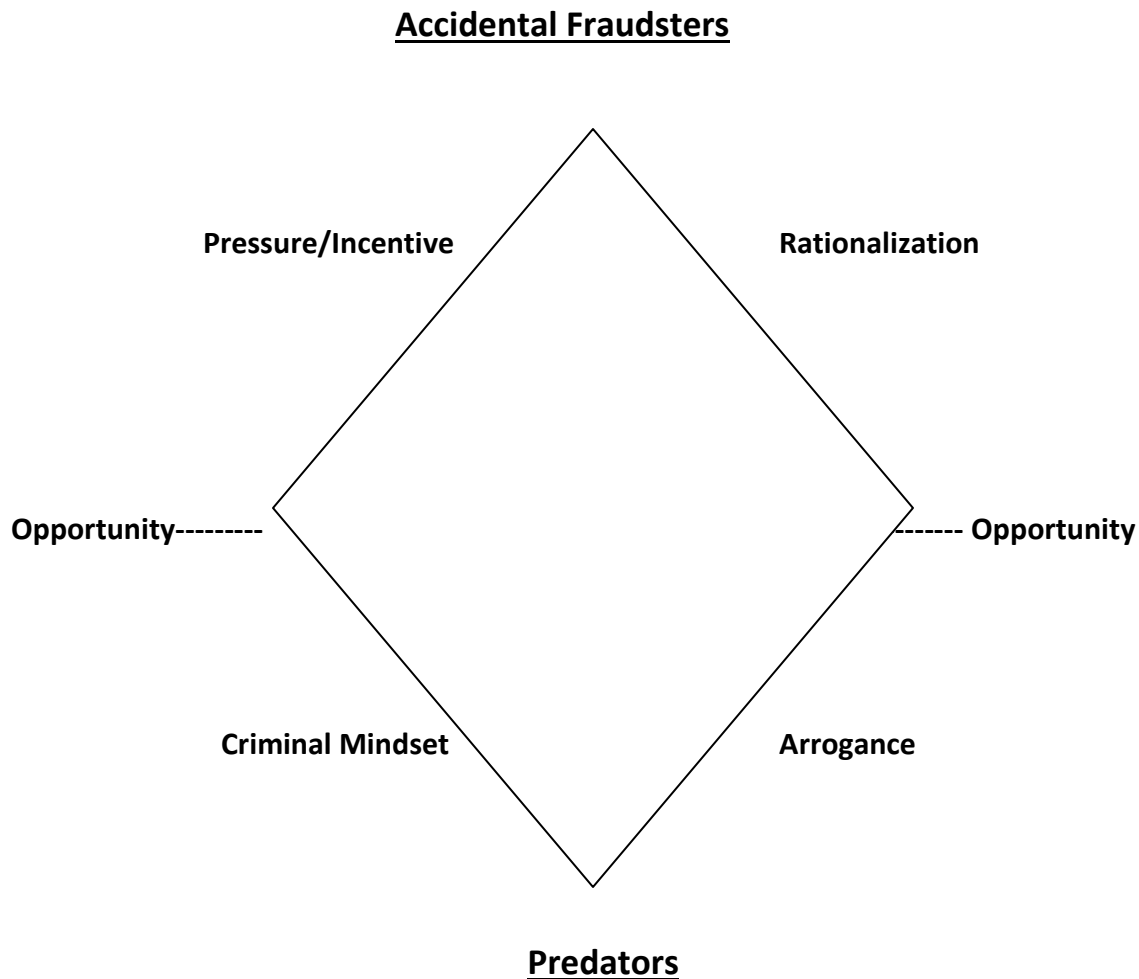
We will change the “Fraud Triangle” to a “Fraud Diamond”. This modification illustrates the equal weight that we should assign to “Capability” when evaluating the potential for fraudulent behavior.



Kranacher, et al (10) examined “Capability” and postulated that there are basically two types of people who engage in fraud. The first category describes the “accidental fraudster”--- usually a first-time offender who has a good reputation among his/her peers, community at their place of work. “The fraud triangle was created with the accidental fraudster in mind.” (10)

Their work also identifies a second category of fraudster---the “pathological fraudster” (AKA “predator”). Predators actively seek-out positions and situations where they can take advantage. They are serial offenders who are only looking for opportunities to commit fraud. Rationalization and pressure/incentive don’t really enter into the criteria mix when they are searching for targets and then actually committing the fraud. They possess the mental *capability*---a combination of criminal mindset plus arrogance---that allows them to commit fraud without experiencing the guilt and/or stress that a responsible person would endure.

We can further modify the fraud diamond to differentiate between “accidental fraudsters” and “predators”. Both classifications share “Opportunity” but the other two fraud components vary by classification.



“CAPABILITY’S” IMPACT ON THE DESIGN AND EFFECTIVENESS OF FRAUD TRIANGLE ANALYTICS (FTA)

Your authors have discovered that attempting to add “Capability” to the FTA process presents some difficulties. *Incentive/Pressure* can be identified (and usually measured in dollars). *Rationalization*, by definition, involves going on the record with an explanation or a defense of one’s actions. *Opportunity* can be identified merely by evaluating a firm’s system of internal controls, searching for deficiencies and weaknesses.

Capability, however, involves delving into the individual’s mind and attempting to determine a person’s thought processes, attitudes and character. This is a very subjective area and one where most auditors have limited experience. Your authors searched for information indicating that at least one entity providing FTA services had taken into consideration “capability” when developing its software---to no avail. This is disappointing, to say the least. And based upon our failed attempts to uncover information supporting the incorporation of a “C-score” (for “Capability”) in the final “Fraud Score”, we may need to reach one of two conclusions.

#1) Currently, purveyors of FTA software are satisfied with the status quo and have decided that ignoring “Capability” doesn’t present problems regarding the effectiveness of FTA.

#2) One or more of the providers has/have considered “capability” and has/have improved their proprietary software to include a “C-score”. However, they have decided not to publish this information at the present time.

So what’s the next step? Maybe auditors need to acknowledge the importance of Human Resources in controlling for fraud risk. When a firm hires for a key position, HR should be conducting (or hiring specialists to conduct) background checks, reference checks, interviews with prior employers etc. etc. etc. All of these activities may provide information regarding a potential hire’s mental characteristics. In addition, there are quite a few psychological methods that allow trained personnel to administer a battery of tests and then evaluate the results. The goal here would be to try to identify those applicants whose mental character, attitude towards responsible and ethical behavior, and ego/arrogance may raise red flags regarding their ability to always act in a principled manner. In short, if a firm can identify which applicants and current employees exhibit some of the mental attitudes characterized by “predators”, the employer can develop a C-score for that person.

With a C-score in hand, an employer can make better decisions regarding who to hire. As far as current employees are concerned, the C-score could easily be factored into the overall

fraud score, improving a firm's ability to identify potential problems either before they come to fruition or very shortly afterwards.

We also believe that C-scores could be very helpful in identifying which persons may be more likely to be predators, as opposed to the accidental fraudsters. Predators are generally methodical, look for weaknesses and are very focused regarding their plans to commit fraud. They are often repeat offenders and may have left an evidentiary trail regarding their prior illegal activities. Human resources personnel should be included in a firm's anti-fraud activities. HR can help auditors predict which individuals may wander off of the straight and narrow path and, just as importantly, the HR department will be (or at least should be) familiar with labor law. Retrieving and evaluating emails, analyzing people based upon psychological tests, asking questions of family, friends, former employers and others requires a knowledge of labor law so that investigators, in their zeal to identify criminal behavior, don't accidentally step over the line themselves.

CONCLUSIONS

As mentioned earlier, we were disappointed not to have discovered any evidence regarding the addition and implementation of “C-scores” in the “Fraud Score” assigned to key employees. Our conclusion (and we admit that we are using the term without satisfactory corroborating evidence---how does one prove a negative?) could be one of the two mutually exclusive statements below.

#1) Currently, purveyors of FTA software are satisfied with the status quo and have decided that ignoring “Capability” doesn’t present problems regarding the effectiveness of FTA.

#2) One or more of the providers has/have considered “capability” and has/have improved their proprietary software to include a “C-score”. However, they have decided not to publish this information at the present time.

Although our conclusion(s) regarding the “C-score” and its importance for FTA are not very helpful, the authors are still fans of FTA procedures that rely on “O”, “P”, and “R” scores.

Fraud Triangle Analytics can save more than just dollars lost to embezzlement or the necessity to restate financial statements. Investigative and litigation expenses will be minimized if fraud can be discovered and stopped in its earliest stages (preferably during the planning stage). Painstaking and time-consuming document-by-document evaluations are no longer necessary to try and pinpoint high-risk areas/individuals.

The big advantage for FTA is that the procedures can be applied proactively. No matter how strong of a case you can build after discovering fraud, it is always better to prevent the fraud from occurring in the first place.

FTA, when contracted out, currently costs about \$1,500 per gigabyte of information analyzed. That price will decrease as more and more competitors enter the market and begin offering FTA services. FTA is still new---but more and more firms are discovering how efficient and effective it can be.

Per Torpey, *et al*, (12)FTA, though still in its infancy, is a powerful weapon against fraud. They mention seven observations:

1. The Fraud Triangle still works
2. Use FTA for high-risk operations
3. Know the regulations and laws
4. Anti-bribery and corruption keywords are particularly effective

5. FTA works well for early assessment of fraud
6. FTA complements internal auditing tests of structured data
7. FTA can be customized to a company, for an industry, and for a certain region or country

As companies try to cut costs without cutting internal control effectiveness, they will discover that FTA is an efficient way to economically achieve their goals. Hopefully, we will see a C-score included as a fourth variable in the future.

REFERENCES

- (1) Cressey, Dr. 1973 *Other People's Money-A Study in the Social Psychology of Embezzlement* Paterson Smith Publishing Company NJ
- (2) Albrecht, Wernz & Williams 1995 *Fraud: Bringing Light to the Dark Side of Business*
- (3) ACFE 2010 *Report to the Nations on Occupational Fraud and Abuse* Austin, TX
- (4) Torpey, D., Walden, V., and Sherrod, M. 2009 Exposing the Iceberg Part 1 Fraud Magazine May/June
- (5) Crumbley, Heitger & Smith 2003 *Forensic and Investigative Accounting* Chicago, IL CCH Publishing, Inc. AICPA SAS #82 Consideration of Fraud in a Financial Statement Audit (Superseded by SAS 99)
- (6) Albrecht, Howe & Romney 1984 *Deterring Fraud: The Internal Auditor's Perspective* IIA Research Foundation
- (7) Razaee and Riley 2010 *Financial Statement Fraud: Prevention and Detection* Wiley & Sons
- (8) Razaee 2002 *Financial Statement Fraud* John Wiley and Sons
- (9) Wolfe and Hermanson 2004 The Fraud Diamond: Considering the Four Elements of Fraud
The CPA Journal December
- (10) Kranacher, Riley and Wells 2010 *Forensic Accounting and Fraud Examination* Wiley & Sons
- (11) Torpey, D., Walden, V., and Sherrod, M. 2009 Exposing the Iceberg Part 2 Fraud Magazine July/August
- (12) Torpey, D., Walden, V., and Sherrod, M. 2010 Fraud Magazine May/June
- (13) Dorminey, J., Fleming, A., Kranacher, M., & Riley, R. 2010 Beyond the Fraud Triangle The CPA Journal July

USING INTERRUPTED TIME SERIES TO PREDICT STOCK PRICES WHEN THE COMPANY ISSUES AN EARNINGS WARNING

Craig G. Harms, The University of North Florida, 4567 St. Johns Bluff Rd. So.,
Jacksonville, Fl 32224, 904-620-2780, charms@unf.edu

ABSTRACT

If a Fortune 500 company issues an earnings warning, the stock price will be affected, sometimes to a huge negative degree. This paper looks at a method of forecasting the price of a stock by calling the earnings warning a “critical event” and using Interrupted Time Series (ITS). A second critical event may occur when the actual earnings are released creating a second “critical event.” There will be a “straw person” example to show the ITS is a valid method of forecasting when there are large changes in stock price due to critical events.

Topics: time series, seasonality, multiple regression analysis, interrupted time series.

INTRODUCTION

Technical Analysis is a process of looking at graphs and historic stock prices and not much at fundamentals of a company to predict the price of a stock. Making technical analysis understandable to the common person is a very difficult process. Listening to the experts on CNBC or Fox Business Network can make your head spin. Using the forecasting technique of Time Series Analysis rather than Exponential Smoothing makes the process somewhat easier since most people have been introduced to Time Series in a Statistical Analysis or Quantitative Method class in their college careers. Going one step further using Interrupted Time Series to identify when a company makes a pronouncement that affects the stock price greatly should make the forecast more accurate.

RESEARCH GOAL

The ultimate goal of this paper is to determine the price of Bed Bath and Beyond’s stock after the announcement of lower than expected earnings followed by the actual earnings release. The day after the warning saw a sharp drop in the price of the stock. There was a slow recovery over several weeks. However, when the actual earnings report was released, the stock dropped again. It is of interest to bring these “critical events” into the forecast model, hoping for better results versus just calling the effects of the announcements “noise.”

There is a secondary goal from the faculty point of view. Interrupted Time Series (ITS) is a very powerful tool that is not often brought to the classroom. When one thinks about all of the “critical events” that can occur in the business world that can affect everything from sales to costs to profits to stock price, it may be a good thing for the classroom education to more than merely mention ITS in passing.

STEPS IN THE PRESENTATION OF INTERRUPTED TIME SERIES

This “case” of introducing ITS is a multi-day process with several steps. Table One presents a list of tasks the students and faculty must accomplish during the six class assignment:

TABLE ONE

Six Steps Used to Validate the Use of Interrupted Time Series

- 1) Present the Research Goal and Present the straw person model.
- 2) Perform statistical analysis using a time series model with trend and seasonal indexes.
- 3) Perform statistical analysis with the addition of ITS.
- 4) Present the Bed, Bath, and Beyond Model.
- 5) Perform statistical analysis on BBBY stock price using time series with trend and seasonal indexes.
- 6) Perform statistical analysis with the addition of ITS.

THE STRAW PERSON MODEL

To get more practice with ITS and before putting the technique to the test, an easier example is used. Coca Cola stock split two for one on August 13, 2012. If we download 65 weeks of Friday closing prices from Finance.Yahoo.Com ending September 7, 2012, we will have the first 61 weeks at a price level in the area of \$70-\$80 and weeks 61 through 65 with a stock price in the area of \$37-\$39. (Finance.Yahoo does not adjust for stock splits). If we perform a time series analysis on these 65 weeks of data, the following statistics can be calculated:

TABLE TWO

Time Series of Coca Cola With Pre and Post Split Prices

B-zero	\$69.06445
B-one	-\$0.00877 / week
Standard Deviation	\$8.926
R-square	0.00035

A scatter plot of the 65 closing stock prices clearly shows the last four prices are about one-half of the first 61. The addition of seasonal indexes (13 weekly indexes) makes for spurious information by assuming that the last four weeks were merely “bad” weeks for the stock price.

ACCOUNTING FOR SEASONALITY

Seasonality in a time series model is straight forward. Seasonality in a multiple regression model is far more complicated and takes several steps. A multiple regression model is necessary when adding the two variables for the “critical event” in the ITS process. Why try to account for

seasonality in a stock price? Every 13 weeks a company releases earnings information and usually pays a dividend. There may be some slight seasonality attached to these two occurrences. The steps to account for seasonality in a multiple regression model and results are described below:

Step 1: Develop a matrix of 12 dummy variables--weeks #1 through #12--for this case. There is no week #13 dummy variable. Thus when the computer calculates the B-coefficients for each of the twelve weeks, that figure is the difference between the particular week (#1-#12) and the 13th week. For example, weekly seasonal index #1 from the computer program is 6.41516. This means that the price of Coca Cola in week #1 is \$6.415 (per week) more than in week #13. Thus to calculate the additive seasonal indexes so that we can talk about the usage in week #1 relative to week #1, more steps are required.

Step 2: Add up the values of the twelve B-coefficients, week #1 through week #12. For this case, that summation is 64.605539. The 13th week is given a seasonal index value of 0.0. Divide this summation by the 13 indexes. This average is 4.9696568.

Step 3: Subtract 4.9696568 from each of the thirteen seasonal indexes (12 from the computer output plus #13) and add 4.9696568 to the B-zero value (63.18623) to become 68.155886. The first week's index becomes +1.4455032 and the 13th index becomes -4.9696568.

Table Three presents the numerical results of the above three steps and the statistical measures of the output. The output of the Time Series Model with Seasonal Adjustment is also included for comparison purposes.

TABLE THREE

Trend and Seasonality in Time Series and Multiple Regression

<u>Measure or Variable</u>	<u>Trend & Seasonal Model Multiple Regression Model</u>	<u>Trend & Seasonal Time Series Model</u>
B-zero	68.1559	69.0645
B-one	0.01876	-0.00877
Standard Deviation	9.0217	8.1335
R-square	0.173327	0.17001
F-statistic	0.822543	
Sum of Squares Regression	870.3287	853.675
Sum of Squares Error	4150.988	4167.642
Sum of Squares Total	5021.317	5021.317

TABLE THREE (continued)

	<u>Seasonal Index</u>	<u>Seasonal Index</u>
week #1	+1.4455	+1.2803
week #2	+1.0627	+0.9251
week #3	+2.8640	+2.7538
week #4	+2.3052	+2.2226
week #5	+1.5785	+1.5234
week #6	+2.6857	+2.6582
week #7	+3.4309	+3.4309
week #8	+3.2982	+3.3257
week #9	+3.0794	+3.1345
week #10	-5.4074	-5.3248
week #11	-5.6621	-5.5520
week #12	-5.7109	-5.5732
week #13	-4.9697	-4.8045

The numeric values of the various measures or variables in the two models are very similar. The slight differences must be due to the actual method of calculation. However, both are “correct” or at least valid because the Sum of Squares Total is the same in both models. However, it is easy to see that these models did not account for the stock split in week #62 (four weeks ago). The seasonal indexes for week #10 through week #13 are extremely negative, as expected, but horribly incorrect. We certainly could not use this model to predict the price of Coca Cola.

The next step is to account for the critical event, the stock split using interrupted time series.

USING INTERRUPTED TIME SERIES -- GENERAL MODEL STATEMENT

Each critical event requires the addition of two independent variables. The basic model is developed from the model used in Coleman and Wiggins [2].

$$\text{Dependent Variable} = B(0) + [B(1) * \text{TREND}] + [B(2, 3, \dots, 14) * \text{DUMMY}] + [B(15) * \text{SHIFT}] + [(B16) * \text{TRCHGE}] \quad (1)$$

- Where:
- Dep. Var is the price of the stock
 - TREND is for the time series variable.
 - DUMMY is for the matrix of 12 dummy variables for the weeks or the seasonality plus the 13th week calculated from output regression information. (a total of 13 variables)
 - SHIFT is the change in price due to the critical event. This could be thought of as another B(0) for the model.

SHIFT = 0 for all pre-event weeks;
 SHIFT = 1 for all post-event months.

TRCHGE is the change in the trend component due to the effects of the critical event.

TRCHGE = 0 for all pre-event weeks;

TRCHGE = 1 for the first post-event week;

TRCHGE = 2 for the second post-event week, etc.

Table Four presents the numerical results with the critical event included in the model. The multiple regression model without the critical event is included for comparison purposes.

TABLE FOUR
Taking Into Account the Stock Split for Coca Cola

<u>Measure or Variable</u>	<u>Trend & Seasonality Multiple Regression Model Stock Split</u>	<u>Trend & Seasonal Model MultipleRegression Model</u>
B-zero	64.57782	68.1559
B-one	0.197678	0.01876
Standard Deviation	2.388561	9.0217
R-square	0.944326	0.173327
Adj R-square	0.927283	
F-statistic	55.4084	0.822543
Sum of Squares Regression	4741.761	870.3287
Sum of Squares Error	279.556	4150.988
Sum of Squares Total	5021.317	5021.317
Stock Split B(0) [shift]	-35.4795	
Stock Split B(1) [change]	-0.9265	
	<u>Seasonal Index</u>	<u>Seasonal Index</u>
week #1	+0.1931	+1.4455
week #2	-0.3686	+1.0627
week #3	+1.2537	+2.8640
week #4	+0.5161	+2.3052
week #5	-0.3896	+1.5785
week #6	+0.5387	+2.6857
week #7	+1.1050	+3.4309
week #8	+0.7934	+3.2982
week #9	+0.3957	+3.0794
week #10	-0.9888	-5.4074
week #11	-1.2372	-5.6621
week #12	-1.2796	-5.7109
week #13	-0.5319	-4.9697

The results are stark! The Interrupted Time Series Model has superior model measures. The four weeks since the stock split were quantitatively handled by the model. Granted, it has taken many pages and several models to validate that Interrupted Time Series is very helpful to quantify critical events. The second part of this paper is to use ITS to predict the price of a stock, Bed, Bath, and Beyond (BBBY) when there was an earnings warning.

Management issued an earning warning during the week ending June 22, 2012. The stock hit a high during that week of \$75.85 and after the warning hit a low of \$58.77. Two models will be compared as we did with the Coca Cola example. One model will not take into account the critical event of the earnings warning and the other model will use ITS to Quantify the effects of the warning. Both are presented in table Five. The data from BBBY ends with Friday's close, September 14, 2012.

TABLE FIVE

Taking Into Account the Earnings Warning for BBBY

<u>Measure or Variable</u>	<u>Trend & Seasonality Multiple Regression Model</u>	<u>Trend & Seasonal Model MultipleRegression Model</u>
	<u>Earnings Warning</u>	
B-zero	53.761784	56.068417
B-one	0.306964	0.191633
Standard Deviation	2.85696	3.816551
R-square	0.768155	0.569369
Adj R-square	0.697182	0.4596
F-statistic	10.82321	5.186979
Sum of Squares Regression	1325.121	982.2002
Sum of Squares Error	399.9487	742.8692
Sum of Squares Total	1725.069	1725.069
Stock Warning B(0) [shift]	-11.6268	
Stock Warning B(1) [change]	+0.590041	
	<u>Seasonal Index</u>	
week #1	-0.1265	-1.5265
week #2	+0.1806	-0.9861
week #3	+1.2101	+0.5562
week #4	+0.7186	+0.0186
week #5	+1.0916	+0.6250
week #6	+1.2510	+1.2153
week #7	-0.8763	-0.8763
week #8	-0.8853	-0.6519
week #9	-2.1422	-1.6756
week #10	-1.2772	-0.5772
week #11	-0.8842	+0.0492
week #12	+0.0872	+1.0795
week #13	+1.3499	+2.7499

USING THE MODELS TO PREDICT THE PRICE OF BBY STOCK

For comparison purposes we want to use both models to predict the price of Bed, Bath, and Beyond stock for Friday, September 14, 2012 which is the next Friday.

$$\begin{aligned} \text{BBY}(9/14) &= [56.068417 + 0.191633 * (66)] - 1.5265 && (2) \\ &= \$67.1896 \end{aligned}$$

$$\begin{aligned} \text{BBY}(9/14) &= [53.761784 + 0.306964 * (66)] - 0.1265 \\ &\quad - 11.6268 + 0.590041 * (14) && (3) \\ &= 73.8949 - 11.6268 + 8.260574 \\ &= \$70.5286 \end{aligned}$$

Which forecast is better? The reason we spent pages developing the Coca Cola example is to show that statistically the model with the use of ITS is superior because the bottom line measures of performance are better. The adjusted R-square of the ITS model is better in the Coca Cola example which was the straw person example. The adjusted R-square is better in the BBY example, 0.69 versus 0.45. Although not as stark as the Coca Cola example, the model's measures of performance are much better.

Since the model with ITS is better, how can I use it to help me make a buy or sell decision for BBY? John Bollinger "developed" the Bollinger Bands which are the end points of a 95% confidence interval and uses these as buy and sell signals. Using the forecast of \$70.53, let's develop the end points of a 95% confidence interval:

$$P [F(9/14) - 2 \sigma \leq \text{BBY} \leq F(9/14) + 2 \sigma] = 95\% \quad (4)$$

$$\$70.53 - 2 (2.857) \leq \text{BBY} \leq \$70.53 + 2 (2.857) = 95\%$$

$$\$64.82 \leq \text{BBY} \leq \$76.24$$

Therefore, if the price of BBY falls below \$64.82, and if there are no horrible fundamental new announcements, this would indicate that it is time to buy the stock. If the stock price goes above \$76.24 and I own the stock and there has been no buyout announcement from another company, it is time to sell the stock.

NOW FOR THE REST OF THE STORY

During the week of September 21st, BBBY released their earning per share. As expected the E.P.S. was lower than originally discussed and in line with the lowered expectations previously discussed. However, the stock dropped precipitously. This created a second critical event. Therefore, one final model was developed as presented below:

$$\begin{aligned}
 \text{Dependent Variable} = & B(0) + [B(1) * \text{TIME}] + [B(2) * \text{SHIFT/WARNING}] \\
 & + [(B3) * \text{TRCHGE}] + [B(4) * \text{SHIFT/RELEASE}] \\
 & + [B(5) * \text{TRCHGE}] \qquad \qquad \qquad (1)
 \end{aligned}$$

Where: Dep. Var is the price of the stock.

TIME is for the time series variable.

B(2) SHIFT and B(3) TRCHGE is for the announcement of lower earnings

B(4) SHIFT and B(5) TRCHGE is for the actual earnings release.

Table Six presents the results. The 65 weeks of price data ends Friday, September 28, 2012. The seasonal indexes were dropped due to the non desired complexity.

TABLE SIX

Taking Into Account the Earnings Warning and Actual Earnings Release for BBBY

<u>Measure or Variable</u>	<u>Value</u>
B-zero	53.91247
B-one	0.319221
Standard Deviation	2.750945
R-square	0.734593
Adj R-square	0.712101
F-statistic	32.65999
Sum of Squares Regression	1235.805
Sum of Squares Error	446.4942
Sum of Squares Total	1682.299
Stock Warning B(0) [shift]	-11.1316
Stock Warning B(1) [change]	+0.485669
Stock Release B(0) [shift]	-9.06549
Stock Release B(1) [change]	+0.62511

Finally, a comparison is made with the model from Table Five with the one critical event and the seasonal indexes and the model from Table Six with the two critical events and no seasonal indexes. We are forecasting for the next week into the future, Friday, October 5, 2012.

$$\begin{aligned}
 \text{BBBY}(10/5) &= [53.761784 + 0.306964 * (68)] + 1.2101 \\
 &\quad - 11.6268 + 0.590041 * (16) \qquad \qquad \qquad (3) \\
 &= 74.635292 - 11.6268 + 9.440656 \\
 &= \$72.449
 \end{aligned}$$

$$\begin{aligned}
 \text{BBBY}(10/5) &= [53.91247 + 0.319221 * 66] - 11.1316 + 0.485669 (16) \\
 &\quad - 9.06549 + 0.62511 (3) \\
 &= 74.981056 - 11.1316 + 7.770704 - 9.06549 + 1.87533 \\
 &= \$64.430
 \end{aligned}$$

The closing prices for the last three weeks are: \$71.6, \$61.57, and \$63.00. Therefore the forecast of \$64.43 seems very reasonable as BBBY tries to climb out from its second self induced pit.

CONCLUSION

Practice, practice, practice is very important in quantitative courses. This paper provides a good amount of practice with forecasting using Time Series with Trend and Seasonal components. It also introduces the reader to Interrupted Time Series. This is a very usable topic for future business managers or current managers. It is logical and not too mathematical. However, several examples are needed to fully understand the concepts and the mechanics behind its use.

REFERENCES

1. Andrews, Robert L., "A Data Collection and Analysis Project for a Statistics or Quality Management Course," Proceedings of the Southeast Decision Science Institute, 1995, page 127.
2. Coleman, B. Jay and Wiggins, C. Donald, "Using Interrupted Time Series Analysis to Access an Allegedly Damaging Event," Litigation Economics Digest, 1986.
3. Davis, Arthur and Harms, Craig G., "Are We Really Going Green? The Development of a Student Case Using Multiple Regression. Proceedings of the

Southeast Decision Science Institute, 2009.

4. Harms, Craig G., "Using Interrupted Time Series Analysis and Multiple Regression to Predict Daily Prices of a Closed End Mutual Fund," Proceedings of Southeast INFORMS, October, 2002.
5. Murphy, John J., Technical Analysis of the Futures Markets, Prentice Hall, 1986.
6. Neter, J, Wasserman, W. , and Kutner, M. H., Applied Linear Statistical Models, 3rd edition, Richard D. Irwin, Burr-Ridge Illinois, 1990.

Do Cotton Fiber Characteristics Still Offer Competitive Advantages

During Times of High Cotton Fiber Prices?

Forrest Stegelin, stegelin@uga.edu , Dept. of Agricultural and Applied Economics

University of Georgia, Athens, GA 30602-7509

Key Words: textiles, cotton fibers, competitive advantage, trade, cotton fiber characteristics

Abstract: The latest USDA cotton forecast (USDA *Cotton and Wool Outlook*, 12/12/12) for 2011/2012 indicates that global cotton consumption is expected to rise 3% from last season's 8-year low as the global economy experiences a slow recovery. This season's projected increase follows two consecutive years of decline when cotton prices reached unprecedented levels. Cotton prices were also driven higher by demand from developing countries where rising wealth boosted consumption patterns. Complicating the issue is that the companies can't blend their way out of the problem, even with the allowance of a three-percent tolerance on the labeled blending percentage. Polyester prices are also rising, climbing 25-percent, driven by oil prices and higher demand from manufacturers switching away from cotton. Switching to more blends using manmade fibers is not without peril, as petroleum (and the associated price variability) is a base ingredient in polyester and other manmade fibers.

Background:

During the 2011 cotton marketing season, USDA cotton projections indicated the world mill use for textiles was forecast to decrease minimally as prices continued at unprecedented levels among tight supplies. Buyers and sellers of cotton fiber understand that price rations supply, and with a smaller cotton ending stocks forecast (supply) and slightly higher demand expectations, the stocks-to-use ratio was forecast at a record low percentage. According to

USDA, the 2010-11 average upland cotton farm-level prices were forecast to range between 76-86 cents per pound, which was over a \$1 per pound less than the \$2 peak during the prior season. Futures cotton prices one and two years out, at the time of the USDA report, were hovering around \$1.25 per pound – a sharp increase in raw material costs that the textile mills and apparel manufacturers see as 80-percent of their respective costs of production.

What a difference a year makes, as average upland cotton prices are back in the 7s – 72 to 76 cents per pound (a 50-cent drop from the year prior). The latest USDA estimates for 2012-2013 suggest world consumption to remain the second lowest level in nearly a decade (14 percent below the 2006/2007 peak) as the weak global economy, raw cotton and labor costs increase, and competition from manmade fibers keep cotton use below the levels experienced in the mid-2000s, thereby keeping prices suppressed from the \$2.00 a pound peak of 2011.

The top four cotton-spinning countries – China, India, Pakistan, and Turkey – are forecast to account for nearly three-fourths of global cotton consumption in 2012/2013. The three spinners, China, India and Pakistan, combined, account for a share forecast at 65 percent (two-thirds) of the total. Some shifts in market share are expected as consumption shifts to the lower cost spinners. Amid the sluggish global economy, total US textile fiber trade has declined for both imports and exports. Cotton products continue to account for most of US textile and apparel trade, although fiber substitution toward manmade fibers has taken its toll on the US market share of cotton textile and apparel.

United States cotton textile trade continues to be affected by the sluggish global economy of 2012. Both cotton product imports (raw-fiber equivalent) and cotton product exports declined, resulting in a further decline in the net cotton trade deficit.

For cotton product imports to the US, the top five suppliers combined for nearly two-thirds of the total during the first half of 2012. Among the leading suppliers (China, Pakistan, India, Mexico, and Bangladesh), the share of total imports increased for both China and India with China accounting for nearly a third of US cotton textile and apparel imports. For US cotton product exports, the top five destinations through the first six months of 2012 accounted for a steady share of nearly 85-percent of the total. Among the top five destinations (Honduras, Mexico, Dominican Republic, Canada, and El Salvador) only exports to Canada were higher, and Honduras was the leading destination with about a one-third market share.

Problem and Research Question:

Consumers paid more for clothing as the skyrocketing cotton prices in 2011 forced companies to increase prices even as consumer spending remained sluggish. Cotton prices were also driven higher by demand from developing countries where rising wealth boosted consumption patterns. Complicating the issue is that the companies can't blend their way out of the problem, even with the allowance of a three-percent tolerance on the labeled blending percentage. Polyester prices are also rising, climbing 25-percent, driven by oil prices and higher demand from manufacturers switching away from cotton.

To be competitive in cotton textile manufacturing, companies, by necessity, must avoid contamination, minimize short fibers, avoid neps, and efficiently move quality cotton through the supply chain. So, is the \$1+ cotton applicable for all apparel quality standards, or does the price-quality inference verify a higher priced product being the higher quality product? Does the same hold true for cotton fibers at the cotton gins and textile mills? Do textile and apparel manufacturers pay a premium for cotton fiber with the desired quality characteristics (grade;

staple length; staple strength; fiber fineness; fiber maturity; uniformity ratio; fiber elongation; feel; non-lint content; sugar content; moisture content; grey value; yellowness; and neppiness)?

Cotton textile mills and manufacturers staunchly claim the high cotton fiber prices have removed any competitive advantages associated with cotton fiber characteristics. They contend cotton production is a derived demand of a value-added product directly or indirectly from consumers' demand for clothing, that the consumer demand for clothing is elastic and not inelastic. Are fiber characteristics perceived or real, with today's apparel manufacturing technologies? Can US brands stay price competitive in times of very high cotton fiber prices? Are there regional implications in the US for upland cotton and extra long staple (ELS) cotton in the Southeast, Delta, Southwest and West?

Analysis Methodology and Results:

Collaborating with the Center for Apparel Research of Clemson University, the National Cotton Council, and Cotton Incorporated, cotton fiber characteristic data is being analyzed as to usage to determine if a price-quality inference and any resulting differentiation can further instill competitiveness in the textile and apparel industries during times of high cotton fiber prices. Initial observations hint that cotton is evaluated as a commodity and that any margins (and profits) will go to the manufacturer or brand that avoids the high quality temptation because those products require the superior fiber characteristics for which either a premium price must be paid or additional costs in screening and separating the fibers must be incurred. Pricing actions by apparel manufacturers strongly suggest they are acting rationally by raising prices as if the demand is inelastic to increase revenue. Varietal selection by cotton producers may also offer some relief in cotton fiber characteristic differentiation. Switching to more blends using

manmade fibers is not without peril, as petroleum (and the associated price variability) is a base ingredient in polyester and other manmade fibers.

Selected References

National Cotton Council of America. Cotton and Textiles. www.cotton.org/econ/textiles/cotton-and-textiles . 1999.

Meyer, Leslie, Stephen MacDonald and James Kiawu. *Cotton and Wool Outlook* reports. United States Department of Agriculture, CWS-12i. December 12, 2012.

United States Department of Agriculture *World Agricultural Supply and Demand Estimates* (USDA WASDE) reports.

<http://usda.mann.lib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1194>

Impact of the Panama Canal Expansion on Corn Exports in the Southeast Region of the United States - A Literature Review

Abstract:

Corn exports are very important to U.S. economy. It accounts for more than 10% of all agricultural export value and makes the most significant contribution to the U.S. agricultural trade balance. Approximately 50 percent of the U.S. corn export flow from major ports in the southeast U.S. to world leading importers in East Asia via Panama Canal. The Panama Canal Expansion (PCE) project, scheduled for completion in 2014, will allow much bigger container ships and other cargo vessels to easily reach East Asia from U.S. southeastern ports. This will definitely have a tremendous impact on U.S. corn exports, but the scale of this impact has not been investigated. We review the current literature on Panama Canal Expansion and its relation to corn exports. This paper also provides discussions on quantitative methods to assess the scale of the impact of PCE on corn exports in the southeast U.S.

Keywords:

Corn Exports, Panama Canal Expansion, Southeast Economy

Guohua Ma, Assistant Professor, South Carolina State University,
300 College Street NE, Orangeburg, SC 29117, 803-536-8173, gma@scsu.edu
LaKeethia M. Curry, Undergraduate Student, South Carolina State University, 300 College
Street NE, Orangeburg, SC 29117, currygirl06@gmail.com
Austin M. James, Undergraduate Student, South Carolina State University,
300 College Street NE, Orangeburg, SC 29117, ajames1@scsu.edu

1. Introduction

Although various studies have been conducted recently to investigate the impact of Panama Canal Expansion (PCE) on different areas [1, 2, 3, 4, 5, 6], the impact of PCE on U.S. corn exports received little attention. U.S. corn exports will be highly affected by the expansion project, because approximately 50% of the U.S. corn exports [7] transit from major ports in the southeast region of the United States to East Asian countries through the Panama Canal. As the demand on corn from East Asian countries keeps growing constantly [8, 9], more corn exports are expected to flow from Gulf and Atlantic ports to East Asia after PCE. This will bring tremendous economic opportunities to southeast states in the following two aspects. First, because the expanded Panama Canal is expected to be a cost-effective route for corn exports, as long as the increase of toll rates is less than the cost saving from the expansion, more corns produced in the Midwest states will be shipped via inland waterways and exported from the Gulf and Atlantic ports to East Asian countries through the canal. This will increase the revenue of major ports and bring more employment opportunities in the southeast region. Second, it is anticipated that the completion of PCE will have enormous effect on the rural economy through the southeast ports. It will bring tremendous opportunities to local farmers for exporting their agricultural products. We expect to see both employment and producer revenue increase in this region after the expansion.

2. Problem Description

The Panama Canal is a 48-mile long ship canal in Panama that connects the Atlantic Ocean and the Pacific Ocean as shown in the Figure 1. It is an extremely important conduit for international maritime trade. The construction of the Panama Canal drastically shortens the marine transport distance between the east and west coast. For instance, the marine transport distance between New York and San Francisco via the Panama Canal is about 5,900 miles.

Before the Canal was completed, ships had to take the route around Cape Horn and the distance was 14,000 miles. The transport distance is significantly reduced by 58%.

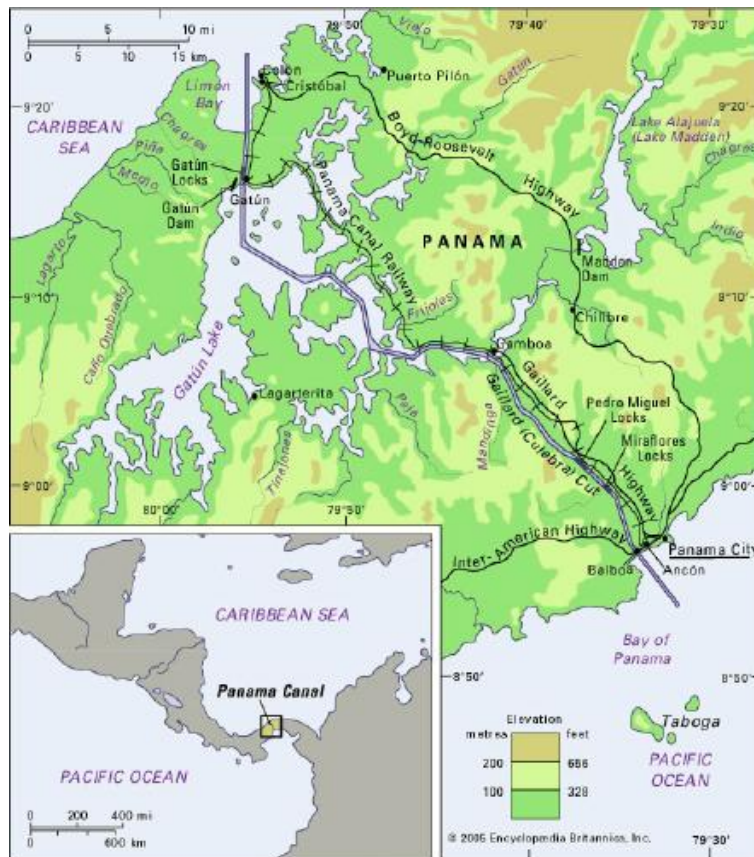


Figure 1 Panama Canal Expansion Project

The PCE project was initiated due to the rapidly growing international freight transportation demand and the heavy congestion. One example is that in March 2008, some ships had to wait more than 8 days to pass through this canal, which significantly increased the shipping costs [10]. When the expansion work is completed in 2014, it will allow post-Panamax size vessels to pass through the Canal, which can handle 14,000 TEU (Twenty-foot Equivalent Unit) compared to the 5,000 TEU for the current Panamax size vessels. This will double the Canal's capacity [11] and solve the congestion problem. Meanwhile, the canal will bring more cargo vessels and containers to the major sea ports along the east coast of the United States. It

will have tremendous impact on many different areas from world commerce to U.S. transportation infrastructures.

Although many studies have been conducted to assess the impact of PCE on a variety of areas, the impact of PCE on U.S. corn exports is overlooked. The United State is the largest producer and exporter of corns. On average, corn exports accounted for approximately 12 percent of the U.S. agricultural export value [8]. Since the leading world importers of corn are located in East Asia, such as Japan, South Korea, China, and Taiwan, a large portion of corn exports transit from the major ports in the southeast region of U.S. to East Asia via Panama Canal. The proportion of corn exports via Panama Canal is expected to grow even larger with the completion of PCE project since the expansion will greatly improve the competitiveness of U.S. corn exports in the world market.

Major ports in the southeast region will greatly benefit from the PCE project as well. The PCE will greatly change port operations, intermodal transportation, and the distribution of total maritime trade among U.S. major ports. Major southeast ports of Charleston, Savannah, Georgetown, New Orleans, and Norfolk are expected to experience the most tremendous increase in growth in container traffic by 2020 [12]. Major southeast ports experience an average of 311.3% increase between year 2004 and 2020, while major ports on west coast experience an average of 272.7% increase for the same period (see Table 1).

Table 1 Growth of Container Traffic in the U.S.

Port	2004	2020	Difference	% change
L.A. - Long Beach	13101.0	59420.0	46319.0	353.6%
Oakland	2043.5	3382.0	1338.5	65.5%
Tacoma	1794.7	4388.0	2593.3	144.5%
Seattle	1776.0	2557.0	781.0	44.0%
<i>Total West Coast</i>	<i>18715.2</i>	<i>69747.0</i>	<i>51031.8</i>	<i>272.7%</i>

Savannah	1662.0	8420.0	6758.0	406.6%
Norfolk	1808.0	6588.0	4780.0	264.4%
Charleston	1860.2	6639.0	4778.8	256.9%
Houston	1437.0	6185.0	4748.0	330.4%
<i>Total East and Gulf Coast</i>	<i>6767.2</i>	<i>27832.0</i>	<i>21064.8</i>	<i>311.3%</i>

U.S. Corn Industry and Trade Overview

Corn exports are very important to U.S. economy. It accounts for more than 10% of all agricultural export value and makes the most significant contribution to the U.S. agricultural trade balance. In the world market, U.S. corn exports represent more than 60% market share during 2003 - 2008. In 2008, U.S. corn exports reach a record high of 61 metric tons.

World demand on corn has been steady and increasing. East Asian countries contribute the largest share of corn imports. Japan is the largest corn importer by far representing about 18% of world corn imports. Its demand on corn is steady since it produces virtually no coarse grain but large amount of meat. South Korea is the second-largest importer accounting for about 9% of world corn imports. China is a fast-growing importer and its demand for corn is expected to increase by fourfold from 500,000 metric tons to 2 million metric tons for marketing year 2012 [9].

As biofuel production expands and global demand for meat production increases, corn demand will remain strong in the long term. In its long-term projections on agricultural products, USDA [13] states “.....U.S. corn exports rise in response to stronger global demand for feed grains to support growth in meat production. Although lower than has been typical in the past, the U.S. share of global corn trade remains above 50 percent in the projections”.

Despite the strong corn demand in foreign countries, the market share of U.S. corn exports has declined significantly from 61.7% in 2008 to 43.6% in 2011/12 (see Table 2). Argentina and other countries (e.g., Brazil, Ukraine, Romania, and South Africa) have gained market share in the world corn export market due to dramatic increase in corn production and exports in these countries.

Another factor contributing to the decline of corn exports in the U.S. is the recent expansion of U.S. meat exports and the expansion of biofuel production, which stir up the domestic demand for corn. Increased domestic demand for corn resulted in less U.S. corn exports in the world market.

Table 2 Leading World Exporters of Corn

Market Year	United States	Argentina	China	Other	Total	US %	Argentina %	Other %
2003/04	48.809	10.439	7.553	12.275	79.076	61.7%	13.2%	15.5%
2004/05	45.347	13.752	7.589	9.338	76.026	59.6%	18.1%	12.3%
2005/06	56.084	10.707	3.727	12.203	82.721	67.8%	12.9%	14.8%
2006/07	54.214	15.693	5.269	16.312	91.488	59.3%	17.2%	17.8%
2007/08	60.663	15.676	0.549	21.398	98.286	61.7%	15.9%	21.8%
2008/09	47.758	8.458	0.172	27.575	83.963	56.9%	10.1%	32.8%
2009/10	49.721	16.971	0.151	26.107	92.950	53.5%	18.3%	28.1%
2010/11	45.254	15.159	0.111	30.811	91.335	49.5%	16.6%	33.7%
2011/12	41	18.5	0.2	34.25	93.950	43.6%	19.7%	36.5%

Source: USDA, Foreign Agricultural Service, [Production, Supply, and Distribution \(PS&D\) Database](#).

Panama Canal Expansion and Corn Exports in Southeast Region

As we can see from Table 2, U.S. share of corn exports has steadily declined over the past 4 years. This imposes great challenges on the corn industry. It is important for the U.S. to remain competitive with foreign suppliers such as Argentina, Ukraine, and Brazil. One of the major factors that affect the efficiency, distribution, and competitiveness of U.S. corn exports will be the expansion of Panama Canal. Expanded Canal capacity is expected to generate a “big surge” in the freight movement. Once the expansion is completed, we will see a significant increase in the number and size of vessels that pass through the Canal. This will attract more corn shipments from the southeast U.S. ports to East Asia. As a result, the congestion problem of West Coast ports will be greatly relieved and bottleneck of world trade via Panama will be broken.

Furthermore, the PCE is expected to reduce ocean freight costs and marine transit time. However, the tolls charged by the Panama Canal Authority could increase substantially after the expansion is completed. The increase in toll rates will offset part of the potential gains from reduced ocean freight costs and transit time. Overall, all-water route via Panama Canal is projected to be cost-effective after the expansion as long as the increase in toll rates is not dramatic. Compared to the intermodal option (rail to West Coast ports), the cost savings from all water-route via Panama Canal is about \$140/TEU, which represent 28% of the current total cost of 490/TEU [3,14, 15].

In summary, the PCE can potentially increase U.S. corn exports since: 1) the present capacity constraint at Panama Canal will be removed; 2) the expansion significantly reduces the maritime cost and transit time thus keeps the cost of goods down. As a result, U.S. corn exports become more competitive in the world market after the expansion. Southeast region of the U.S. in particular will be greatly impacted. First, the tremendous cost advantage of all-water route via Panama Canal offers great opportunity to the corn producers in the southeast region. Both farmer's income and profitability will increase as a result of PCE, which will further stimulate more corn production and exports within the region. Second, corns from "Corn Belt" states such as Illinois, Ohio, Indiana, and other Midwest states that were previously exported by intermodal route via West Coast ports can now be shipped via inland waterways and exported through the southeast ports. As shown in Figure 2, major "Corn Belt" states such as Iowa (19%), Illinois (17%), Ohio(8%), Missouri (4%), and Indiana (4%) account for about 52% of national total corn production. The corns produced from those states can be transported through the Mississippi River system down to southeast ports. The tremendous cost savings brought by PCE (28% reduction [3]) makes it possible to export corns from those states via all-water route. This will further boost corn

exports via southeast ports. Revenue and operating efficiency of inland waterways and major ports in the Southeast region are expected to increase as a result. Investing in Mississippi River locks and southeast port infrastructure is thus crucial to Midwest corn producers to fully tap the Canal's potential.

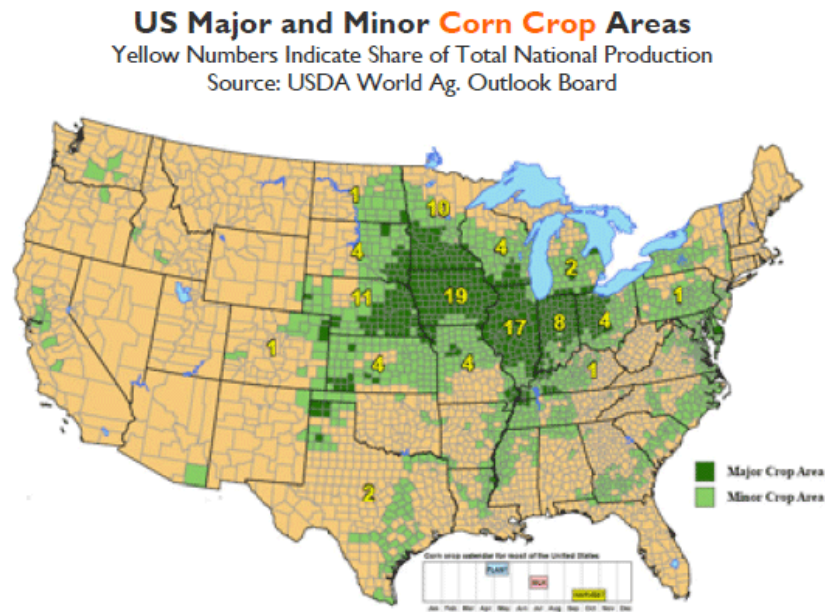


Figure 2 US Major and Minor Corn Crop Areas

A Brief Literature Review and Discussions

Few studies have been recently conducted on the impact of PCE on the exports of agricultural commodities. Moon and Koo [2] evaluated the impacts of alternative Panama Canal toll rates in shipping soybeans from major exporting countries to major importing countries on the U.S.'s competitiveness of soybean exports and the world soybean trade. Costa [3] examines the impact of PCE on the U.S. competitiveness of cotton exports and the world cotton trade. To our knowledge, no existing research addresses the impacts of PCE on U.S. corn exports in southeast U.S. and the scale of the impacts. Given the importance of corn exports in the U.S. agricultural trade and the fact that U.S. corn export share has been declined over the past several years, it is imperative to evaluate the competitiveness of U.S. corn exports after the completion of PCE.

To investigate the impact of PCE on U.S. corn exports in southeast U.S., the spatial equilibrium model is an appropriate method to use. A number of studies have applied the spatial equilibrium model on various research topics. Fuller et al. [16] developed a spatial equilibrium model to examine the effect of grain transportation capacity on the upper Mississippi and Illinois rivers on trade flows. Fuller et al. [17] developed a spatial equilibrium model to evaluate improvements in South America's grain transportation infrastructure and its influence on competitiveness in world grain markets. In addition, Fuller et al. [18] employed an international spatial equilibrium model of the grain economy to evaluate the effect of increasing Canal tolls on U.S. agriculture. Wilson et al. [19] developed a cost-minimizing spatial model of the world grain economy for purposes of estimating long-run grain movements on the Mississippi River. Appropriate econometric models can also be developed to estimate the future trend in regional corn exports.

Summary

The production of corn, its domestic use, its imports, and its exports are all dependent upon methods (roads, waterways, railways) and means of transportation (trucks, barges, ships, rail cars) to realize the economic value of corn. A review of literature has revealed that the United States produces and exports the largest share of corn. Accessing the importing countries in the market for these exports of corn occurs by way of the Panama Canal. Maximizing efficiency and capacity of the Panama Canal accommodates the increase in demands for production, import and export of corn. Another benefit of the Panama Canal's expansion is shipping costs would decrease. The time it takes for a vessel to travel through the canal will also decrease upon the completion of expansion. Corn exports will be greatly impacted by the PCE project. This will bring tremendous economic opportunities to southeast states. We review the

current literature on Panama Canal Expansion and its relation to corn exports. This paper also provide a brief discussion on quantitative methods to assess the scale of the impact.

References

- ¹ Reece F. Shaw. A Primer on the Effect of the Panama Canal Expansion on World Commerce, November 2007, available online at http://aapa.files.cms-plus.com/SeminarPresentations/07_FACENG_Shaw_Reece.pdf, accessed on November 1, 2011.
- ² Sang Y. Moon and Won W. Koo. Effects of the Panama Canal on U.S. Competitiveness on the World Soybean Market, available online at <http://ageconsearch.umn.edu/bitstream/21418/1/sp06mo03.pdf>, accessed on November 1, 2011.
- ³ Rafael Costa, Parr Rosson, John Robinson, and Steve Fuller. The Impacts of the Panama Canal Expansion on World Cotton Trade, available online at <http://www.economia.esalq.usp.br/intranet/uploadfiles/1459.pdf>, accessed on November 1, 2011.
- ⁴ US Army Corps of Engineers. The Implications of Panama Canal Expansion to U.S. Ports and Coastal Navigation Economic Analysis, December 2008, available online at <http://www.iwr.usace.army.mil/docs/iwrreports/whitepaperpanamacanal.pdf>, accessed on November 1, 2011.
- ⁵ S.M. CanagaRetna. The Panama Canal Expansion and SLC State Ports – A Special Series Report, June 2010, available online at https://www.slcatlanta.org/Publications/EconDev/ports_web.pdf, Accessed on November 1, 2011.
- ⁶ Delmy L. Salin. Impact of Panama Canal Expansion on the U.S. Intermodal System, January 2010, available online at

<http://www.ams.usda.gov/AMSV1.0/getfile?dDocName=STELPRDC5082003>, accessed on November 1, 2011.

⁷ Stephen Fuller, Luis Fellin, and Ken Eriksen, The Panama Canal and its Affect on the Competitiveness of the U.S. in International Grain/Oilseed Markets, TAMRC International Market Report, No. IM 1-99, June 15, 1999.

⁸ USDA Economic Research Service, Corn: Trade, available online at <http://www.ers.usda.gov/Briefing/corn/trade.htm>, accessed on December 10, 2011.

⁹ Tom Polansek, USDA Sees More Corn to China, Wall Street Journal, July 12, 2011

¹⁰ Don Winner. Panama Canal Seriously Backed Up, March 2008, available online at <http://www.panama-guide.com/article.php/20080312194725743>, accessed on November 1, 2011.

¹¹ Kimberly Amadeo. Panama Canal Expansion Impact on U.S. Economy, available online at <http://useconomy.about.com/od/tradepolicy/p/Panama-Canal-Expansion-Impact-On-U-S-Economy.htm>, accessed on November 1, 2011.

¹² American Society of Civil engineers (ASCE), Report Card for American's Infrastructure, U.S. DOT, 2005

¹³ Paul Westcott, USDA Agricultural Projections to 2020: U.S. Crops, Outlook Report No. (OCE-111) page 61, February 2011, available online at <http://www.ers.usda.gov/Publications/OCE111/OCE111d.pdf>, accessed on December 10, 2011.

¹⁴ Ashar, A., The Impact of Panama Canal Expansion, Proceedings of TOC Americas 2009, November 2009. Available at <http://www.asafashar.com/publications.html>, Accessed on December 10, 2011.

- ¹⁵ Salin, Delmy, Impact of the Panama Canal Expansion of the U.S. Intermodal System, Agricultural Marketing Service, USDA, Washington, DC: January 2010.
- ¹⁶ Fuller, S., L. Fellin, and W. Grant. Grain transportation capacity of the Upper Mississippi and Illinois Rivers: A Spatial Analysis. *Journal of the Transportation Research Forum*, Vol 38, 1999, pp. 38-54.
- ¹⁷ Fuller, S., T. Yu, L. Fellin, A. Lalor, and R. Krajewski, Effects of Improving Transportation Infrastructure on Competitiveness in World Grain Markets, *Journal of International Food & Agribusiness Marketing* 13(4), (2001): 61-84.
- ¹⁸ Fuller, S., L. Fellin and K. Eriksen, Panama Canal: How Critical to US Exports, *Agribusiness: An International Journal* 16(4),(2000): 435-457.
- ¹⁹ Wilson, W., E. Devuyst, W. Koo, B. Dahl and S. Taylor, Longer-Term Forecasting of Commodity Flows on the Mississippi River: Application to Grains and World Trade. U.S. Army Corps of Engineers, Institute of Water Resources, 2005.

GDP GROWTH, UNEMPLOYMENT, AND INDEXES OF FINANCIAL STRESS

C. Barry Pfitzner and Steven D. Lang, Department of Economics/Business,
Randolph-Macon College, Ashland, VA, bpfitzne@rmc.edu, slang@rmc.edu

ABSTRACT

This project employs a baseline trivariate vector auto-regression (VAR) model to generate forecasts of real GDP growth and the unemployment rate. In addition to the two aforementioned variables, this project also includes an index of financial stress. Estimations reported in this project indicate that measures of financial stress can be useful in forecasting important macroeconomic variables. Out-of-sample forecasts are generated for a horizon of six years.

INTRODUCTION

The current recovery from the “great recession” has been called both slow in terms of economic growth rates, and a jobless recovery. The meaning of this statement is that the economic growth that has taken place in recent quarters has not been robust enough to result in a great deal of job creation, and the growth has done relatively little to lower the unemployment rate toward “normal” levels.

It is commonly acknowledged that the *great recession* had its roots in the financial sector, and that continued financial stress has been one of the causes of the slow recovery from the recession. Most models of the economy, based on data since the 1950s, predicted faster rates of economic growth and a more rapid rate of recovery of employment. This paper presents estimates of a baseline trivariate vector auto-regression (VAR) model that was used to generate forecasts of real GDP growth and the unemployment rate.

MEASURING FINANCIAL STRESS

Because of the focus on the financial sector as a proximate cause of both the recession and slow recovery, many researchers have constructed new indexes of financial stress. The composition and performance of eleven such measures are described in detail by Kliesen, et al. [6]. These measures are categorized as financial stress indexes (FSIs) and financial conditions indexes (FCIs). FSIs attempt to identify evidence of exogenous shocks to the financial sector by combining time series data on varieties of interest rate spreads and asset prices. For example, greater interest rate spreads between forms of debt involving different degrees of risk could indicate more stress. Lower stock prices could be an indication of lower expected earnings or smaller dividends. FCIs include many of the same variables as FSIs *and* a larger set of variables, including various economic indicators since many of them are intended to map directly onto changes in real GDP and other macroeconomic conditions. So for the purposes of this paper, FCIs would be the preferred type of measure of financial stress to be employed.

Most of these FCIs do not extend back very far in time—often only to the early 1990s. Such a short time frame does not provide sufficient data for convincing tests of whether these indexes

will be helpful in predicting important macroeconomic variables such as GDP growth and unemployment rates. There are, however, two indexes that extend to the early 1970s, covering a period of time that includes six recessions. That time frame is sufficiently long to judge whether the indexes can be helpful in predicting growth and unemployment. One of these indexes, which is produced by Hatzius, et al. [5], was not available for use in this project. The other, which is produced by the Federal Reserve Bank of Chicago and is termed the National Financial Conditions Index (NFCI) is available on-line.

The NFCI is a comprehensive weekly update on U.S. financial conditions that includes data on 100 variables reflecting conditions in money markets (28), debt and equity markets (27), and traditional and “shadow” banking systems (45). These data include prices, volumes, and surveys of financial activity. The index is a weighted average of quarterly (25), monthly (34), and weekly (41) indicators of U.S. financial activity.

The money markets reflected in the NFCI are repurchase agreements, treasuries, commercial paper, and interbank lending. The corresponding variables include total repo market volume, the 2-year interest rate swap/Treasury yield spread, the 1-month nonfinancial commercial paper A2P2/AA credit spread, and the 3-month TED spread (LIBOR-Treasury).

The debt and equity markets are corporate bonds, securitized debt, stock markets, municipal bonds, and collateral prices. Examples of associated variables include the Merrill Lynch High Yield/Moody's Baa corporate bond yield spread, the Citigroup Global Markets ABS/5-year Treasury yield spread, CBOE S&P 500 Volatility Index (VIX), the Municipal Bonds Bond Market Association Municipal Swap/20-year Treasury yield spread, and the MIT Center for Real Estate Commercial Property Price Index.

The NFCI data on the banking system include measures of consumer credit conditions, banking system conditions, shadow bank assets and liabilities, business credit conditions, and commercial bank assets and liabilities. These measures include the Consumer Credit Conditions Senior Loan Officer Opinion Survey: Tightening Standards on RRE Loans, the Credit Derivatives Research Counterparty Risk Index, total assets of funding corporations/nominal GDP, Senior Loan Officer Opinion Survey: Tightening Standards on Small C&I Loans, and commercial bank C&I loans/total assets.

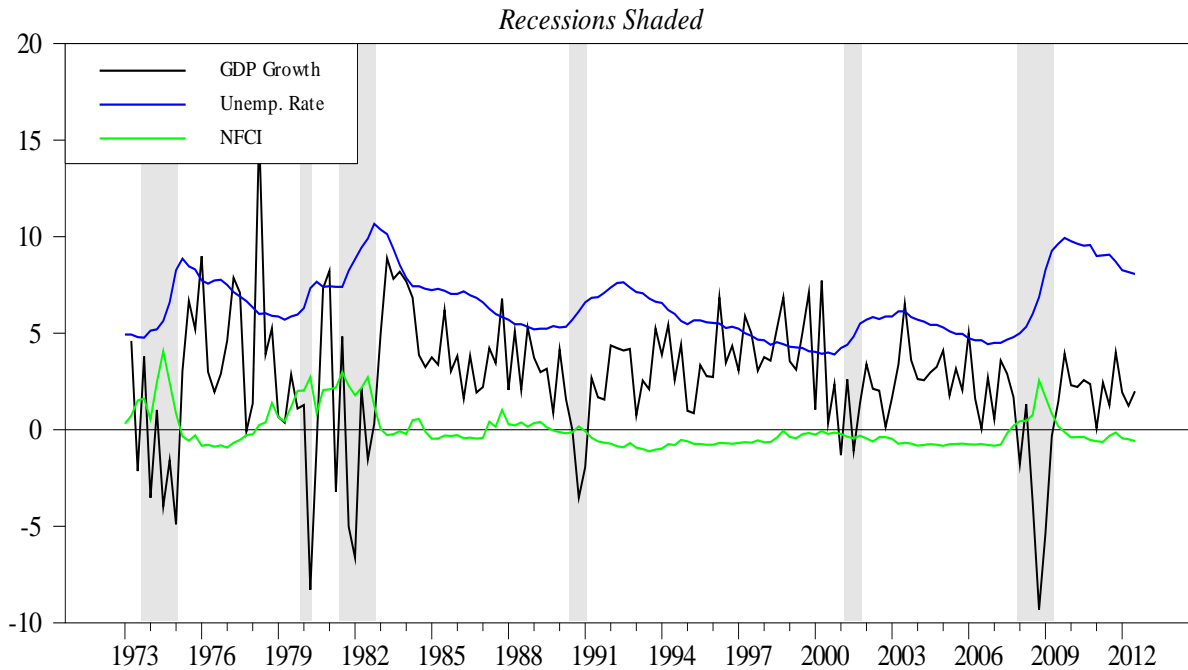
The 100 variables included in the NFCI are expressed relative to their sample averages and scaled by their sample standard deviations. The index itself is measured in standard deviations from its historical mean, where positive values denote tight financial market conditions and negative values denote loose conditions. So an increase in the index is an indicator of increasing financial stress.

See <http://www.chicagofed.org/webpages/publications/nfci/index.cfm> for the NFCI data and detailed descriptions of the index and its construction.

DATA AND METHOD

The data set for this project begins in the early 1970s and extends through the most recently available data. The variables are the growth rate (annualized) of real GDP, the unemployment rate, and the index of financial stress. Since the index of financial stress from the FRB Chicago is a weekly measure we averaged the weekly values over the course of each quarter, producing the desired quarterly index. The unemployment rates are quarterly averages of monthly data. These series are available from the FRED economic database of the FRB St. Louis, and the FRB Chicago. Figure 1 depicts the series on unemployment, real GDP growth, and the NFCI for the sample period.

Figure 1: GDP Growth, Unemployment Rate, and NFCI



From inspection of the figure, in which recessions are shaded, it is reasonably clear that the periods following negative real GDP growth are periods of rising unemployment, and that recoveries produce declines in the rate of unemployment with a significant lag. Note also that with the exceptions of the 1990-91 and the 2001 recessions, each of the other four recessions were also accompanied by significant financial stress as measured by the NFCI. It is further clear that the 1990-91 and the 2001 recessions were relatively mild in comparison to other recessions over the time frame depicted in the figure, lending support to the view that financial stress is associated with deeper and more prolonged recessions.

A simple VAR model is estimated in the form of equation 1.

$$UR_t = a_0 + \sum_{i=1}^p b_i UR_{t-i} + \sum_{i=1}^p c_i GDP_{t-i} + \sum_{i=1}^p d_i FS_{t-i} + e_t \quad (1)$$

Where UR is the unemployment rate, GDP is the annualized quarterly growth rate of real GDP, FS is an index of financial stress, t indexes time, e_t is a white noise disturbance term and the b_i and c_i ($i = 1, \dots, p$) are the lag coefficients, and p indicates the order of the lags. Each variable serves as the left-hand side of (1) in a VAR. We are, of course, interested primarily in forecasts of real GDP growth and the unemployment rate. For comparison purposes we also estimated a bivariate VAR model excluding the financial stress index.

The number of lags to be included in the model can be selected by complexity penalized likelihood criteria such as the Akaike information criterion (*AIC*). The *AIC* can be represented as

$$AIC = (2k / T) + \log(\sigma) \quad (2)$$

where k is the total number of estimated coefficients in the equation, T is the number of usable observations, and σ is the scalar estimate of the variance of the equation's disturbance term. In this case the *AIC* chooses only two lags. Most VAR practitioners suggest that the *AIC* is likely to choose lag structures that are too parsimonious to capture the dynamics of the relationships between the variables included in the model. It is generally recommended that at least a year's worth of lags (four with quarterly data) should be included in the estimated model (see [3], p 206). We choose to include a year's worth of lags in the results that follow.

Table I: F-Tests, Dependent Variable: GDP growth

<i>Variable</i>	<i>F-Statistic</i>	<i>Significance</i>
GDP Growth	0.6072	0.65812
UR	1.5197	0.19966
NFCI	6.8331	0.00005

Table II: F-Tests, Dependent Variable: Unemployment rate

<i>Variable</i>	<i>F-Statistic</i>	<i>Significance</i>
GDP Growth	2.6769	0.034305
UR	1306.96	0.000000
NFCI	14.7610	0.000000

Table III: F-Tests, Dependent Variable: NFCI

<i>Variable</i>	<i>F-Statistic</i>	<i>Significance</i>
GDP Growth	2.01540	0.095516
UR	6.3833	0.000095
NFCI	113.2846	0.000000

RESULTS

Estimation and Analysis

Tables I, II, and III are the traditional F-tests for “Granger [4] causality” for the individual equations in the VAR model, where $p = 4$ (lags = 4). Table I suggests that real GDP growth is

unrelated to its own lags, perhaps weakly related to the unemployment rate, but significantly related to financial conditions. These results are not particularly surprising given: (1) that real GDP growth does not exhibit smooth persistence, (2) unemployment lags rather than leads real GDP growth, (3) the depth and duration of the recessions are clearly associated with heightened levels of financial stress (see Figure I). Table II indicates that the unemployment rate is related to its own lags as well as those of real GDP growth and the NFCI. Finally, from Table III, the NFCI is related to the unemployment rate, its own lags and (more weakly) to real GDP growth.

Figure 2: Impulse Response Functions

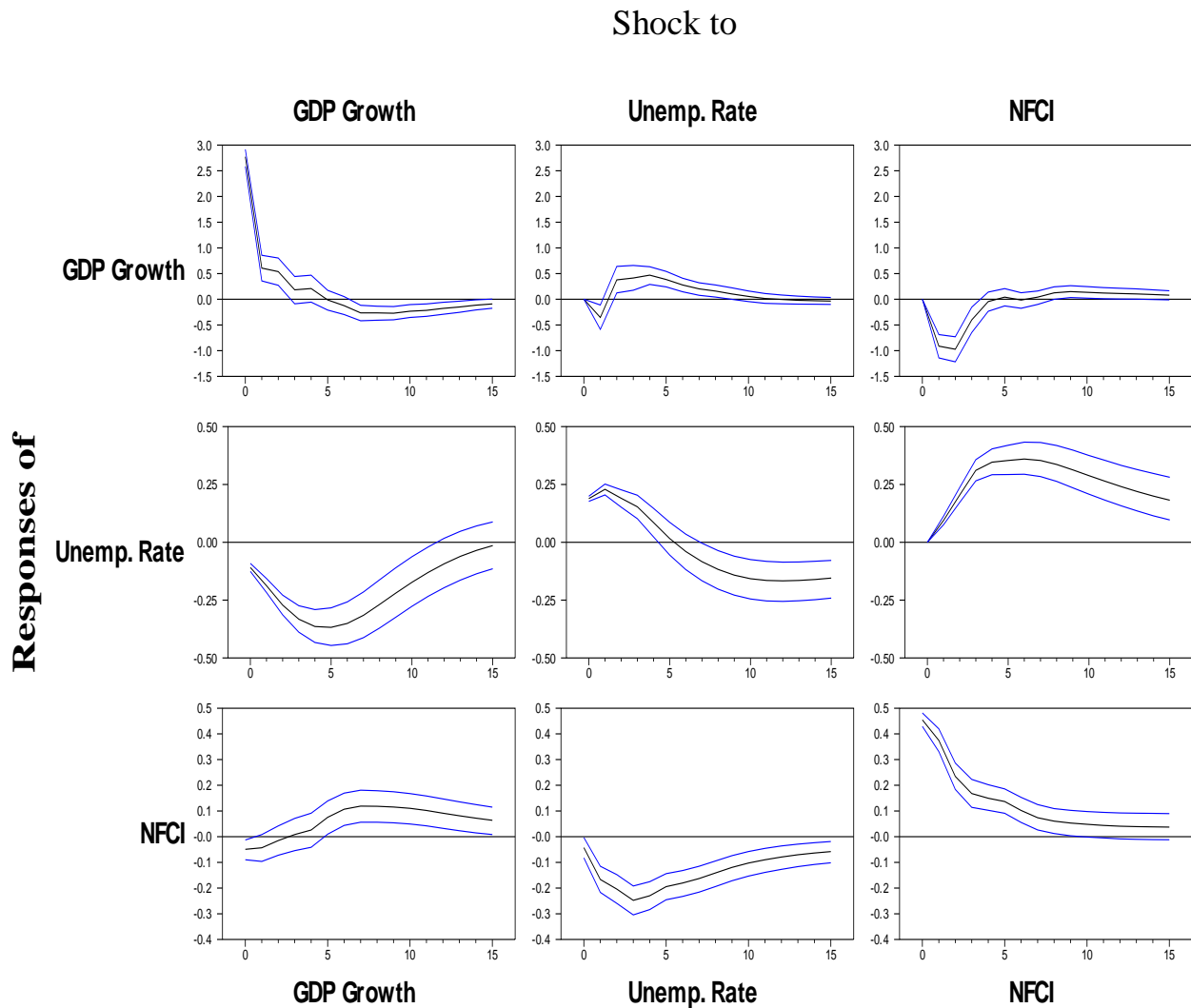


Figure 2 contains the impulse response functions computed from the VAR model. The blue lines are 95% confidence bands for the variable responses. The impulse response functions simulate the dynamic response of the variables to a one-standard deviation change (shock) to one of the variables. Here the horizon over which the responses are evaluated is four years (16 quarters). For example, the first column represents the responses of the three variables to a (positive) shock to real GDP growth. A shock to GDP growth has a relative short term effect on itself, a

persistent effect on the unemployment rate (GDP growth lowers the unemployment rate as expected), and little short-term effect on NFCI.

A shock to the unemployment rate has relatively little effect on GDP, a short term effect on itself that raises unemployment (as expected) and in the longer term appears to *lower* the rate of unemployment. Interestingly, a shock to the unemployment rate has a negative effect on the NFCI (middle panel at the bottom). We suspect the latter result represents an easing of monetary policy due to a rise in the unemployment rate, which by extension could explain why unemployment ultimately declines following an initial shock to the unemployment rate. Finally, the third column represents the effect of a shock to the NFCI. A one standard deviation change in the NFCI (a worsening of financial conditions) results in a sharp short-term decline in real GDP growth and a persistent rise in the rate of unemployment. These effects are, of course, in line with economic theory and the motivation for constructing such indexes. The bottom right panel might suggest that worsening financial conditions are not short-lived.

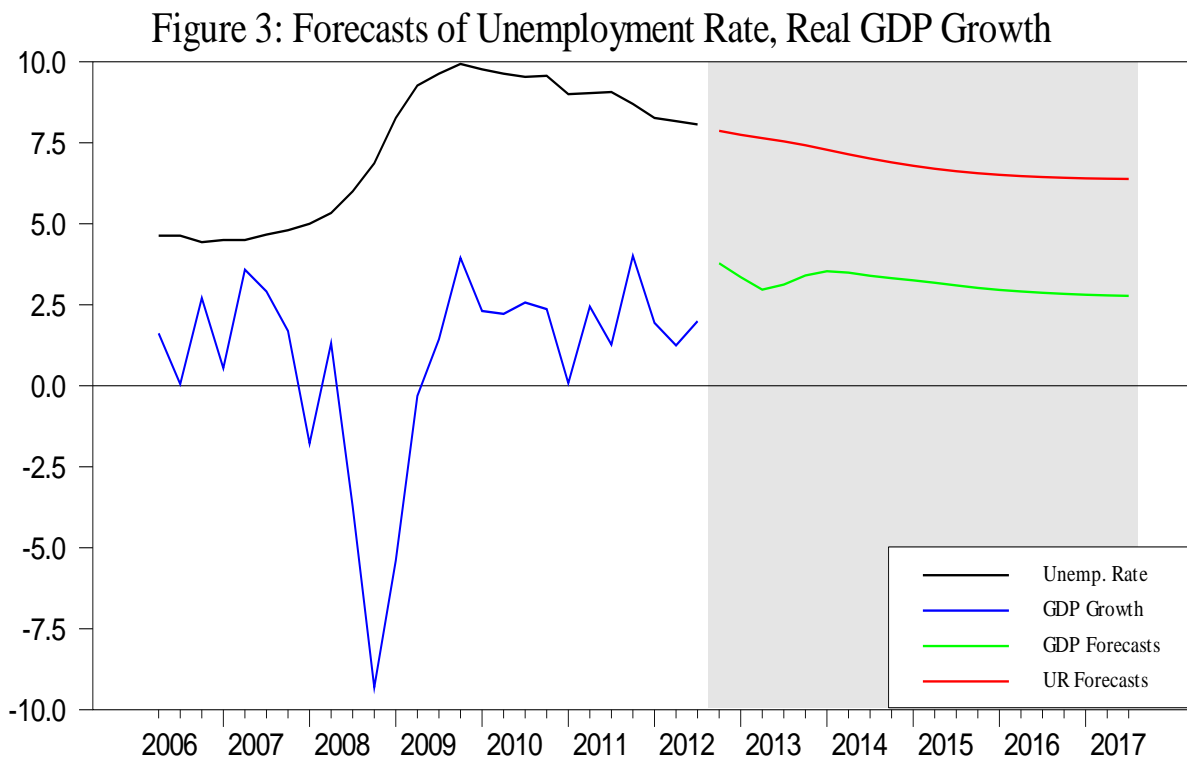
Table IV: Forecasts from the VAR

<i>Quarter</i>	<i>GDP Growth</i>	<i>Unemployment Rate</i>	<i>NFCI</i>
2012:04	3.78	7.87	-0.37091
2013:01	3.35	7.75	-0.30552
2013:02	2.97	7.64	-0.33967
2013:03	3.12	7.54	-0.38195
2013:04	3.40	7.42	-0.41645
2014:01	3.54	7.28	-0.41052
2014:02	3.49	7.14	-0.39356
2014:03	3.39	7.01	-0.37828
2014:04	3.32	6.89	-0.36132
2015:01	3.25	6.79	-0.34018
2015:02	3.18	6.70	-0.31584
2015:03	3.10	6.62	-0.29259
2015:04	3.02	6.56	-0.27233
2016:01	2.96	6.51	-0.25465
2016:02	2.91	6.47	-0.23917
2016:03	2.87	6.44	-0.22588
2016:04	2.84	6.42	-0.21475
2017:01	2.81	6.40	-0.20558
2017:02	2.79	6.39	-0.19802
2017:03	2.77	6.38	-0.19173
2017:04	2.76	6.38	-0.18649
2018:01	2.75	6.37	-0.1821
2018:02	2.75	6.37	-0.17839
2018:03	2.74	6.37	-0.17524

Forecasts

Table IV contains out-of-sample forecasts for all three variables for six years, based on the data available at the time of this writing. Though the model predicts the absence of stress, most forecasters would agree that only the GDP growth and the unemployment rate are of primary interest as forecasts.

The GDP growth predictions are for relatively robust growth in the near term, followed by a smooth return to mean historical rates (the growth rate of real GDP averaged 2.6% over the sample period). Similarly, the model predicts that the unemployment rate will decline slowly toward historical averages based on the sample period (the unemployment rate averaged 6.4% over the sample period). Figure 3 contains the same forecasts, with the actual data going back to 2006.



CONCLUSIONS

We find that a vector autoregression including real GDP growth, the unemployment rate, and an index of financial conditions performs as expected in a forecast setting—that is, it produces reasonable forecasts for the macroeconomic variables of interest. Traditional F-tests indicate that a measure of financial conditions can improve forecasts for GDP growth and the rate of unemployment. Since that is one of the primary motivations for such indexes, the results here are encouraging, but not particularly surprising. The financial index we employ is, to our knowledge, the only one of its kind that is available over a sufficient length of time for exercises such as those in the project.

As a further test of the efficacy of indexes of financial stress as important forecasting tools, we plan to produce real time forecasts for the years following the *great recession* from a model that includes the NFCI and a competing model that does not. This will allow us to generate formal tests of the accuracy of the competing forecasts.

REFERENCES

- [1] Enders, Walter. *Applied Econometric Time Series*, John Wiley & Sons, INC. New York, 2010.
- [2] Diebold, Francis X., *Elements of forecasting*, 2nd edition, South-Western College Publishing, Cincinnati, OH, 2001.
- [3] Doan, Thomas. *RATS user's guide*. Estima, Evanston, Illinois, 2010.
- [4] Granger, C.W.J., "Investigating causal relationships by econometric models and cross spectral models," *Econometrica*, 37, 1969, 424-438.
- [5] Hatzius, Jan; Hooper, Peter; Mishkin, Frederic; Schoenholtz, Kermit L. and Watson, Mark W. "Financial Conditions Indexes: A Fresh Look after the Financial Crisis." Presented at the U.S. Monetary Policy Forum, New York, February 26, 2010; <http://research.chicagobooth.edu/igm/events/docs/2010usmpfreport.pdf>.
- [6] Kliesen, Kevin L., Michael T. Owyang, and E. Katarina Vermann, "Disentangling diverse measures: a survey of financial stress indexes," *Federal Reserve Bank of St. Louis Review*, volume 94, number 5, September/October 2012, pp. 369-97.

RE-EVALUATION OF THE EUROPEAN MONETARY UNION MAASTRICHT CONVERGENCE CRITERIA

Dr. Sanela Porca, Professor of Economic
(803) 641-3232 sanelap@usca.edu
Patrick Stiebinger, Student
School of Business Administration
University of South Carolina Aiken

Abstract

The goal of this research is to examine the validity of the European Monetary Union Maastricht Convergence criteria under the current economic and monetary conditions of the European Union. By using the case study of the four European Monetary Union member economies which are currently experiencing severe monetary struggles – Greece, Italy, Spain, and Portugal – the Maastricht Convergence Admission criteria to the EMU are re-evaluated. Would Greece, Italy, Spain, and Portugal be accepted to the European Monetary Union under their current economic conditions? Are there weaknesses to the European Monetary Union Admission criteria that need to be revisited and revised? Based on the findings of the current research, policy recommendations are derived.

INTRODUCTION

The origins of the European Union were created in 1957 in form of the Treaty of Rome, which lead to the European Economic Community (EEC) (Afxentiou, 2000). The EEC focused on the increase of economic cooperation of the six original members Belgium, Germany, France, Italy, Luxembourg, and the Netherlands. Over the years, the EEC has developed into a community of 27 countries and in 1993, the EEC changed its name into today's name, the European Union.

More than an economic community, the desire arose to form a community in the monetary system as well. This was to be accomplished by a common currency, the Euro. Eleven members of the European Union, among them Spain, Italy, and Portugal, decided to adopt the new currency in the Treaty of Maastricht in February 1992 (Afxentiou, 2000). During the conference in Maastricht, guidelines were set to allow the common currency adoption, referred to as the Maastricht Convergence (MC) criteria.

The goal of this research is to examine the validity of the European Monetary Union (EMU) Maastricht Convergence (MC) criteria under the current economic and monetary conditions of the European Union (EU). By using the case study of the four EMU member economies which are currently experiencing severe monetary struggles – Greece, Italy, Spain, and Portugal – the MC Admission criteria to the EMU shall be re-evaluated. The current study attempts to answer the following questions: “Would Greece, Italy, Spain, and Portugal be accepted to the EMU under their current economic conditions?” and “Are there weaknesses to the EMU Admission criteria that need to be revisited and revised?” Based on the findings of the current research, policy recommendations are derived.

BACKGROUND ON MAASTRICHT CONVERGENCE ADMISSION CRITERIA

The Euro was officially launched in 1999 in the eleven original countries, and Greece also joined the EMU in 2001. Initially, the Euro was only used in transactions while the physical currency, meaning banknotes and coins, were introduced on January 1, 2002 (European Commission, 2012). Today, there are 17 countries that are members of the EMU, with Latvia and Bulgaria scheduled to join the Euro zone by 2014 and 2015, respectively.

There are five Maastricht Convergence criteria which have been applied used for EMU membership. These admission criteria are the following:

1. **Price Stability** – the country's inflation rate shall be no more than 1.5 percentage points above the rates of the three best performing member states.
2. **Durability of Convergence** is referred to as the long-term interest rate and shall not be more than 2% above the rate of the three best performing member states in terms of price stability.
3. **Sound Public Finances** is measured as the government deficit rate as a percentage of the country's Gross Domestic Product (GDP). No country candidate member to the EMU should have government deficit greater than 3 percent of its GDP.
4. **Sustainable Public Finances** is measured as a percentage of the government debt relative to the GDP. Government debt shall not exceed 60 percent of a nation's GDP.
5. **Stability of Exchange Rate** – the exchange rate of the country that wants to join the Euro shall not be devaluated or revaluated within two years before entering the EMU.

Unfortunately, economic crises, bankruptcy of countries, and extreme state deficits happened in the last several years. Greece's economic, fiscal, and monetary crises started speculations about Italy, Portugal, and Spain's economic, fiscal, and monetary conditions as well. The current economic conditions of the four countries lead to the fluctuations of the Euro and threaten its stability and reliability.

METHODOLOGY

In order to provide an evaluation of the EMU MC Admission criteria with respect to the selected four countries: Greece, Spain, Italy, and Portugal, the current study utilizes macroeconomic data provided by the European Union. In addition, in order to test the validity of the existing EMU MC Criteria, these criteria have been are modified and compared.

The four selected economies (Greece, Spain, Italy, and Portugal) were among the first group of countries that adopted the Euro as their currency during the 1999-2001 time period. By analyzing the EMU MC Admission criteria under the current economic conditions, one might be able to understand the strengths and/or weaknesses of the criteria used to allow a country to adopt the Euro as its national currency.

The objectives of this research are defined as follows:

1. Analyze and re-evaluate four MC criteria used to admit countries to the EMU by developing three different EMU admission scenarios;
2. Test the current Greece, Italy, Spain, and Portugal's EMU membership based on the newly developed EMU admission scenarios.

In order to examine weather Greece, Italy, Portugal, and Spain would be able to join the EMU under their current economic and monetary conditions, three different scenarios were constructed. If we assume that the four countries were not currently members of the EMU and if we evaluate them under different MC criteria, the question is will they be able to join the EMU? The evaluation of MC criteria is based on economic conditions of the remaining

seven original EMU economies – Austria, Belgium, Germany, France, Finland, Luxembourg, and the Netherlands – “*the Group of 7*” – (the original eleven member countries minus the four examined countries – Greece, Italy, Portugal, and Spain).

Recall that there are five EMU MC Admission criteria: countries’ inflation rates, their long-term investment rates, government deficit given as a percentage of the particular nation’s GDP, gross debt, also shown as a percentage of the nation’s GDP, and the exchange rate stability. Due to the common currency already in place, the last EMU MC Admission Criteria – the exchange rate stability – cannot be evaluated. Since Greece, Italy, Portugal, and Spain are officially members of the EMU, and are already using Euro as their currency, an evaluation of the stability of the exchange rate criteria is not possible. The remaining four criteria will be examined, whereas only the criteria concerning price stability and long-term investment need to be evaluated relative to other countries. In the following three scenarios the countries’ gross debts and government deficits criteria do not need to be compared to other members of the EMU.

The selected four countries’ ability to join EMU will be evaluated based on their current economic conditions and the hypothetical scenarios developed to test their admission eligibility. The fulfillment of the EMU MC criteria in the following hypothetical scenarios will be based on the official government reports from 2011 (Eurostat, 2012). The focus will be the countries’ inflation rates, their long-term investment rates, government deficit given as a percentage of the particular nation’s GDP, and gross debt, also shown as a percentage of the nation’s GDP. The three hypothetical scenarios developed by the current study are the following:

Scenario I

The first scenario evaluates Greece, Italy, Portugal, and Spain’s admission eligibility in comparison to the top three “*Group of 7*” countries with the ***lowest rate of inflation***. The three “*Group of 7*” countries with the highest price stability were France, with an inflation rate of 2.3%, Germany with 2.5%, and the Netherlands with 2.5% inflation rate. The average inflation rate of the three “*Group of 7*” countries with the ***lowest rate of inflation*** is 2.43%. According to Scenario I, the examined country will pass this hypothetical criterion, if the country’s inflation rate is not higher than 1.5% of the average rate of inflation. In other words, a country’s inflation rate should not exceed 3.93%.

Likewise, the long-term interest rates were averaged across the three nations leading in price stability. Then, the examined country’s long-term investment rate was compared to the average long-term interest rate. In 2011, the interest rate on the long-term investment bonds in France was 3.32%, in Germany it was 2.61%, and the Netherlands’ was 2.99%. The average long-term interest rate for the top “*Group of 7*” with the ***lowest rate of inflation*** was 2.97%. According to the existing EMU MC Admission Criteria, a country will pass this admission criterion if the examined country’s long-term investment rate is not larger than 2.0% of that average, meaning it should not exceed 4.97%.

Scenario II

The second scenario considers the three “*Group of 7*” countries with the ***highest inflation rate***. The three “*Group of 7*” countries with the ***highest inflation rate*** were Belgium with inflation rate of 3.5%, Luxembourg with 3.7%, and Austria, with inflation rate of 3.6%. The average rate of inflation for Scenario II was of 3.6%. Just like in Scenario I, the examined country’s price stability should not be larger than 1.5% of the average ***high inflation rate***, meaning no higher than 5.1%.

The average long-term investment rate of the three *Group of 7* countries with the **highest inflation rate** was calculated to be 3.49%. The individual interest on long-term investments in Belgium was 4.23%, 2.92% in Luxemburg, and 3.32% in Austria.3.32%. According to Scenario II, in order for an examining country to pass this criteria, its long-term interest rates should not exceed 5.49% (3.49% average + 2.0% maximum allowed ceiling)..

Scenario III

While a country selection for Scenario I and Scenario II was based on the inflation rate levels, Scenario III compares the examined countries relative to the three top economies from the *“Group of 7”*. For Scenario III, the top three *“Group of 7”* economic performers were selected and this group consists of France, Germany, and Austria. The average inflation rate of the top three *“Group of 7”* economic performers was 2.8%. The individual inflation rates were the following ones: France 2.3%, Germany 2.5%, and Austria 3.6%. In order for an examining country to pass the third scenario, its individual inflation rate should not exceed 4.3%

The average long-term investment rate of the top three *“Group of 7”* economic performers for 2011 was 3.08%. Individual long-term investment rates for France, Germany, and Austria were 3.32%, 2.61%, and 3.32% respectively. An examining country will satisfy this criteria its long-term investment rate is no higher than 5.08%

FINDINGS

The above obtained inflation and long-term investment rates were used to test the validity of Greece, Italy, Portugal, and Spain’s membership to the EMU. Each of the four countries was evaluated based on the four EMU MC Admission criteria and the three different scenarios presented earlier. The findings of this research should give an insight on potential strengths, flaws, or (in)effectiveness of the existing EMC MC Admission criteria.

Findings for Greece:

Based on the first EMU MC Admission criteria – price stability – Greece’s inflation rate of 3.1% will grant this country a membership into the EMU in all three scenarios. Compared to the maximum allowed inflation rate of 3.93% from Scenario I, 5.1% from Scenario II, and 4.3%, from Scenario III, Greece would pass the first EMU MC Admission criteria.

Unfortunately, even though Greece passed the test of price stability in all three scenarios, it did not pass the long-term investment criterion in any of the three scenarios. The 15.75% interest rate on government bonds, compared to the maximum allowed long-term investment rate of 4.97% from Scenario I crates a difference of 10.77%. The maximum allowed long-term investment rate of Scenario II and Scenario III were 5.49% and 5.08% respectively. The difference between the Greece’s long-term investment rates and the two maximum allowed long-term investment rates were 10.26% for Scenario II and 10.66% for Scenario III.

In addition to the two mentioned criteria, the examination of the remaining two criteria that need no comparison to other countries, namely the country’s gross debt and government deficit, showed that Greece can fulfill neither criterion. Greece’s gross debt in 2011 was 170.6% of its GDP. That makes a 110.6% difference to the actual maximum of 60% that are needed to be accepted to the Euro. Also, the country’s government deficit was €19,686 million. Compared to its GDP of €208,531.7 million during the year 2011, the ratio of government deficit to GDP calculates 9.44%, which is 6.44% higher than the maximum 3%, allowed by the EMU MC Admission criteria.

Table 1. Greece's EMU eligibility under the three hypothetical Scenarios			
<i>EMU MC Acceptance Criteria</i>	<i>Scenario I</i>	<i>Scenario II</i>	<i>Scenario III</i>
Price Stability	YES	YES	YES
Long-Term Investment	NO	NO	NO
Gross Debt	NO	NO	NO
Government Deficit	NO	NO	NO

According to Table 1 and the 2011 data, Greece's current economic performance does not fulfill three out of four hypothetical EMU MC Admission Criteria.

Findings for Italy:

In 2011 Italy's inflation rate was 2.9%, which means that, just like in case of Greece, Italy passes the criterion concerning inflation in all three scenarios. Scenario I, with the maximum allowed inflation rate of 3.93%, would make Italy pass the criterion by a difference of 1.03%. Similarly, the maximum allowed inflation rate of 5.1% from Scenario II would be passed by 2.2%. Finally, Italy would pass the Admission Criteria for Scenario III by 1.7%.

Based on data from 2011, Italy would not pass the long-term investment Admission Criteria in Scenario I or Scenario III, but would be successful in passing it in Scenario II. Italy's interest on long-term investment government bonds is 5.42%. Compared to the average of 4.97% from Scenario I, Italy would not pass this criterion by 0.45%. However, in Scenario II Italy would pass the long-term investment Admission Criteria by only 0.07%. Similarly to Scenario I, Italy would not pass the admission criterion in Scenario III. The long-term investment Admission Criteria in Scenario III would be passed by Italy by .34%.

The two criteria which require no comparison to other countries cannot be fulfilled by Italy either. Italy's gross debt from 2011 was 120.7% of the nation's GDP. Thus, Italy is 60.7% over the maximum allowed 60% gross debt compared to GDP and would fail to meet this requirement. Furthermore, this nation failed to hold the quotient of government deficit divided by GDP smaller than 3.0%. While Italy's GDP of 2011 was recorded as €1,579,659.2 million, the government deficit of 2011 was €61,758 million. This results in a quotient of .091, which means the maximum allowed difference of 3.0% is missed by .91%. Even though the criterion is missed, Italy came closest to fulfilling this specific criterion among all the examined countries.

Table 2. Italy's EMU eligibility under the three hypothetical Scenarios			
<i>EMU MC Acceptance Criteria</i>	<i>Scenario I</i>	<i>Scenario II</i>	<i>Scenario III</i>
Price Stability	YES	YES	YES
Long-Term Investment	NO	YES by 0.07%	NO
Gross Debt	NO	NO	NO
Government Deficit	NO	NO	NO

After examining Italy's economic performance, one can conclude that Italy (just like Greece) cannot fulfill three out of four hypothetical EMU MC Admission Criteria.

Findings for Portugal:

When measuring the price stability admission criterion, Portugal's inflation of 3.6% would pass all three scenarios. The maximum allowed inflation rate of 3.93% from Scenario I would make Portugal pass the criterion by a difference of 0.33%. Similarly, Scenario II with

the maximum inflation rate of 5.1% and Scenario III with the 4.3% maximum allowed inflation rate would make Portugal eligible to join the EMU.

With respect to the second hypothetical EMU Admission Criteria – long-term investment rates – Portugal would not be able to pass requirement in any of the three scenarios. Portugal’s interest rate of 10.24% would exceed the maximum allowed long-term interest rates for Scenario I by 5.27%, for Scenario II by 4.75% and for Scenario III by 5.16%

Portugal’s gross debt as a percentage of nation’s GDP in 2011 was 108.1%, making the country exceed the maximum value of 60.0% by 48.1%. Furthermore, Portugal’s GDP of €170,909.0 million and a government deficit of €7,525 million, made Portugal surpass the maximum allowed value of 3.0% by 1.40%.

<i>EMU MC Acceptance Criteria</i>	<i>Scenario I</i>	<i>Scenario II</i>	<i>Scenario III</i>
Price Stability	YES	YES	YES
Long-Term Investment	NO	NO	NO
Gross Debt	NO	NO	NO
Government Deficit	NO	NO	NO

By examining Portugal’s 2011 economic data, one can conclude that Portugal – just like Greece and Italy – could not meet three out of four hypothetical EMU Admission Criteria.

Findings for Spain:

Spain’s inflation rate of 3.1% would be sufficient for this country to pass the price stability requirement under all three scenarios. Based on the 2011 data Spain’s inflation rate is 0.83%, 2%, and 1.2% below the maximum allowed interest rate level.

In 2011 Spain’s interest on long-term government bonds was 5.44%. This would disqualify Spain from passing two hypothetical scenarios – Scenario I and Scenario III. Spain would miss meeting Scenario I’s criterion by 0.47% and Scenario III by 0.36%. Under Scenario II Spain would pass the long-term investment criterion by 0.05%.

Out of all four examined countries, Spain came closest to meeting the criterion concerning the country’s gross debt. However, Spain did not pass this criterion, but it showed the smallest difference between the maximum allowed debts of 60.0% and its gross debt of 69.3% of the GDP. Spain also exceeded 3.0% of maximum allowed government deficit/GDP ratio. €100,402 million in government deficit of 2011 divided by €1,063,355 million led to a quotient of 9.44%, which exceeds the maximum allowed value by 6.44%.

<i>EMU MC Acceptance Criteria</i>	<i>Scenario I</i>	<i>Scenario II</i>	<i>Scenario III</i>
Price Stability	YES	YES	YES
Long-Term Investment	NO	YES by 0.05%	NO
Gross Debt	NO	NO	NO
Government Deficit	NO	NO	NO

After analyzing Spain’s data, the country showed a very similar long-term investment performance like Italy. Like Italy, Spain passed the criterion on price stability in every

scenario and barely passed the criterion on long-term investment in Scenario II. Therefore, Spain would fulfill three out of four hypothetical EMU admission criteria.

CONCLUSION

As the monetary situation of the Euro-currency continues to dominate the headlines, the questions about the validity of the EMU MC Admission criteria continue to arise. Any economic and monetary fluctuations that occur in Europe have an effect on the rest of the world, especially on the economies of other developed nations such as the United States. By conducting research on this topic, the current study could potentially increase the knowledge and awareness of the importance of the EMU MC Admission criteria and the problems one can face if those criteria are not evaluated properly. The three hypothetical scenarios which tested the EMU admission criteria showed consistent results of countries' inability to satisfy three out of four conditions. The only criteria that the examined countries were able to satisfy were the price stability one. While the solutions to European monetary problems are being discussed in the news, universities, and in public, no scholarly article conveying the relationship between the current monetary and economic crisis and the EMU MC Admission criteria exist. Clearly, there is need for additional research on this topic. By doing this research, the current study attempts to analyze a topic equally important for European as well as global economy.

References

- Afxentiou, P. C. (2000). Convergence, the Maastricht criteria, and their benefits. *The Brown Journal of World Affairs*, 7(1), 245-254.
- European Commission. (2012). *The Euro*. Retrieved from http://ec.europa.eu/economy_finance/euro/index_en.htm
- European Union. (2012). *Basic Information On the European Union*. Retrieved from http://europa.eu/about-eu/basic-information/index_en.htm
- Kahrs, K. H. (2002). Meeting the Maastricht targets. *The Review of Policy Research*, 19(4), 44-60.
- McKay, J. E. (1997). Evaluating the EMU criteria: Theoretical constructs, member compliance and empirical testing. *Kyklos*, 50(1), 63-82.

ROBUST MONITORING OF CONTAMINATED MULTIVARIATE DATA

Eric B. Howington
Department of Management
Valdosta State University
1500 North Patterson St.
Valdosta, GA 31698-0076
229-245-3876
ebhowington@valdosta.edu

ABSTRACT

Monitoring a process that suffers from data contamination using a traditional multivariate T^2 chart can lead to an excessive number of false alarms. This paper extends the diagnostic statistic technique of Davis and Adams [1] to the multivariate case. A traditional T^2 control chart augmented by a diagnostic statistic improves the work stoppage rates for contaminated multivariate data and maintains the ability to detect process shifts.

INTRODUCTION

Davis and Adams [1] consider the problem of dealing with contaminated data in univariate control charts. They consider monitoring a process for which measurement systems are problematic, leading to occasional unusual measurements for key quality characteristics. These atypical measurements do not reflect the true state of the process and are referred to as outliers. A sample containing an outlier is said to be contaminated. Contaminated data can be troublesome for practitioners monitoring a process because a control chart signal could indicate a true process shift or could simply be the result of an outlier. Thus, Davis and Adams distinguish two types of signals: signals that indicate a process problem and signals that reflect a data problem. They propose use of a diagnostic statistic that allows the practitioner to distinguish between the two types of signals. When the control chart signals, a diagnostic statistic is calculated for that sample. If the value of the diagnostic statistic exceeds a threshold, then the signal could have been caused by contaminated data and further investigation is warranted before stopping the process. If the value of the diagnostic statistic does not exceed the threshold, then the signal is interpreted as a process problem and appropriate action is recommended. The benefit of such a scheme is clear – occurrence of unwarranted work stoppage is reduced.

Davis and Adams restrict their analysis to the univariate case, but it is likely that many processes suffering from contamination issues are not characterized by a single quality characteristic, but by several related quality characteristics. A common tool for monitoring several quality characteristics simultaneously is the Hotelling T^2 control chart. If the T^2 chart is used to monitor a process that has contaminated data, and the chart signals, the analyst must determine if the process is out of control, or if a contaminated sample has caused the chart to signal. We propose

an extension of the diagnostic statistic technique for use with multivariate process monitoring via the Hotelling T^2 chart.

THE T^2 CONTROL CHART

Control charting procedures involve two phases of analysis. A multivariate process is characterized by a mean vector $\boldsymbol{\mu}$ and covariance matrix $\boldsymbol{\Sigma}$ which describes the quality characteristics and their inter-relations. During phase I analysis, an in-control set of data is identified and used to estimate process parameters. The mean vector is estimated by the vector of sample means $\bar{\boldsymbol{x}}$ and the covariance matrix is estimated by the sample covariance matrix \boldsymbol{S} .

During phase II analysis, the process is periodically sampled and monitored by plotting one or more statistics on control charts. Unlike univariate control charting procedures, the upper limit of the T^2 chart is determined independently of the phase I parameter estimates. The upper control limit of the T^2 chart is a multiple of a critical value of an F distribution depending on p = number of quality characteristics, n = subgroup sample size, m = number of phase I samples, and the desired α . The phase II upper control limit is given by the following expression:

$$UCL = \frac{p(m+1)(n-1)}{mn-m-p+1} F_{\alpha, p, mn-m-p+1}$$

Typically, there is no lower control limit in a T^2 chart.

The statistic that is plotted is often called Hotelling's T^2 statistic:

$$T^2 = n(\bar{\boldsymbol{x}} - \bar{\boldsymbol{x}})' \boldsymbol{S}^{-1} (\bar{\boldsymbol{x}} - \bar{\boldsymbol{x}})$$

This statistic is essentially the Mahalanobis distance between the mean vector of the sample and the in-control mean vector. Values of T^2 that fall above the UCL indicate potentially out-of-control or special cause variation and warrant further investigation. Comprehensive treatment of T^2 control charting is given by [2].

An Example

Consider monitoring quality of a product with $p = 3$ inter-related quality characteristics. Phase I analysis has been successfully completed and results in the following in-control process parameter estimates:

$$\bar{\boldsymbol{x}} = \begin{bmatrix} 3.034 \\ 3.556 \\ 2.788 \end{bmatrix}$$

$$\boldsymbol{S} = \begin{bmatrix} 1.521 & 1.131 & 1.170 \\ 1.131 & 1.562 & 1.180 \\ 1.170 & 1.180 & 1.315 \end{bmatrix}$$

The phase I estimates are used to establish the formula for the T^2 statistics charted during phase II monitoring of future production data. The UCL for the chart is calculated as detailed in the previous section and results in a value of 12.04.

Subsamples of size $n = 10$ are periodically collected from the production process and the T^2 statistics are calculated and plotted in Figure 1. The chart signals at sample 37. This is the result of a shift in the mean vector characterizing the process. Samples 38-40 continue to signal.

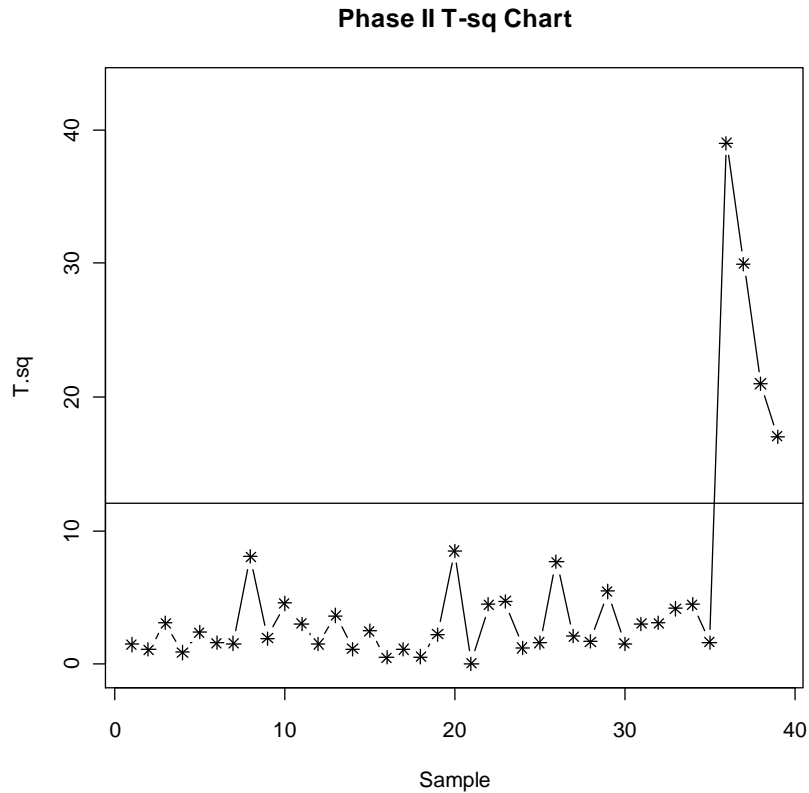


Figure 1. T^2 chart for the $p = 3$ quality characteristics and subsamples of size $n = 10$. This chart shows signals at samples 37-40.

The Challenge of Contamination

We will define “contamination” as a sample of size n containing 1 outlying observation and $n - 1$ typical observations. It is well-known that the sample mean vector and covariance matrix are not resistant to the effects of even a single outlying value in the data. Consequently, contaminated samples can cause a T^2 control chart to signal when, in reality, the process is still “in-control” and there is no assignable cause. The average run length (ARL) of the T^2 control charting scheme would be reduced in this scenario.

Now, consider a process that occasionally produces a contaminated sample as described above. Suppose contamination occurred in sample #10. The manager monitoring the control chart may call for work stoppage after observing the signal from sample #10, but in reality, the process is still in-control and there is no assignable cause. The signal is caused by 1 outlying observation within sample #10. Figure 2 displays the T^2 chart for the first 10 samples and 25 additional samples after the signal.

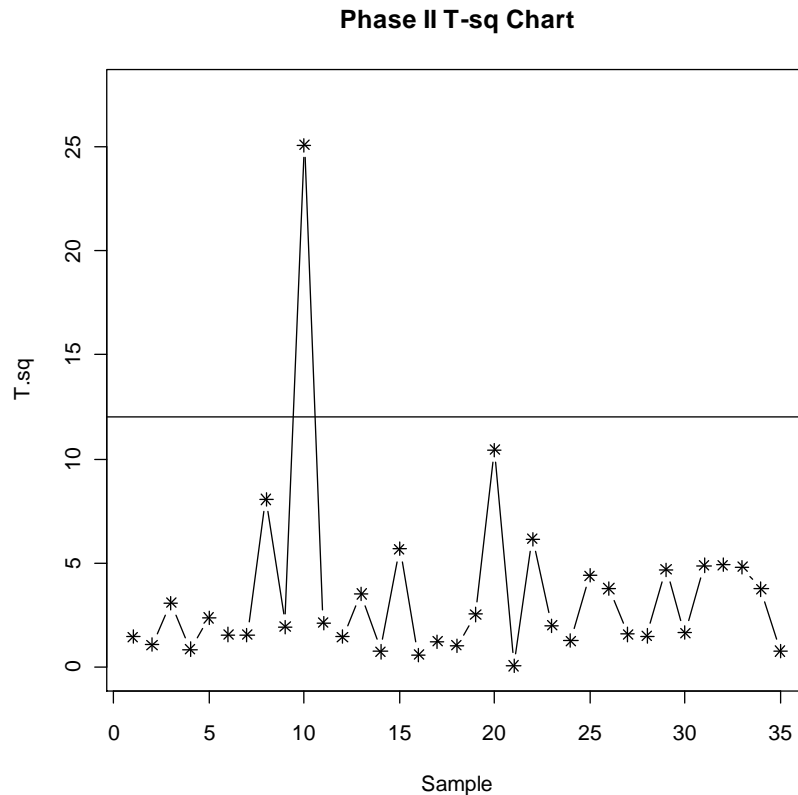


Figure 2. Sample #10 is contaminated with one outlying observation, but the process is actually in-control, as demonstrated by in-control statistics charted for samples 11-35.

THE DIAGNOSTIC STATISTIC TECHNIQUE

We propose a secondary diagnostic statistic (DS) be calculated after the T^2 chart signals. The purpose of the DS is to distinguish between signals caused by real changes in the process mean vector and signals caused by a single outlying value within the sample. If the T^2 chart signals, the DS is calculated and compared to a decision value. If the DS exceeds the decision value, the signal is deemed to be caused by contaminated data and the process is allowed to continue. If the DS does not exceed the decision value, then the signal is judged to represent a real process change and appropriate action should be initiated.

Diagnostic Statistic Proposals

The value of a DS should reflect the presence or absence of an outlier in the sample under consideration. Contaminated samples should result in large values of the DS. In this paper, we propose two possible diagnostic statistics for use in conjunction with the T^2 chart.

Proposal #1: Calculate the mean vector and covariance matrix of the sample data and use these values to calculate the Mahalanobis distance (MD) of each observation in the sample to the mean vector of the sample. Choose the maximum of these distances.

$$DS1 = \max(MD_1, MD_2, \dots, MD_n)$$

If the maximum value of DS exceeds a designated decision value, conclude that the signal is caused by a data contamination problem.

Proposal #2: Use a “leave-one-out” approach to calculate n sets of Mahalanobis distances (similar to deleted residuals in regression analysis). For samples of size n , calculate n sets of “deleted Mahalanobis distances” where the i th set of MD s is calculated by excluding the i th observation from the mean vector and covariance matrix calculation. If the i th observation is contaminated, it should stand out as the largest value in the i th set of MD s. Let $MD_{(i),j}$ represent the Mahalanobis distance of observation j when observation i is the observation left out. Choose the maximum of these n^2 distances.

$$DS2 = \max(MD_{(1),1}, MD_{(1),2}, \dots, MD_{(n),n})$$

Note that proposal #2 requires subsamples of size at least $n \geq p + 2$. (Larger sample sizes are required because $p + 1$ data points uniquely determines an ellipsoid such that these $p + 1$ data points are all exactly the same distance from the mean vector [3]. If these $p + 1$ data points were situated in such a way as to form an elongated, narrow ellipsoid, then the data point that is “left out” could artificially appear as if were an outlier.)

Choosing the Decision Value

Since the DS will only be calculated in the event of a signal, the DS technique should use a decision value from the *conditional distribution* of the DS given a T^2 chart signal. We suggest using simulation to calculate an appropriate decision value for use in any given control charting scheme and choice of diagnostic statistic.

We will present a small set of simulations to illustrate the methodology. The following simulations generate “clean” multivariate normal data and run until 10,000 signals are observed. Diagnostic statistic values are recorded for each signal and the decision value is chosen as the $(1 - \alpha)$ percentile of the distribution of DS values. The objective is find a decision value (dv) such that $P(DS > dv | T^2 \text{ signal}) = 1 - \alpha$. We restrict this set of examples to $p = 3$, $n = 8$ or 10 , and α values of .05, .01, and .005.

	$\alpha = .05$	$\alpha = .01$	$\alpha = .005$
n = 8	5.770	5.964	6.031
n = 10	7.016	7.484	7.628

Table 1. Decision Value Simulation Results for DS1.

	$\alpha = .05$	$\alpha = .01$	$\alpha = .005$
n = 8	114.6	268.4	309.9
n = 10	54.0	99.6	125.2

Table 2. Decision Value Simulation Results for DS2.

The practitioner should generate a set of tables reflecting the characteristics of their process data and T^2 charting scheme. Computer code for running these simulations in the R statistical computing environment is available from the author upon request.

T^2 -Diagnostic Statistic Scheme Example

Again, consider monitoring quality of a product with $p = 3$ inter-related quality characteristics. Phase I analysis has been completed, in-control parameter estimates are established, and UCL for phase II process monitoring has been calculated. A simulation has been conducted and the decision value for the DS for $p = 3$, $n = 10$, and $\alpha = .01$ has been determined (see Tables 1 and 2 above). Analysts collect subsamples of size $n = 10$ from the production process and the T^2 statistics are calculated and plotted in Figure 3.

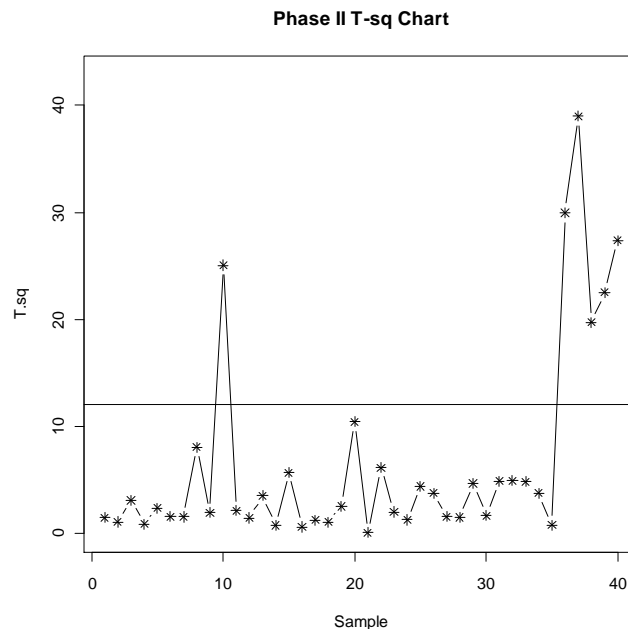


Figure 3. Sample #10 is contaminated with one outlying observation. The signals at samples 36-40 are due to a shift in the process mean vector.

The chart signals at sample 10. Both DS1 and DS2 are calculated and both diagnostic statistics *exceed* the decision values. The analyst monitoring the process can conclude that the signal for sample #10 is due to data contamination, not a shift in the process mean vector and the process is allowed to continue running. The chart signals again at samples 36-40. DS1 and DS2 are calculated for these samples, but the values fall below the decision values, indicating a shift in the process mean is responsible for the signals.

Figure 4 displays the DS1 calculations for all 40 samples and Figure 5 displays the values of DS2 for all 40 samples. (In practice, the DS will only be calculated for those samples that signal, but they are shown for all samples here for illustrative purposes.)

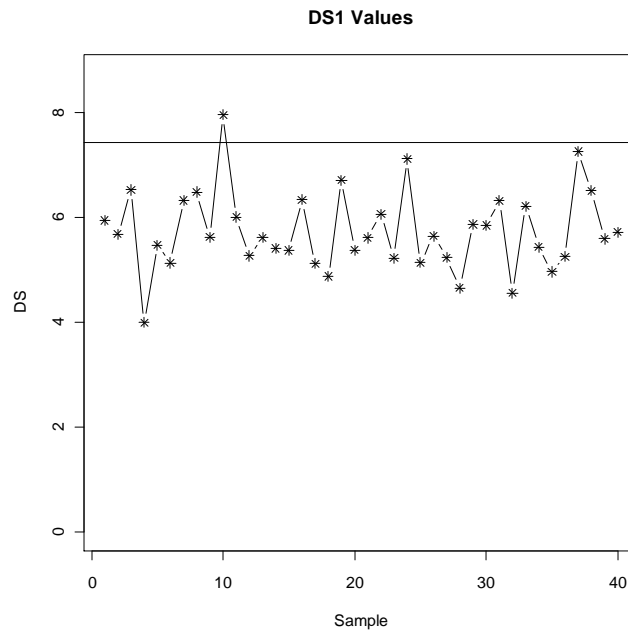


Figure 4. Values of DS1 for all 40 samples. Only sample #10 exceeds the decision value.

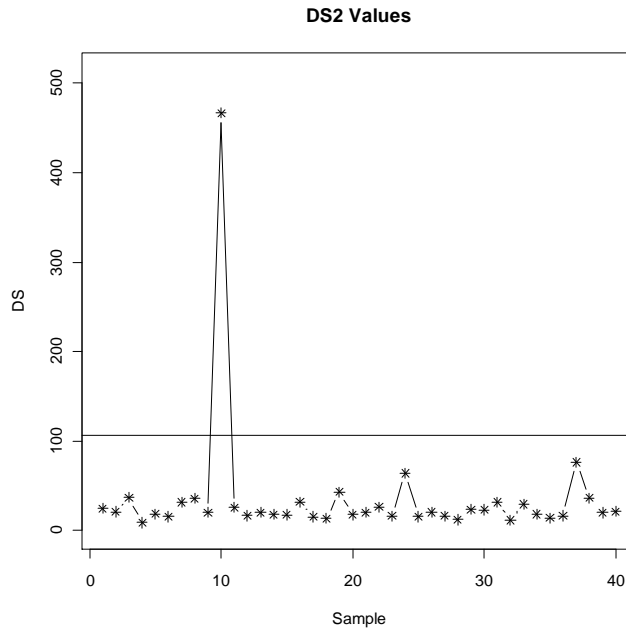


Figure 5. Values of DS2 for all 40 samples. Only sample #10 exceeds the decision value.

For the contaminated sample, sample #10, the T^2 chart signals and the diagnostic statistics exceed the decision values leading the analyst to conclude that the signal is due to data contamination. For samples 36-40, the T^2 chart signals, but the diagnostic statistics do not exceed the decision values – the analyst should conclude these signals represent a real shift in the process mean vector and are not due to data contamination – appropriate action should be taken.

Limitations of the T^2 -Diagnostic Statistic Scheme

The proposed scheme is more expensive in terms of data collection than T^2 schemes based upon individual's data. The proposed process monitoring scheme requires collection of subsamples of process data rather than individual's data. DS1 requires samples of size $n \geq p$. DS2 requires samples of size $n \geq p + 2$.

Another limitation is the number of outliers that the scheme can accommodate. The T^2 -DS scheme is designed for the specific situation of occasional samples containing a single outlying value. If the measurement system is so problematic that samples are contaminated with multiple outlying values, the proposed scheme will be less useful.

CONCLUSIONS

The T^2 chart can be augmented by a secondary diagnostic statistic to effectively monitor multivariate process data in the presence of occasional data contamination. If subsamples are used in the T^2 control charting scheme, then the DS can help the analyst distinguish between true shifts in the process parameters and signals caused by single outliers.

REFERENCES

- [1] Davis, C. M. and Adams, B. M. (2005). "Robust Monitoring of Contaminated Data," *Journal of Quality Technology* 37, pp. 163-174.
- [2] Mason, R. L. and Young, J. C. (2002). *Multivariate Statistical Process Control with Industrial Applications*. SIAM, Philadelphia, PA.
- [3] Titterton, D. M. (1975). "Optimal Design: Some Geometric Aspects of D-Optimality," *Biometrika*, 62, 313-320.

FORECASTING DONATED GOODS FOR A LOCAL FOOD BANK

Lauren Davis, Department of Industrial and Systems Engineering, North Carolina A&T State University, lbdavis@ncat.edu

Steven X. Jiang, Department of Industrial and Systems Engineering, North Carolina A&T State University, xjiang@ncat.edu

Shona D. Morgan, Department of Management, North Carolina A&T State University, smorgan@ncat.edu

Christina Harris, Department of Industrial and Systems Engineering, North Carolina A&T State University.

ABSTRACT

The Food Bank of Central and Eastern North Carolina (FBCENC) receives a wide variety of goods in varying quantities from numerous sources during a year. A primary issue for the FBCENC is that the type and amount of donated goods is not known in advance complicating their efforts to match supply with demand. Using historical data from the FBCENC, time series forecasting techniques are used to help predict the amount of food donated by item and donor type. Preliminary results show that exponential smoothing provides a reasonable approximation to forecasting food supply. Future research efforts will further explore how data aggregation can impact forecast accuracy.

INTRODUCTION

Food banks serve an important role in helping individuals seeking food assistance. They often fill the gap between food costs and federal food assistance programs for the food insecure. Food insecurity, as defined by the U.S. Department of Agriculture (USDA), occurs when a household does not have access to enough food for active, healthy living [10]. The number of food insecure individuals tends to be proportional to the poverty rate. Recent data from the U.S. Census Bureau indicates that approximately 15% (or 46.2 million) of U.S. residents had incomes below the federal poverty level in 2011 [11], which is mirrored by the 14.9 % of U.S. households determined to be food insecure at some point in 2011. Although these figures offer an important starting point to estimate the supply needs associated with food donation and distribution, they are subject to change due to the dynamic economic and employment environment. This necessitates the need for food bank operations to implement planning strategies to account for this uncertainty.

Food bank operations are complex and challenged by numerous operational issues. The operational complexity of food banks manifests in the simultaneous need to coordinate multiple processes and products. Core food bank operational efficiency depends on effectively predicting

donations, determining supplemental food purchases, storing, distributing, and transporting food items to ultimately meet the nutritional needs of the food insecure. Food banks operate in the high stake environment of providing food relief where considerable pressures exist to balance supply with demand such that waste is minimized. Donated food (particularly perishable items) needs to get to the right location at the right time and in the right quantity to help individuals seeking food assistance.

In this paper, we investigate supply-side planning for a local bank as a means to enhance their overall efficiency. Specifically, the ability for food banks to anticipate, plan for, and utilize donations from multiple sources can significantly impact food bank storage, distribution, and supplemental purchasing decisions that are essential to their mission of providing hunger relief. In addition, it is important for food banks to demonstrate effective use of donations to encourage consistent future donation activity. Our approach uses historical data supplied by the Food Bank of Central and Eastern North Carolina (FBCENC) to assess the predictive power of two time-series based forecasting procedures.

The remainder of the paper is outlined as follows. In the next section we describe the food bank supply chain in greater detail. Subsequently we characterize our method for categorizing the data by food type and the results of the forecasting procedures used for the project. Finally, we present our results and a discussion of future research.

BACKGROUND

The Food Bank of Central and Eastern North Carolina (FBCENC) has been in existence since 1980 and distributes approximately 40.2 million pounds of food to soup kitchens, food pantries, shelters and school programs that together serve an estimated 2.9 million people in 34 counties. Donations to the FBCENC are received from a wide variety of sources including federal, local, and private sources. One of its largest suppliers is Feeding America, the nation's leading domestic hunger-relief charity. As a part of the Feeding America network, the FBCENC receives donations from network managed sources. Federal programs such as The Emergency Food Assistance Program (TEFAP) and the Supplemental Nutrition Assistance Program (SNAP) are also sources of supply. Other sources of food supply to FBCENC include local food drives, other food banks, grocery stores, and direct purchases.

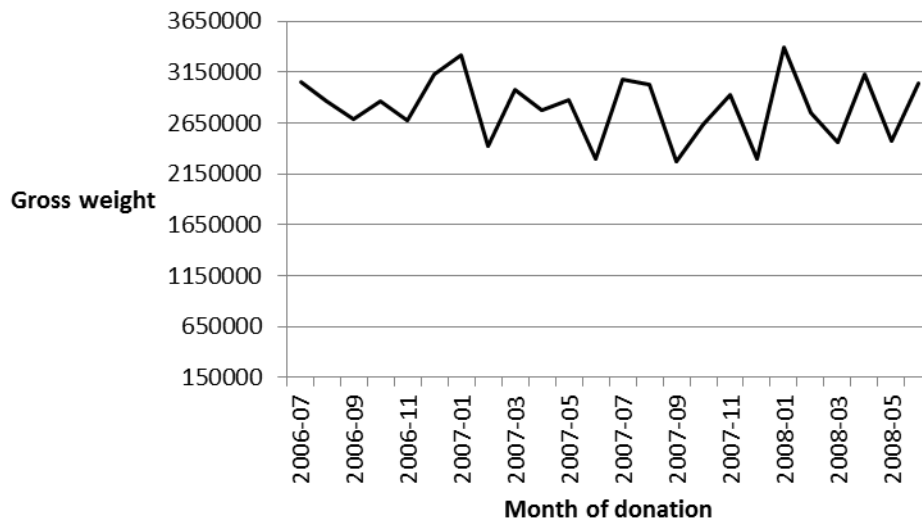
Research relevant to food banks is scant. We identified work in the open literature on assessing food bank quality and the food bank workforce in Canada [8] [9], community assessments that validate the need for food banks [7] [12], and the scheduling of vehicles and food allocation to charitable agencies and/or collection [2][3][4]. To the best of our knowledge, forecasting donations to food bank organizations has not been addressed quantitatively in the open literature. Our work fills an important gap for predicting in-kind food related donations.

DATA

Data supplied by the FBCENC cataloged donated food items according to 14 different key fields which includes donor information and product information (description, expiration date, quantity and weight). The data set covers two fiscal years spanning the time period of July 2006 to June 2008 and contains over 18,000 entries totaling approximately 68.2 million pounds of donated items. The donation portfolio consists of 652 donors, 43 different product classifications and over 100 unique product descriptions.

A plot of the monthly donations (in pounds), independent of the type or source of the donation, is presented in Figure 1. It is apparent that donated food supply varies significantly over the two year period. We notice that donations fluctuate with a spike in donations in December 2007. This is attributed to an abnormally large donation of dairy items (milk from a farm). This was a one-time donation made by this particular donor which adds to the variability in the overall data set. Donations tend to also increase during the end of the year.

Figure 1: Monthly Total Donation Amounts



While the information presented in Figure 1 is important to determine overall capacity needs of the FBCENC, an analysis of the data in terms of donations by product type will aid decision making to support equitable and efficient food product distribution. To get a better sense of the type of products donated to the FBCENC, product groupings of a national grocery store retailer (www.harristeeter.com) are used as the basis to construct 22 distinct standardized product categories. The data is also categorized according to the donor source which is provided in the original data set. These two classifications (i.e., food type and donor type) drive our data analysis. Specifically, donation patterns are described for both product and donor type to gain

critical insights on what is being donated and who is donating to the FBCENC. We pursue this information by examining the frequency of donations as well as the quantity of donations over the two year time frame. Our initial investigation of the data reveals several key observations which we describe now.

The top three categories of donated food items are produce, beverages, and frozen foods accounting for approximately, 56 and 55 percent of the total volume of donated products during fiscal years 2006-07 and 2007-08, respectively. These products were also the highest items donated on average per month.

In terms of donors, the largest volume of donated items comes from food manufacturers (31.7%) and the retail/ wholesale sector (29.18%) which primarily consists of grocery store outlets (traditional and bulk). One reason for the large number of donations from food manufacturers is attributed to imperfect packaging (i.e., dented cans). These items are completely safe to eat, but due to public misconception are difficult to sell.

Given these findings (see Figure 2) we focus our forecasting efforts on products supplied in the largest quantities and on the most active donors for greatest impact. As stated earlier produce, beverages, and frozen items account for over 50% of donated goods. Food manufacturers donated the largest amount of beverages and retail/ wholesale outlets donated the largest amount of frozen items. Produce did not have a dominate donation source.

Figure 2: Donor Activity for Beverages, Frozen items, and Produce

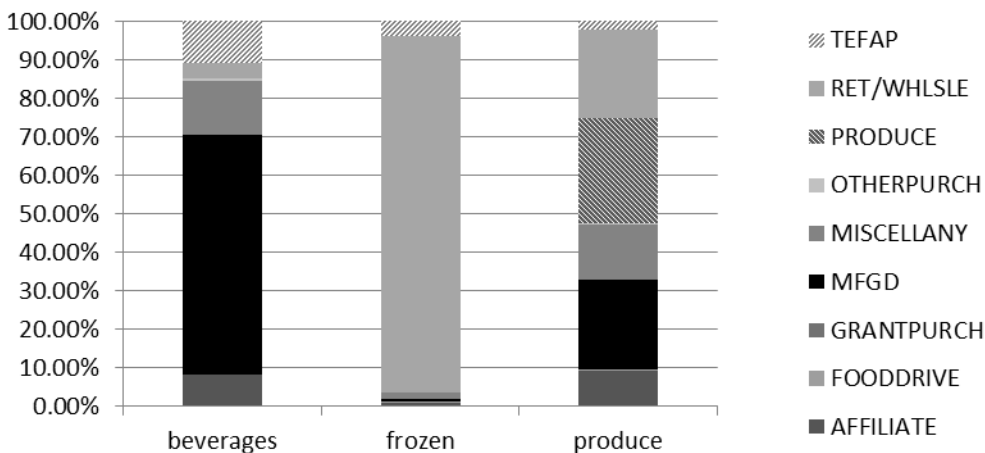


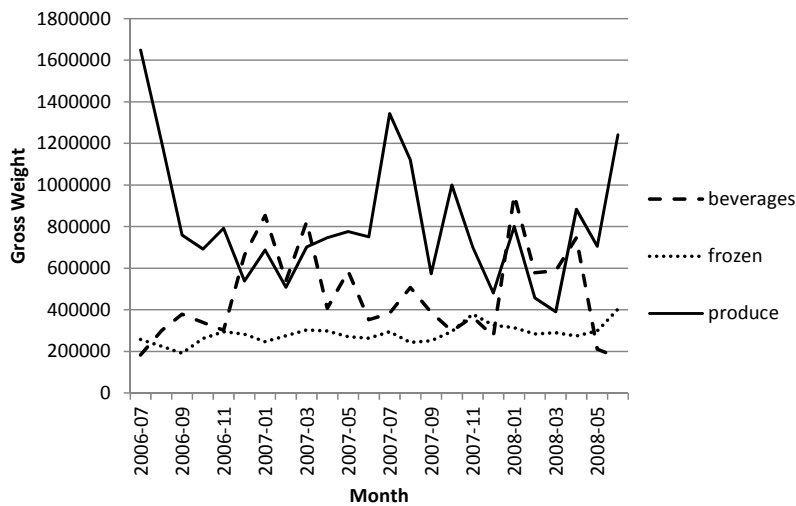
Table 1: Donation Product Groups

Product Group	Supply Data Description Field
Baby Product	Baby bath and skin care, baby food, baby medications, bottles and nursing, diapering needs, formula
Bakery	bread, baked items, croutons, tortilla
Beverages	Alcohol, soda pop, water, juice (refrigerated), juice (non refrigerated), sport drink, coffee, tea
Breakfast	Cereal (cold & hot), syrup, breakfast bars, pancake mix, frozen meals
Canned Goods	Canned vegetables, canned beans, soups, chili, stew, tomatoes
Condiments and Sauces	Ketchup, mayonnaise, mustard, olives, pasta sauces, peanut butter, pickles, salad dressing, salsa
Dairy	Cheese, eggs, milk, pudding, yogurt, creamer, deli, eggs, other refrigerator, egg returned/ damaged
Deli	Deli-meat sliced, prepared foods, lunch kits
Food Drives	Miscellaneous items obtained from food drives
Frozen	Frozen, frozen bakery, frozen snacks, frozen meat, frozen dinner
General Merchandise	Office and school supplies, toys, air freshener, blankets,
Health and Beauty	Hygiene products, toothpaste, medicine, lotion, soap, vitamins, adult diapers
Ingredients	Baking mix, muffin mix, honey, flour and meal
International	Asian, latin/ mexican, middle eastern, thai/ indian
Meats	Brand packaged, fish, lunch meat, beef
Paper products	Plastic cups, plates, napkins, tissues, toilet, towels, wraps and foils
Pasta	Pasta noodles, pasta sauces, rice, instant potatoes, pasta mixes
Produce	Fresh fruit, fresh vegetables, prepackaged salads, produce
Refrigerated	Refrigerated
Salvage	Salvage
Seasoning	Stuffing, marinade, bread crumbs, baking goods
Snacks	Crackers, bars, chips/ pretzels, snack cakes, popcorn, desserts

FORECAST PROCEDURES

The most sensible start to selecting a forecast procedure is to generate a plot of the data to determine if any patterns are present. Figure 3 represents the historical plots of produce, beverage, and frozen item supply over the two year period. All three plots show volatility with beverages and produce exhibiting the most variability. Smoothing techniques offer a simple, pragmatic approach to deal with variability. These popular techniques have been observed to perform surprisingly well against more sophisticated approaches [5] [6]. For our work, the simple moving average and exponential forecasting procedures are selected and briefly described below.

Figure 3: Monthly Supply Donation for Produce, Beverages, and Frozen Items



The mathematical formula for a moving average (MA) forecast is shown below.

$$F_t = \frac{\sum_{i=t-N}^{t-1} D_i}{N}$$

where N is the number of periods in the moving average and D_i is the demand in period i . MA is the simplest and oldest smoothing method that embraces the idea that observations which are close in time are also likely to be close in value. More specifically, averaging a specific number of past observations will provide a reasonable estimate of the present period's observation. The challenge with this procedure is that the forecaster must decide how many data points to include in the average. In addition, the longer the length of the moving average the greater the need for sufficient historical data.

Exponential smoothing (ES) overcomes some of the shortcomings of the MA procedures. The general forecast equation for ES is as follows.

$$F_t = \alpha D_{t-1} + (1-\alpha)F_{t-1}$$

$$0 \leq \alpha \leq 1$$

where F_t is the forecast value, F_{t-1} represents the previous forecast, D_{t-1} is the previous period's actual demand and α is the smoothing constant. Exponential smoothing has broad appeal given its technically straightforward approach [1] and need for little historical data, predictors, or regressors.

RESULTS

We consider a monthly time series for: (1) the aggregate level inclusive of the entire dataset, (2) donations segmented by food type (i.e., produce, beverages, and frozen items), (3) donations segmented by donor type (i.e., food manufacturers and retail/ wholesale sector), and (4) donations segmented by food type per donor. A commercially available software package (StatTools) is used to generate forecasts. To judge the forecast accuracy the mean absolute percent error (MAPE) is presented. The best parameter used for each forecasting method is determined through-experimentation and summarized in Table 2.

Table 2. Mean absolute percentage error (MAPE) for MA and ES.

Segmentation Level	Value	Mean	CV	n	Moving Average	Exponential Smoothing	MAPE
					MAPE	α	
All	All	2809283	0.11	3	13.54	0.067	12.64
Donor Type	Retail	839413.7	0.14	11	9.12	0.04	11.11
Donor Type	Manufacturer	885777	0.22	2	18.63	0.005	17.89
Donor Type	Produce	228057	0.78	2	148.13	0.722	144.19
Food Type	Frozen	284173.1	0.16	19	10.02	0.851	12.11
Food Type	Produce	813036.1	0.38	21	19.39	0.729	33.65
Food Type	Beverage	466118.8	0.47	2	30.97	0.477	41.92
Food/Donor	Frozen/Retail	262028.6	0.17	3	8.58	0.276	10.16
Food/Donor	Produce/Retail	181860.6	0.28	1	19.48	0.25	18.5
Food/Donor	Beverages/Manufacturer	289314.4	0.59	3	58.51	0.144	56.3
Food/Donor	Beverages /Retail	18001.67	0.69	22	8.68	0.429	150.29
Food/Donor	Produce/Produce	224369.3	0.79	3	161	0.702	166.91

Our results indicate that for certain segmentation levels of the data set, moving average results generate forecast errors of 10% or less. However, the superior predictive performance of MA comes at the expense of maintaining a large amount of past observations. For example, beverage items donated by the retail sector required 22 of the 24 past observations to generate the lowest forecast error. In contrast, frozen items received from the retail sector only required three past observations to generate a forecast producing the smallest MAPE value.

Exponential smoothing provides slightly better results when the entire data set is used (e.g. no segmentation by product or donor) and when forecasts are generated by retail or manufacturer donors. Interestingly, the values of the smoothing constants are quite small indicating that more weight is placed on prior observation rather than the most recent demand observation. Both MA and ES failed to produce satisfactory results for produce items. While produce is received every month, results of our data analysis combined with prior knowledge indicate that fresh produce is a seasonal item. A closer screening of the data reveals the seasonal nature of produce in that it is the most donated item during the months of April to October. For this reason, the Holts-Winters method which is designed to handle seasonality is implemented (assuming quarterly seasons) to forecast produce donations. As expected, the Holts-Winters method outperformed MA and ES producing a MAPE of 30.89 when considering only the produce donor and 18.02 when considering produce from the retail donors.

It is common in forecasting to use aggregate representations of data as opposed to disaggregate forms since the former tends to produce better forecast accuracy. Aggregating tends to quiet data volatility but at the same time generates an aggregation bias in the forecast. The level of aggregation bias often depends on the variation present in the disaggregated data.

In our results, it is interesting to note that an aggregate forecast across all donors and products does not yield the lowest MAPE value. Disaggregating the data according to donor type produces a lower MAPE value (9.12) than the aggregate forecast across all donors (13.54). Additional gains in forecast performance are observed when the retail sector is disaggregated by product type. Specifically, the MAPE for frozen foods and beverages donated by the retail sector are 8.58 and 8.68, respectively. This result is particularly interesting when viewed simultaneously with the variability present in the disaggregated data.

Figure 4: Comparison of forecast error and donation variability using MA.

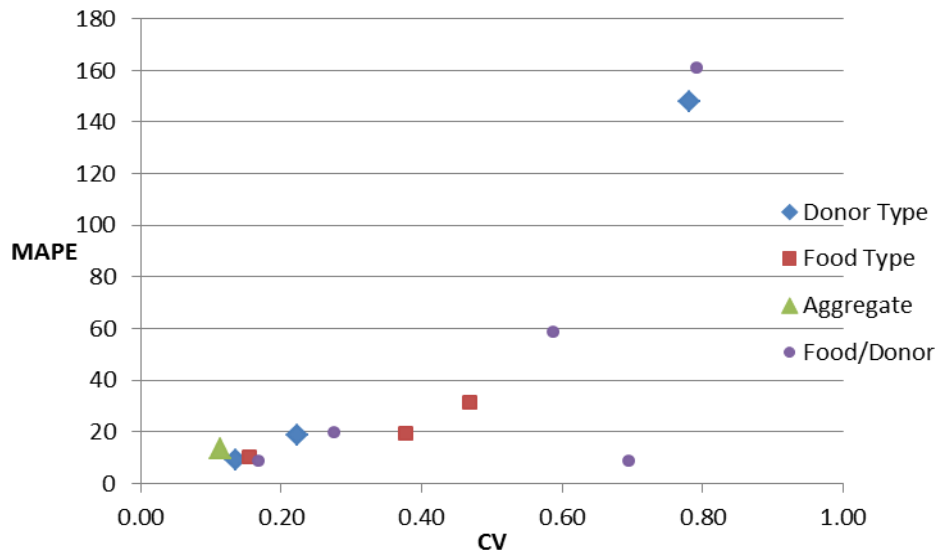
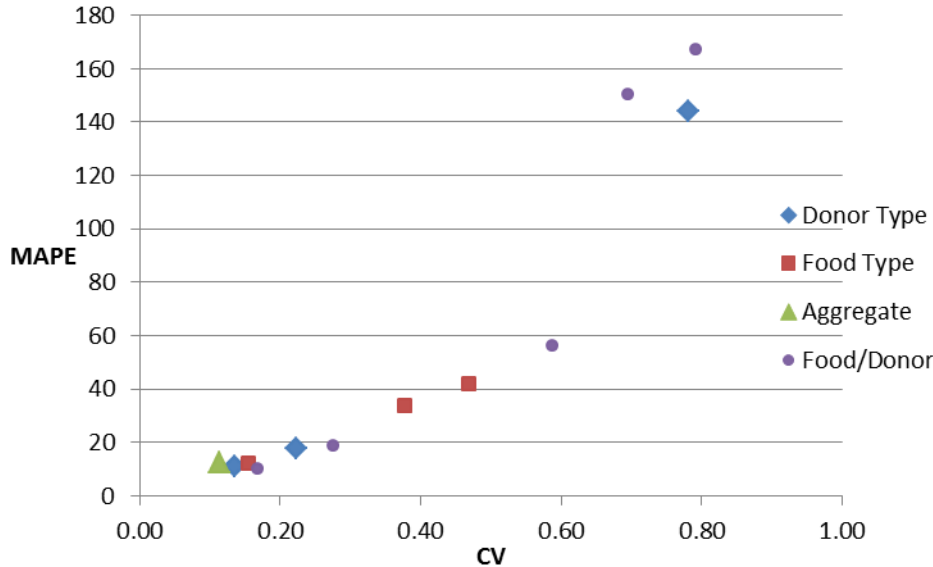


Figure 4 depicts the relationship between aggregation levels, forecast error (MAPE) and coefficient of variation (CV), a measure of the donation variability. We observe that the level of variability for the disaggregated forecasts for the retail sector (frozen foods and beverages) exceeds the variability associated with the aggregate product forecast. A similar effect is also observed for the exponential smoothing forecast method (Figure 5).

Figure 5: Comparison of forecast error and donation variability using ES.



CONCLUSIONS AND FUTURE WORK

Improving operational efficiency for the FBCENC is essential to their mission to fight hunger. This work presents preliminary results to forecast in-kind donations according to food type and donor type. Using methods that are technically straightforward (i.e., MA and ES), we explored how aggregation impacts forecast accuracy. Future work will continue to study the impact of the forecast segmentation on forecast accuracy. The latter is a particularly challenging problem given the wide variety of products and donors contributing to the FBCENC. Finally, we will investigate the use of more sophisticated forecast procedures that offer appropriate tuning for the data patterns. Supply forecasting for the FBCENC has the potential to significantly enhance their planning and food distribution efforts as well as their strategies for targeting donation sources and food product needs.

ACKNOWLEDGEMENT

This research is supported by NSF Service Enterprise Systems grant #CMMI-1000018 and #CMMI-1000828. We would also like to thank Charlie Hale and Earline Middleton from the Food Bank of Central and Eastern North Carolina for their collaboration.

REFERENCES

- [1] Armstrong, J.S. and Green, K.C., 2005. Demand forecasting: evidence-based methods. Working paper 24/05. Dept. of Econometrics and Business Statistics, Monash University, <http://forecastingprinciples.com/paperpdf/DemandForecasting.pdf>, accessed on October 21, 2012.
- [2] Bartholdi III, J., Plazman, L.K., Collins, R. L., Warden III, W. H. 1983. A minimal technology routing system for meals on wheels, *Interfaces*, 1-8.
- [3] Lien, R.W., Iravani, S. M. R., and Similowitz, K. R. 2007. Sequential resource allocation for nonprofit operations, (unpublished paper), Northwestern University.
- [4] Gunes, C., van Hoes, W.J. and Tayur, S. 2010. Vehicle routing for food rescue programs: a comparison of different approaches. *Integration of AI or OR Techniques in Constraint Programming for Combinatorial Optimization Problems*, 176-180.
- [5] Makridakis, S., Andersen, A., Carbone, R., Fildes, R., Hibon, M., Lewandowski, R., Newton, J., Parzen, E., and Winkler, R. 1982. The accuracy of extrapolation (time series) methods: results of a forecasting competition, *Journal of Forecasting*, 1, 111-153.
- [6] Makridakis, S., and Hibon, M. 2000. The M3-competition: results, conclusions and implications. *International Journal of Forecasting*, 16, 451-476.
- [7] Mosley, J., and Tiehen, L. 2004. The food safety net after welfare reform: use of private and public food assistance in the kansas city metropolitan area. *Social Service Review*, 78(2), 267-283.
- [8] Teron, A, and Tarasuk, V. 1999. Charitable food assistance: what are food bank users receiving?" *REVUE CANADIENNE DE SANTE PUBLIQUE*, 90(6).
- [9] Tarasuk, V. and Eakin, J. 2005. Food assistance through surplus food: insights from an ethnographic study of food bank work. *Agriculture and Human Values*, 22(2), 177-186.
- [10] United States Department of Agriculture, <http://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us.aspx> accessed on October 11, 2012.
- [11] United States Census Bureau, http://www.census.gov/newsroom/releases/archives/income_wealth/cb12-172.html, accessed on October 11, 2012.
- [12] Winter, J. 2009. Comprehensive planning for the napa county food system: a preliminary study of problems and possibilities in regional planning. Diss. Cornell University.

A SHORTAGE IN BUSINESS DOCTORAL CANDIDATES IN ACADEMIA: CONTRIBUTING FACTORS, IMPACT ON ACADEMIA AND REMEDIATION

Megan Martin
Business Information Technology
Virginia Polytechnic Institute and State University
1007 Pamplin Hall
Blacksburg, VA 24061
540-231-5051
meganmartin@vt.edu

ABSTRACT

In 2012, the Association to Advance Collegiate Schools of Business International projects a 2,419 faculty shortage of business Ph.D. candidates available for employment in academia in the United States.[1] Three critical questions must be answered: What are the contributing factors creating and intensifying the shortage in the academic business candidacy, what is the impact on academia, and what can be done to remediate this issue now and in the future? The contributing factors can be categorized into three areas: student enrollment and conferment, doctoral funding, and faculty retirement. The shortage has caused entry-level faculty salaries to increase and the accreditation standards to be challenged. It is essential to remediate the shortage by implementing reactionary programs that will affect the short-term, along with long-term prevention measures to ensure this concern does not continue in the future.

INTRODUCTION

In 2012, the Association to Advance Collegiate Schools of Business (AACSB) International projects a 2,419 faculty shortage of business Ph.D. candidates available for employment in academia in the United States.[1] This is of major concern because undergraduate business degrees have become the most popular degree in United States and the data shows that there may not be enough Ph.D. level faculty to meet the expected demand. In Figure 1, the U.S. Department of Education compiled conferment data from the academic years 1997-98, 2002-03 and 2007-08 for bachelor degrees in the U.S.[2] As shown, the business field of study is the dominant leader in the number of bachelor degrees conferred.

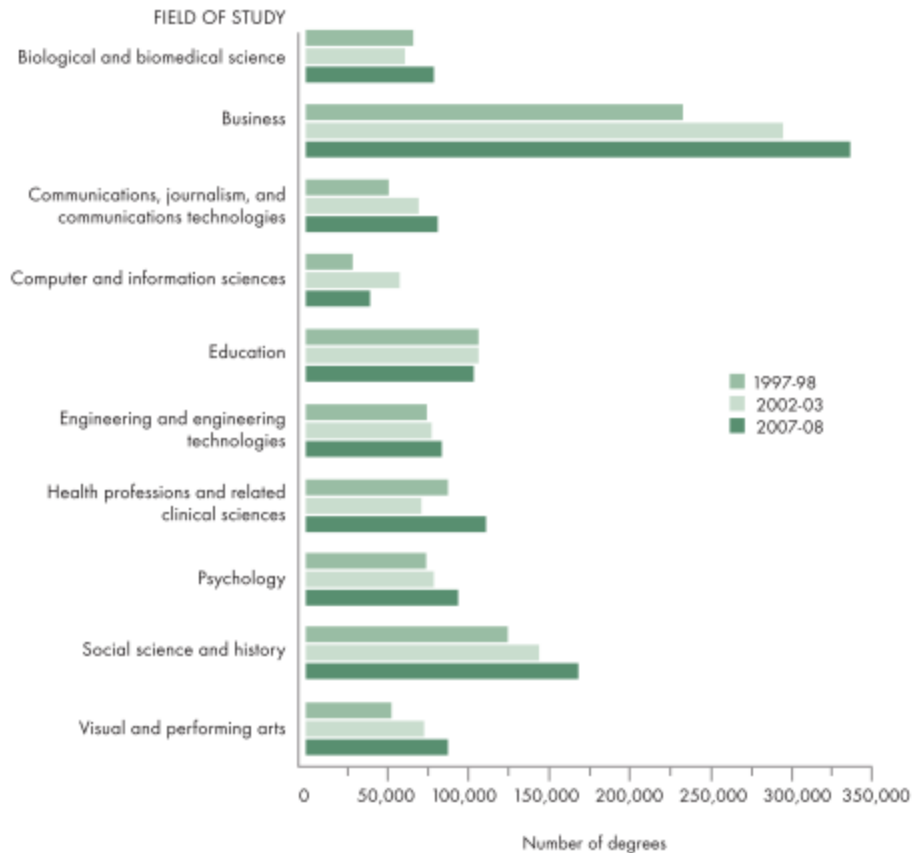


Figure 1: Bachelor’s Degrees Conferred by U.S. Degree-Granting Institutions for academic years 1997-98, 2002-03 and 2007-08.[2]

In order to investigate the faculty shortage, three critical questions must be answered: What are the contributing factors creating and intensifying the shortage in the academic business candidacy, what is the impact on academia, and what can be done to remediate this issue now and in the future?

BACKGROUND

The world’s largest and most well recognized not-for-profit accreditation association for business schools is the AACSB International. The AACSB International is composed of “education institutions, corporations and other organizations dedicated to the advancement of quality business education worldwide.”[3] They were established in 1916 and in 1919 the accreditation standards were set for undergraduate and graduate degree programs in business administration. The AACSB International’s mission statement states that the, “AACSB International will provide global leadership in advancing management education through accreditation and by fostering international interchanges, key business linkages, sharing of best practices, professional development, and other member services.”[1]

An institution accredited by the AACSB International must meet the accreditation standards which are continuously reviewed and revised for relevancy and currency.[3] The accreditation standards are outlined in the AACSB document, *Eligibility Procedures and Accreditation*

Standards for Business Accreditation, revised on January 31, 2010. These standards are broken up into four sections: eligibility, strategic management, participants and assurance of learning. All accreditation standards will not be discussed in this paper, although, certain criteria will be highlighted.

The accreditation process starts with a self-evaluation followed by an onsite peer evaluation completed by a Peer Review Team. Once the accreditation is awarded, the AACSB International challenges the newly accredited institution to continuously improve educational quality by conducting periodic reviews that include annual reports and five-year reviews of strategic progress. Only 5 percent of schools offering business degrees worldwide meet the standards of AACSB International accreditation.[3]

In Table 1, the 2011 and 2012 AACSB International membership data is provided.[2, 3] The total number of accredited business schools worldwide has increased; specifically the number of Non-U.S. business degree-granting institutions. The number of AACSB members in the U.S. increased by 11 members, which is a 1.7 percent increase. In comparison, the Non-U.S. members increased by 77 members, a 14.5 percent increase. In total, the addition of 88 AACSB members compounds the need for additional qualified faculty due to the additional number of programs created. By 2012 the AACSB International membership was represented in 80 countries which increased from 70 countries in 2011.[3] In summary, the AACSB is going global.

Table 1: Total Number of AACSB Memberships and Percent Breakdown in January 2011 and January 2012.

Educational Members	2011		2012	
	Number	Percent of Total	Number	Percent of Total
U.S.	651	55.1	662	52.1
Non U.S.	531	44.9	608	47.9
Total	1182	100	1270	100

Table 2 summarizes the number of ACCSB International business degree-granting programs by program level and location for the academic years 2009-10 and 2010-11.[2, 3] In 2011, there were 484 business undergraduate degree-granting institutions in the U.S., in comparison to 129 doctoral degree-granting institutions. In total, the 259 doctoral degree-granting institutions (U.S. and Non-U.S.) need to be able to supply faculty members to the 789 hiring institutions in order to educate and meet the demand of the undergraduate degree-granting institutions.

Table 2: Business Institutions with Undergraduate Degrees versus Business Institutions with Doctoral Degrees for the academic years 2009-10 and 2010-11.

Degree Program Level	2009-10		2010-11	
	U.S.	Non-U.S.	U.S.	Non-U.S.
Undergraduate Degree	482	145	484	305
MBA	440	142	453	183
Doctoral Program	126	128	129	130

Although this may seem like a feasible task, doctoral programs are very limited in the number of positions available to potential Ph.D. students. Some universities may only be able to accommodate 1 to 2 Ph.D. students; a very low number in comparison to hundreds of undergraduate students each year. In the academic year 2009-10, 126 AACSB accredited doctoral degree-granting institutions supplied 2,123 doctoral candidates, equivalent to 17 students per doctoral degree-granting institution.[2, 3]

CONTRIBUTING FACTORS

Consistent with the AACSB and Bryant and Ebrahimpour (2009) the contributing factors intensifying the shortage in business Ph.D. candidates can be categorized into three areas: student enrollment and conferment, doctoral funding, and faculty retirement.

Enrollment and Conferment

In general, Non-U.S. enrollment in business for undergraduate, master’s and doctoral programs are trending upward. Similarly, U.S. enrollment in business for master’s and doctoral programs are trending upward, although, undergraduate enrollment has incurred a slight decrease. In Table 3 and Table 4, a compilation of the AACSB International Business School Questionnaire (BSQ) data from 2010 and 2011 is provided.[2, 3] Surprisingly, undergraduate enrollment has decreased by 2.2 percent in the U.S. where enrollment has increased by 9.5 percent in Non-U.S. business degree-granting programs. On the other hand, doctoral enrollment has increased by 6.4 percent in the U.S. and 8 percent in the Non-U.S. In addition, the percent breakdown shows a gradual movement toward a balance between U.S. and Non-U.S. enrollment.

Table 3: U.S. and Non-U.S. Business Degree Enrollment for the academic years 2009-10 and 2010-11.

Degree Program	2009-10		2010-11	
	U.S.	Non-U.S.	U.S.	Non-U.S.
Undergraduate	855,675	327,103	836,493	358,188
MBA	157,249	101,498	168,415	109,026
Other Master’s	51,203	71,617	64,318	83,981
Doctoral	6,654	11,003	7,078	11,886

Table 4: Percent of U.S. versus Non-U.S. Business Degree Enrollment for the academic years 2009-10 and 2010-11.

Degree Program	2009-10		2010-11	
	U.S.	Non-U.S.	U.S.	Non-U.S.
Undergraduate	72.3	27.7	70	30
MBA	60.8	39.2	60.7	39.3
Other Master’s	41.7	58.3	43.4	56.6
Doctoral	37.7	62.3	37.3	62.7

Similarly, degrees conferred in business for undergraduate, master and doctoral students are all trending upward. Figure 2 provides business degree conferment data from the U.S. Department of Education’s Higher Education General Information Survey (HEGIS).[3] Specifically, the percent increase for doctoral students from 2005 to 2009 was 42 percent, in comparison to a 12 percent increase for undergraduates and an 18 percent increase for master’s students. The perception of a 42 percent increase would appear that the educational system should be able to accommodate the number of students with the number of faculty. Although the data indicates that a 42 percent increase is equivalent to 625 doctoral students, a 12 percent increase is equivalent to 36,411 master’s students and an 18 percent increase is equivalent to a 25,758 undergraduate student increase. In summary, a total of 62,169 additional students must be accommodated by the additional doctorate output of 625, which is a 1 to 100 faculty-to-student ratio.

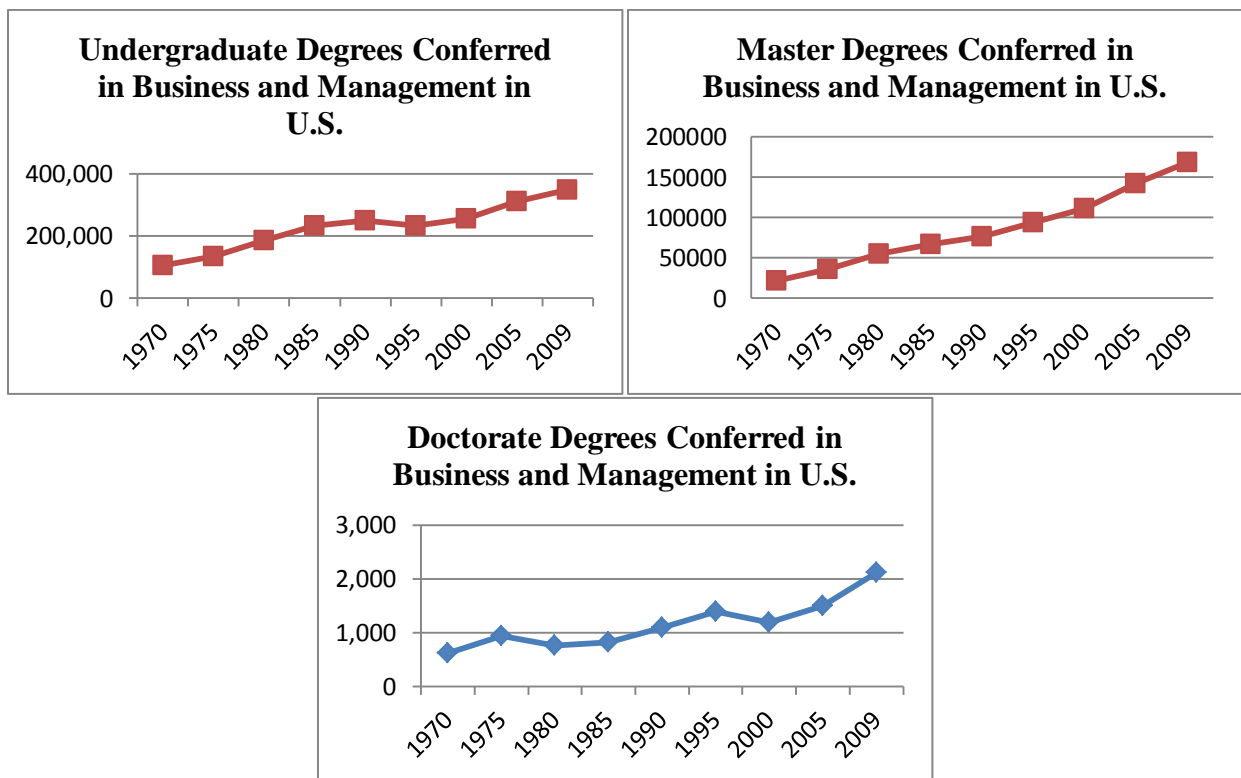


Figure 2: Business Degree Conferment for Undergraduate, Master’s and Doctoral Students in the U.S. from 1970-2009.[3]

In addition, not all 625 doctoral students are U.S. citizens or maintain a permanent visa. In Table 5, results from the 2011 BSQ administered by the AACSB International is shown.[3] Statistically, 44.2 percent of doctoral students enrolled are not U.S. citizens or do not maintain a permanent visa potentially creating a barrier for the newly graduated doctoral candidate seeking employment in the U.S., therefore, returning to his/her permanent home outside of the U.S. In addition to citizenship concerns, newly graduated doctoral students have more choices of an AACSB International accredited business school outside of the U.S. due to the increase in Non-U.S. membership. Continuing with the conferment data, the 625 doctoral candidate output from

2005-2009 could potentially drop by 44.2 percent to become approximately 349 candidates, increasing the faculty-to-student ratio to 1 to 179

Table 5: Percent of Doctoral Enrollment in the U.S. by Citizenship in 2011.

Citizenship	Percent
U.S. Citizen or Permanent Visa	55.8
Non-U.S. Citizens without Permanent Visa	44.2

In addition, not all doctoral candidates choose employment in academia. In 2000, the AACSB International identified 62 percent of doctoral business graduates from a U.S. doctoral program intended to enter academia, leaving 38 percent to industry.[4] Once again, the 349 doctoral candidate output (conferment data adjusted based on citizenship) could potentially drop by 38 percent to become approximately 217 candidates, which increased the faculty-to-student ratio to 1 to 288. Institutions should be troubled by the large faculty-to-student ratio because an AACSB International accreditation standard requires the student-faculty interaction to be sufficient. The student-faculty interaction is partly evaluated by the learning experiences and interaction opportunities in large lecture courses or large faculty-to-student ratio.[5]

Doctoral Funding

A decrease in doctoral funding has immense consequences on the shortage of business faculty. The reduction in funds has decreased the funding packages, including research and teaching assistantships, for potential business candidates minimizing the temptation to leave a career in industry and start a career in academia. In Table 6, U.S. doctoral records maintained by the Department of Education and National Science Foundation were evaluated by the Doctoral Faculty Commission (DFC).[1] The main form of support was provided by the institution (research/teaching assistance and fellowship/scholarship) totaling 49.8 percent, followed by family support at 14.8 percent of funding.

Table 6: Source of Support for Business Doctoral Students in U.S.

Source	Percent
Loans	7.7
Foreign	4.8
Fellowship or Scholarship	14.7
Dissertation grant	0.3
Teaching assistantship	22.0
Research assistantship	13.1
Internship or Residency	0.1
Personal savings	6.3
Other personal earnings	9.8
Spouse/significant other/family support	14.8
Employer reimbursement/assistance	6.1
Other	0.3

According to the DFC, 37.7 percent of students expect to incur significant debt to complete a Ph.D.[1] In 2000, 16 percent of doctoral students incurred over 20,000 dollars upon completion of his/her degree.[1] Unfortunately, the impression of incurring a large financial burden will deter certain potential doctoral candidates from pursuing the degree.

Faculty Retirement

The upcoming amount of faculty pursuing retirement will create an even larger shortage than projected. According to Bryant and Ebrahimpour, the AACSB identified “more than 30 percent of U.S. business faculty members are age 55 or older, compared with less than 20 percent a decade ago.”[4] Individuals are working longer and the increase in age of faculty members is delaying the impact of retirement. The current shortage of business faculty will escalate quickly, only enhancing the necessity of business Ph.D. faculty.

IMPACT ON ACADEMIA

The magnitude of the shortage has caused entry-level faculty salaries to increase and accreditation standards to be challenged. Institutions may struggle to maintain business accreditation and universities may not be able to compete with industry salary, possibly creating an undergraduate business enrollment constraint. Bottom-line, we may not have enough professors to teach the students.

Faculty Shortage

One of the AACSB International accreditation standards requires 90 percent of faculty to be Academically Qualified (AQ) or Professionally Qualified (PQ); a minimum of 50 percent must be AQ.[5] An Academically Qualified (AQ) faculty member must meet a set of criteria outlined by the AACSB although almost all of the guidelines require the faculty member to have a doctoral degree, preferably in business. A Professionally Qualified (PQ) faculty must have relevant academic *and* professional experience, usually requiring a master’s degree in business. The institution under review will be responsible for justifying all faculty members identified as PQ during AACSB reviews.[5] On November 18, 2010, The Chronicle of Higher Education interpreted the accreditation standard by stating, “A current standard calls for half of the faculty at business schools to hold Ph.Ds.”[6]

Using the data from the 2010 BSQ by the AACSB International, a breakdown of business faculty qualification from AACSB institutions from academic years 2005-06 to 2010-11 is demonstrated in Figure 3.[2] Over time, percent of PQ faculty on staff has experienced a 7 percent growth, where AQ faculty experienced a 5 percent decline. The utilization of more PQ faculty for AACSB accredited institutions is gaining recognition and rising.

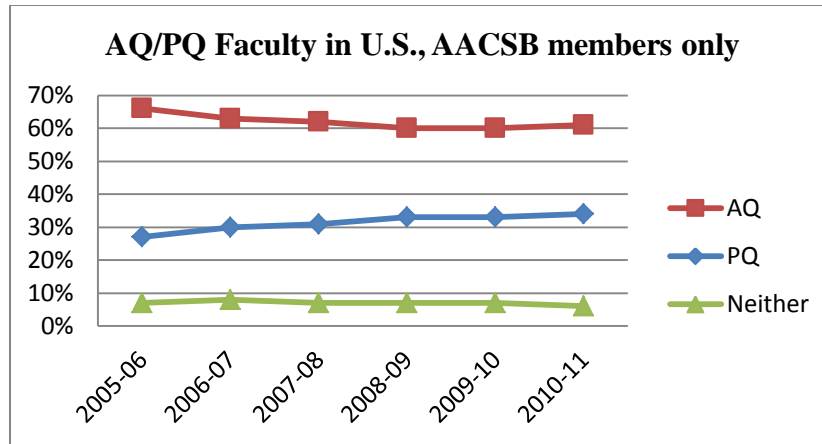


Figure 3: Percentage of Academically Qualified (AQ)/Professionally Qualified (PQ) Faculty in the U.S., AACSB members only.[2]

Most areas of business are expecting a growth in full-time faculty positions increasing the demand. In Table 7, the 2012 AACSB International Salary Survey data show that Accounting, Finance and Marketing expect the most amount of growth in the number of full-time business doctoral faculty positions.[3] Management and Economics are a close second. On the other hand, these numbers do not show if the positions were filled, in other words, if the supply is sufficient.

Table 7: Percent of Net Planned Growth in the Number of Full-Time Business Doctoral Faculty Positions by Discipline in 2012.

Discipline	U.S.	Discipline	Non-U.S.
Accounting	24.2	Accounting	15.2
Finance	13.6	Finance	14.6
Marketing	13.3	Marketing	11.4
Management	8.9	Economics	6.3
Economics	7.3	Management	6
CIS/MIS	5.7	Behavioral Science	5.1
Strategic Management	3.6	Strategic Management	5.1
Operations Management	2.6	HR Management	4.4
Behavioral Science	2.5	International Business	4.4
Small Business	2.5	CIS/MIS	4.2
Logistics	2.1	Small Business	3.8
Business Communication	1.9	Operations Management	3.5
Business Law	1.9	Business Law	2.8
HR Management	1.7	All Others	2.8
Health/Hospital Management	1.1	General Business	1.9
International Business	1.1	Logistics	1.4
Statistics	0.9	Operations Research	1.3
All Others	0.9	Business Communication	0.9
Quantitative Methods	0.8	Business Ethics	0.9

Taxation	0.8	Insurance	0.9
Operations Research	0.7	Health/Hospital Management	0.6
Business Ethics	0.6	Hotel/Restaurant	0.6
Hotel/Restaurant	0.6	Statistics	0.6
Insurance	0.4	Business Education	0.4
Real Estate	0.3	E-business	0.3
Business Education	0	Quantitative Methods	0.3
E-business	0	Taxation	0.3
General Business	0	Public Administration	0
Public Administration	0	Real Estate	0

In 2003, the AACSB has projected a shortage of academically qualified business faculty of 2,419 by 2012.[1] In summary, the U.S. doctoral faculty demand and supply has been projected and demonstrated by the AACSB Doctoral Faculty Commission in Figure 4.

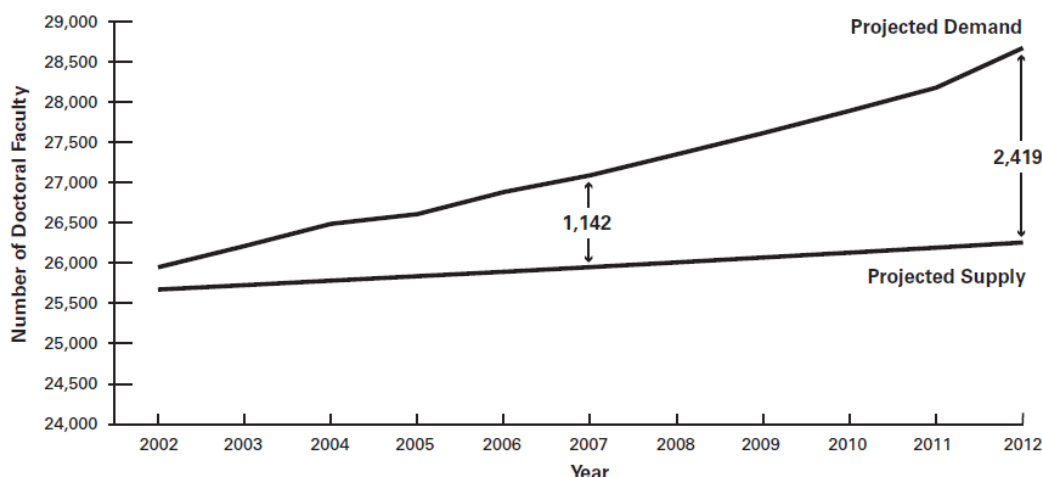


Figure 4: Projected U.S. Doctoral Faculty Shortage by 2012.[1]

Faculty Salaries

During the academic year 2009-10, the College and University Professional Association for Human Resources (CUPA-HR) conducted a survey of all disciplines to evaluate salary differences in regards to entry-level assistant professors and tenured professors, shown in Table 8.[7] The business field is ranked third for tenured professors and first for entry-level assistant professors, averaging almost twice as much as the education discipline.

Table 8: Average Salary by Discipline and Rank for 2009-10.

Discipline	New Assistant Professor	Discipline	Tenured Professor
Business, Management/Marketing	95,822	Legal Professions & Studies	134,146
Legal Professions & Studies	92,033	Engineering	112,679

Engineering	75,450	Business, Management/Marketing	109,919
Computer & Information Sciences	72,199	Computer & Information Sciences	101,219
Agriculture	62,589	Architecture	95,723
Architecture	58,935	Biological/Biomedical Sciences	91,184
Social Sciences	58,466	Agriculture	90,053
Biological/Biomedical Sciences	57,021	Social Sciences	89,351
Physical Sciences	56,483	Physical Sciences	88,147
Mathematics	55,186	Foreign Language	85,620
Psychology	54,584	Philosophy/Religious Studies	84,621
Communication/Journalism	54,424	Mathematics	84,324
Education	54,009	Psychology	83,840
Philosophy/Religious Studies	53,668	Communication/Journalism	83,656
Foreign Language	52,271	Education	82,919

More detailed and current data of average full-time faculty salaries for assistant professors and new doctorates in 2012 are provided in Tables 9 and 10.[3] The average salary of a new assistant professor has increased from 2010 but is it enough to compete with industry?

Table 9: Average Full-Time Business Faculty Salaries for Assistant Professors for 2012.

Discipline	U.S.	Non-U.S.
Accounting/Taxation	127.6	103.1
CIS/MIS	101.4	92.1
Economics/Managerial Economics	90.8	75.5
Finance/Banking/Real Estate/Insurance	135.3	100.9
Management/Behavioral Science	107.7	95.5
International Business/Strategic Management	107.7	95.5
Marketing	111.3	93.7
Productions/Operations Management	116.9	97.7
Quantitative Methods/Operations Research/Statistics	100.5	73.5

Table 10: Average Full-Time Business Faculty Salaries for New Doctorates for 2012.

Discipline	U.S.	Non-U.S.
Accounting/Taxation	135.5	130.0
CIS/MIS	96.7	87.5
Economics/Managerial Economics	92.0	73.9
Finance/Banking/Real Estate/Insurance	138.6	133.3
Management/Behavioral Science	102.4	115.8

Marketing	114.1	95.3
Productions/Operations Management	106.7	-
Quantitative Methods/Operations Research/Statistics	99.0	-

AACSB Accreditation

Institutions are pushing back and requesting the 50 percent AQ faculty requirement be reevaluated. In 2011, the AACSB International has developed a review board called the Blue Ribbon Committee to assist with the assessment and suggest improvements in regards to the accreditation standards. The AQ faculty requirement has been addressed in the March 2012 BRC Progress Report, although no commitments have been made.[8]

CURRENT AND FUTURE REMEDIATION

As shown by the data, it is essential to remediate the shortage and implement prevention measures to ensure this concern does not occur in the future. A few current remedies consist of the development and implementation of bridge programs, part-time Ph.D. programs, and attractive marketing packages. In addition, cost sharing programs may be a remedy for the future.

Bridge Programs

First, there are a multitude of bridge programs available; although, the majority falls into two categories. A professionally qualified bridge program is based on training individuals from industry on how to teach in a classroom setting. The other option is the academically qualified bridge program which converts existent Ph.D. professors from other disciplines into a business concentration. The bridge programs can last from two months to two years costing 14,000 to 40,000 dollars.[9] In summary, bridge programs are a great way to increase the business professor candidate pool in the short-term.

Part-time Programs

Based on a study conducted by Bryant and Ebrahimipour in 2009, 11 institutions offer a part-time Ph.D. business program; of the 11, only two address executive professionals.[4] In Figure 5, the 2011 BSQ doctoral enrollment data is summarized. [3] Only 8.2 percent of U.S. doctoral enrollment is in a part-time program.

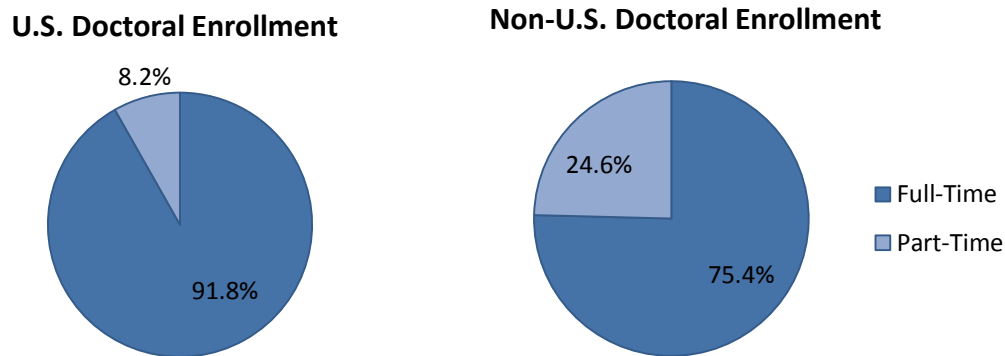


Figure 5: Percent of Doctoral Student Enrollment for Full-Time and Part-Time Students in 2011, U.S. versus Non-U.S.[3]

Executive professionals are a key market that institutions are omitting from the recruitment band. Executive professionals usually have sufficient personal funds to pay for the Ph.D. program. Executives may also have the possibility of the company reimbursing the student to enhance career development. Either way, institutions will benefit from the reduction in budget and an increase in doctoral candidates.

Marketing

Institutions need to enhance their marketing packages and strategies to promote doctoral programs. Life in academia is a career choice that can be advertised at career fairs, recruitment conferences, academic conferences, industry-sponsored conventions, current master's student, etc.[4] In brief, marketing can expand the knowledge of doctoral programs, although, it does not alleviate the financial burden and does not open additional Ph.D. positions

Cost Sharing Programs

In line with Bryant and Ebrahimpour, a future possibility may include cost sharing programs where the cost of the 4 year doctoral program with the Ph.D. degree-granting institution and the hiring institution. Certain stipulations will need to be included, for instance upon completion of the Ph.D. program the candidate will agree to research and teach for the hiring institution for a specific duration of time.[4]

CONCLUSION

In summary, an increase in business school enrollment and conferment, a decrease in doctoral funding and the number of upcoming faculty retirees have contributed to the deficiency in business Ph.D. candidates available for employment in academia. The entry-level faculty salaries, institutions' and accreditation standards are impacted by the shortage. Current reactionary and prevention measures have been put in place to optimistically alleviate the shortage. Unfortunately, the shortage is not an easy fix and will not happen in the near future. Additional remedies will need to be created, evaluated and implemented before the shortage is resolved.

RESOURCES

1. Doctoral Faculty Commission, *Sustaining Scholarship in Business schools: Report of the Doctoral Faculty Commission to AACSB International's Board of Directors*, 2003, AACSB International-The Association to Advance Collegiate Schools of Business: Tampa, Florida.
2. AACSB International- The Association to Advance Collegiate Schools of Business, *Business School Data Trends and 2011 List of Accredited Schools*, 2011: Tampa, Florida. p. 72.
3. AACSB International- The Association to Advance Collegiate Schools of Business, *Business School Data Trends and 2012 List of Accredited Schools*, 2012: Tampa, Florida. p. 82.
4. Bryant, S.K. and M. Ebrahimpour, *A Survey of Ph.D. Candidate Shortage in Business Schools*. Academy of Business Disciplines Journal, 2009. **1**: p. 96-106.
5. AACSB International- The Association to Advance Collegiate Schools of Business, *Eligibility Procedures and Accreditation Standards for Business Accreditation*, 2010: Tampa, Florida.
6. Glenn, D. *Accreditor Re-Ignites Debate Over Business-School Faculty Credentials*. The Chronicle of Higher Education, 2010.
7. Jaschik, S. *Salaries Fell for 32.6% of Faculty*. Inside Higher Education, 2010.
8. AACSB International- The Association to Advance Collegiate Schools of Business. *BRC Progress Report to AACSB Membership*. 2012 [cited 2012 October 19]; Available from: <http://www.aacsb.edu/brc/documents.asp>.
9. Damast, A. *Bridging the Business Faculty Gap*. BloombergBusinessweek, 2007.

**ENROLLMENT, RETENTION, AND GRADUATION RATE CHALLENGES FACING
HBCU's AND MINORITY INSTITUTIONS**

Michael H. Deis
Professor of Management
Interim Dean
College of Business
Clayton State University
Morrow, Georgia 30260
(678)466-4541

MichaelDeis@clayton.edu

Ali Dadpay
Assistant Professor of Economics &
MBA Director
College of Business
Clayton State University
Morrow, GA 30260
(678)466-4538

alidadpay@clayton.edu

Submitted October 12, 2012

A Paper Proposal submitted for consideration for presentation at the
Southeast Decision Sciences Institute Forty-Third Annual Meeting
February 20 – 22, 2013

**Track: Ag Econ, Environmental Economics, Economics, and Finance
or Innovative Education, Teaching, and Pedagogy**

ENROLLMENT, RETNETION, AND GRADUATION RATE CHALLENGES FACING HBCU's AND MINORITY INSTITUTIONS

Michael H. Deis, Clayton State University
Ali Dadpay, Clayton State University

ABSTRACT

There is a crisis in today's educational environment that must be addressed. Given the current educational economic environment, increased emphasis is being placed on enrollment, retention, and graduation rates. The challenges and issues are prevalent at most, if not all, universities, but appear to more prevalent at minority institutions, either Historically Black Colleges and Universities (HBCU's) or other institutions with a majority minority enrollment. This paper will focus on those issues and will attempt to answer questions relevant to regional and national trends in enrollment, retention, and graduation rates at HBCUs and other minority institutions.

BACKGROUND

There are currently 105 institutions considered HBCU's, both private and public, within the United States (Montgomery, 2012). Although the history of HBCU's goes back to the mid-1800s, declining enrollment and low retention and graduation rates appear to be having increasingly detrimental effects on Historically Black Colleges and Universities (HBCU's) and other minority institutions. The implications of these changes, specifically on enrollments, need to be studied.

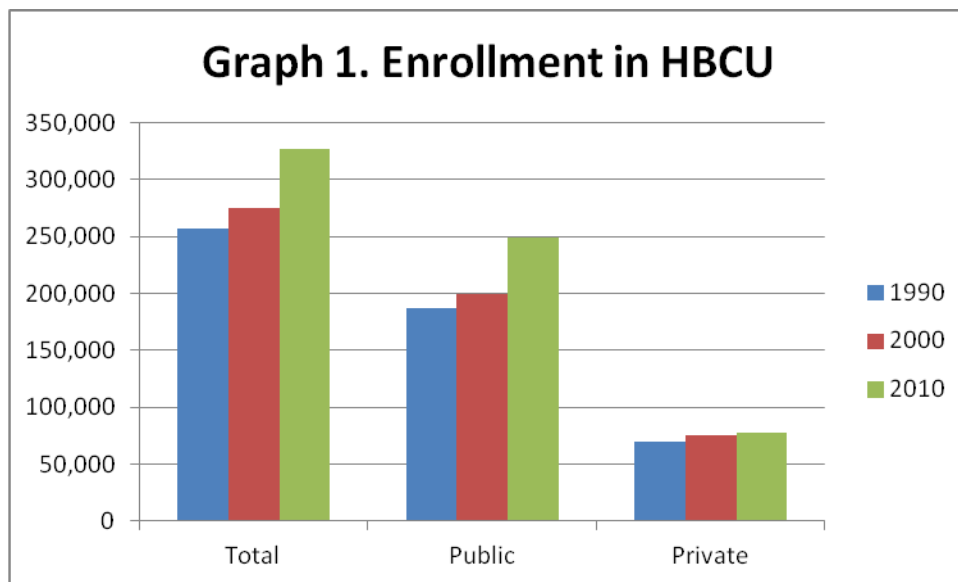
Table 1. Enrollment in HBCU

	Total Enrollment	Public HBCU	Private HBCU
1990	257,152	187,046	70,106
2000	275,680	199,725	75,955
2010	326,614	249,146	77,468

Recent data (list of historically black colleges and universities, n.d.) indicates that for most of the past decade the enrollment in private HBCU's has been flat and relatively constant. In fact, as of the fall, 2012, there was only one HBCU with more than 10,000 students, Florida A & M University, which had 11,180 students. Even schools such as Howard University and North Carolina University had less than 10,000 students, with 7,164 and 9,206 students, respectively (US News Rankings, 2012). Saint Philips College in San Antonio, Texas, also has just over 9,000 students. From 2009 – 2010, three of those four HBCU's with enrollments of more than 10,000 experienced a decline of 2% of their student enrollment. The exception was Florida A& M University. It should be pointed out that Black female students consistently constitute a

larger population of the student body at HBCU's than Black male students. Half of the students in HBCU's are Black females, and only one-third are Black male students.

Reviewing NCES data one finds out that from 1990 to 2000 the enrollment in HBCU's increased by 7%, and from 2000 to 2010 the rate of increase was 18% (Table 1). It should be noted, however, that from 2000 to 2010 the enrollment in public HBCU's increased by 25%, whereas the enrollment in private HBCU's only increased by 2%. In addition, data indicated that from Fall, 2009 to Fall, 2010, enrollment in HBCU's increased by only one percent, from 322,789 to 326,614, according to National Center for Education Statistics (NCES). NCES also reports that some colleges, such as West Virginia State University and Jarvis Christian College (in Texas) experienced a drop of over 20% in their enrollment from Fall, 2009 until Fall, 2010. Many schools experienced a drop of more than 10%, but most of those schools had student populations of less than 1000.



A recent article on Money Watch (O'Shaughnessy, L. CBS News, 10/1/12), listed 25 state universities with the highest four-year graduation rates and 25 state universities with the lowest four-year graduation rates. Of the 25 schools having the best graduation rates, none were HBCU schools. However, of the 25 schools having the lowest graduation rates, six were HBCU schools. Those schools, shown with their graduation rates, are shown in bold print in the table below.

Several of the other university listed above, such as Clayton State University, have large minority student populations. Those universities have some of the same challenges as the HBCUs. In addition, one should note that the trend is not new. For many years (Wilson, 1999), the graduation rates of black students at flagship state universities and HBCU's has been significantly lower than the graduation rates of black students at selective U.S. colleges.

Table 2: Worst Four-Year Graduation Rates

Ranking	University	Graduation Rate
1	Vincennes University	0%
2	University of Houston-Downtown	12.4
3	Texas Southern University	13.3
4	Chicago State University	13.9
5	Cameron University	14.1
6	Utah Valley University	15
7	Coppin State University	16.3
8	Central State University	19.4
9	Indiana University – Northwest	19.4
10	CUNY York College	19.4
11	University of Texas at Brownsville	19.6
12	University of New Orleans	20
13	Northeastern Illinois University	20.1
14	Metropolitan State College of Denver	20.5
15	Shawnee State University	20.5
16	University of Arkansas – Little Rock	20.8
17	Southern University A&M College	21.2
18	Clayton State University	21.9
19	Kent State University	23.1
20	Alabama State University	24
21	Eastern New Mexico University	24.1
22	University of Arkansas at Monticello	24.2
23	University of Arkansas at Pine Bluff	24.2
24	Augusta State University	25.5
25	Auburn University at Montgomery	24.5

The authors, who are from a predominantly minority institution in Georgia, are also very interested in the enrollment trends at HBCU’s in Georgia. A recent article in the Atlanta Journal Constitution (Diamond, 2012), gave the preliminary enrollment data for all of the 35 colleges in the University of Georgia. Over 50% of the schools in Georgia experienced a decrease in enrollment from the fall, 2011 to the fall, 2012. The overall decline was only 1.1%, but as seen in the table below, the overall enrollment decrease at the public HBCU’s in Georgia appears to be much greater than that.

Table 3: Enrollment Data at Public HBCU’s in Georgia

College	Fall, 2011 Preliminary	Fall, 2012 Preliminary	Change
Albany State College	4,653	4,258	-8.5%
Fort Valley State College	3,949	3,541	-10.3%
Savannah State University	4,541	4,512	-.6%

Morehouse College, Spelman College, and Clark Atlanta University also experienced enrollment decreases in the past year.

SOME REFLECTIONS

There are some strategic implications of the enrollment evolution in HBCU's. Most of the HBCU's were established during the segregation period in the U.S. as a means for Blacks to obtain a college education. Since many Blacks were not able to attend White educational institutions during the segregationist period, HBCU's played an important role in the lives of many Blacks (Sissoko and Shiau, 2005).

Although Mykerezi and Mills (2008) and Price, Spriggs and Swinton (2011) suggested that HBCU's afford their graduates relatively superior long-run gains in the labor market, (need citations, need to pull article to see what they say it say), Fryer and Greenstone (2010) stated that the relative returns to students graduating from a HBCU has become negative over time. It appears that HBCU's have been receiving a decreasing amount of the Black high school enrollments in institutions of higher learning.

HBCU's and other minority institutions need to study if they will continue to provide students with long-run gains in the foreseeable future. Additional analysis needs to be done on the retention and graduation rates of HBCU's. There are many research questions that need to be answered. As the changing social dynamics occur throughout the U.S., it will be important to determine how the enrollment in HBCU's will evolve. The implications of the changes in enrollment in HBCU's must also be studied.

In addition, the authors believe changes in enrollment must be investigated as they are different from the national trend for enrollment all colleges and universities. A hypothesis could be that desegregation has made the market more competitive. HBCUs are not alone in the market anymore and have to compete with other institutions. The authors eventually plan on testing for the increase in competition to see if this claim can be justified. The authors also suggest that a survey be conducted to measure if the potential demand for students at HBCU's has decreased because students have decided that a degree from a HBCU will not provide them with long-term gains in the labor market.

REFERENCES

Chace, W.M. (2011). Affirmative Inaction: Opposition to affirmative action has dramatically reduced minority enrollment at public universities; private institutions have the power and the responsibility to reverse the trend. *American Scholar*, Winter 2011, Vol. 80, Issue 1, pg. 20-31.

Fryer Jr., R. G. and M. Greenstone (2010). The Changing Consequences of Attending Historically Black Colleges and Universities. *American Economic Journal: Applied Economics*. Volume 2 (1), pp. 116-148.

Montgomery, R., (2012). Graduation rates at Historically Black Colleges and Universities: An underperforming performance measure for determining institutional funding policies. *Journal of Continuing Higher Education*; 2012, Vol. 60, Issue 2, pg 93 - 109

List of historically black colleges and universities (n.d.). In Wikipedia. Retrieved October 9, 2012, from http://en.wikipedia.org/wiki/List_of_historically_black_colleges_and_universities

Mykerezi, E. and D. F. Mills (2008). The Wage Earnings Impact of Historically Black Colleges and Universities. *Southern Economic Journal*. 75(1) pp. 173-187.

O'Shaughnessy, L. (2012). 50 universities with best, worst grad rates, Money Watch (O'Shaughnessy, L. CBS News, 10/1/12); <http://www.cbsnews.com/8301-505145>

No author, 1999: African-American college graduation rates: Blacks do best at the Nation's most selective colleges and universities. *Journal of Blacks in Higher Education*, n25, pg 122 – 127, Fall, 1999

Price G., W. Spriggs and O. Swinton. (2011). The Relative Returns to Graduating from a Historically Black College/University: Propensity Score Matching Estimates from the National Survey of Black Americans. *The Review of Black Political Economy*. 38 (2), pp. 103-130.

Patterns of Accountability: The Millennial and Peer Evaluations

By

Janice A. Black
janblack@coastal.edu
843-349-5012

J. Kay Keels
jkeels@coastal.edu
843-349-2688

And

H. Lee Shinaberger
lshinabe@coastal.edu
843-234-3416

Department of Management and Decision Science
E. Craig Wall Sr. College of Business
Coastal Carolina University
Conway, South Carolina

Accountability, the enactment of the responsibility to measure the output of another and compare it to a set standard with a corresponding consequence (Lerner & Tetlock, 1999), is something desired by employers (English, Manton, Pan, Schirru, & Bhowmik, 2012). However, such accountability when used by a supervisor may be negatively perceived by workers born after 1980 (Fredrick, 2008). Indeed, this generation of workers (often called the Millennial generation, (Alsop, 2008) and referred to as Millennials hereafter), has been identified as being narcissistic (Westerman, Berman, Berman, & Daly, 2012) with attendant difficulties in positively viewing any feedback which negatively impacts their ego (Berman, Westerman, & Daly, 2010; Kelley, 2009). Furthermore, all folks no matter their age need to be taught how to be good work team members (Mumford, Van Iddekinge, Morgeson, & Campion, 2008) where the reliability and quality of the team's output is so crucial. We also see an increasing use of team based learning in higher education where researchers have called for including an impact from peer evaluations (Cestone, Levine, & Lane, 2008). Research has also shown that allowing narcissistic behavior when teams are used as a learning tool undermines the learning of all involved (Twenge & Campbell, 2003).

However, we cannot assume that Millennials will automatically know what and how to be a good team member which includes being willing and able to provide peer evaluations (Cannon & Witherspoon, 2005). Yet, teams must be able to rely on individuals to honor commitments made and to pull their own weight (Compton, 2007). There are three questions that arise. How well do Millennials provide feedback to their peers? How well do they receive feedback from their peers? Do either of these events increase later team output quality or personal output quality?

The paper is organized as follows. We first cover what we mean by accountability. Next, we present what is known about needed team member characteristics whether work teams or student learning teams. The presentation of our hypothesis concludes the theoretical portion of the paper. The methods portion details the data gathering, analysis and results. We conclude the paper with implications for teaching and employers.

Accountability

Accountability is a widely studied phenomena in the business world ranging from educational settings (Sweet & Pelton-Sweet, 2008) to those of top management (Stapleton & Hargie, 2011). It covers venues from international accountability (Gilbert, Rasche, & Waddock, 2011) to personal accountability (Laird, Perryman, Hochwarter, Ferris, & Zinko, 2009). This paper focuses on the more micro level of accountability to one's peers. This level of accountability is really a highlighting of one's individual or personal accountability through the use of peer reviews. Recent articles have shown that having peer evaluations of individual efforts improves the outcome results of individual effort in a work environment (Moorer-Whitehead, 2010). Accountability is integral to work teams from a variety of disciplines ranging from information technology and virtual teams (Dubinsky, Yaeli, & Kofman, 2010; Rusman, van Bruggen, Sloep, & Koper, 2010) to health care (Piper, 2012).

Teams and Accountability

Typically, accountability in the work place is the justification of actions, their output and their quality level to someone in authority where there is a consequence to the justifying party (Lerner &

Tetlock, 1999). Accountability's importance to the justifying party is enhanced when that person values that other's judgment and/or the consequence (Sweet & Pelton-Sweet, 2008). When accountability occurs via peer evaluations as is done in teams, peer authority (Fredrick, 2008) is the basis rather than leadership or hierarchical authority as when the evaluation is done by a supervisor. When in a learning context, peer evaluations of learning team members is often expanded beyond the idea of successful quality accomplishment of team tasks to the ability to work in a self-directed work team work team where a member must be able to take on the roles of a follower, an expert and a leader (Andert, 2011). As higher education instructors find that learning cannot occur in dysfunctional teams (Twenge & Campbell, 2003), there is more and more use of peer evaluations that impact the grades earned by students who are in these learning teams. Thus, the output moves from a single grade for the team to an adjusted grade for each team member based on the peer evaluations (Cestone, Levine, & Lane, 2008).

From this movement, there have been a number of students which have shed insight into what goes into better peer evaluations. Quality work is a primary reason for a strong peer evaluation (Kim, Baek, & Kim, 2011). It is, however, important to control for intrinsic motivation of students (Mitchell, 1992) and effective team process roles (Kim, Baek, & Kim, 2011). Another confounding issue appears to be prior knowledge of and acceptance of team members as friends (Corgnet, 2012). Friends do not earn the best grades on team projects (Corgnet, 2012). Another area influence on peer evaluations that may impact perceived satisfaction of quality is having similar social styles (May & Gueldenzoph, 2006). However, it is important to note that for the Millennial student, gender does not appear to unduly influence peer evaluations (Ammons & Brooks, 2011).

After providing a literature review exploring how Millennials might be expected to perform in a team setting with peer evaluations, we develop precise hypotheses. We report on a quasi-experiment on Millennials faced with complex and messy problems as they work towards a term project that is a significant portion of their term grade and the impact of giving and receiving peer evaluations. The participants were from a regional university in the southeast. Drawn from over the course of three semesters, close to 300 students in around 60 5-member teams are included in the study (actual team

sizes varied between 4 and 6 members). Peer assessments included assessing one's own self, as well as, one's peers along the same criteria. This makes it possible to compare both the personal understanding of an individual's accomplishments towards the team's output and the peer group's understanding of that individual's accomplishments.

Given the importance of peer evaluations in the work place and its growing importance in higher education, how well do students actually do peer evaluations? Do they, for example, even acknowledge differences between individuals or has their immersion in teams and groups throughout their K-12 experience trained them to just accept people as they are and to put up with social loafing? We now move to better understanding the Millennial perspective.

Millennials' View of Teams and Accountability

Scholarly work has found that to be used as a formal extrinsic motivation force, performance expectations of work teams need to be based on well-defined and communicated strategic goals (Wilkinson, 1997) and that team roles need to also be clearly delegated and defined (Dubinsky, Yaeli, & Kofman, 2010). Yet pressure to reach these goals is not a sufficient motivator nor is it an implicit accountability measure since when under performance pressure teams tend to morph into a single unit forgetting the disciplinary expertise that goes into their makeup (Gardner, 2012). High performance pressures coupled with variation in stakeholders doing their fair share (Piper, 2012), as can be found in education (Turnbull, 2005) and medical industries (Leggat, 2007) where the customer/client is also a coproducer, can lead to suboptimal results (Turnbull, 2005; Piper, 2012). Today, even more so than in the past, effective teams require having effective team members (Leggat, 2007). Having a good work ethic is a construct that employers more frequently call for (English, Manton, Pan, Schirru, & Bhowmik, 2012; Placeholder1). A good work ethic really means having self-discipline and being reliable and professional in accomplishing assigned tasks and in one's dealings with others (Perkins, 2011).

Millennials strongly prefer a more democratic decision making atmosphere with minimal hierarchical influences (Twenge J. M., Campbell, Hoffman, & Lance, 2010). They prize work-life balance above company loyalty and higher pay (Piper, 2012). They are comfortable in conditions of

diversity and really don't see it as an issue (Ng, Schweitzer, & Lyons, 2010). They want to learn and to progress rapidly up the corporate ladder and so they value a nurturing environment (Ng, Schweitzer, & Lyons, 2010). However, there is a bit of a disconnect with their perception of achievement-reward causality (Ng, Schweitzer, & Lyons, 2010) and their perspective is often viewed as having an "entitled" view (Twenge J. , 2010) or even as being lazy (Twenge J. , 2010). Yet, these same individuals are willing to work long and hard hours for projects that they believe in (Ng, Schweitzer, & Lyons, 2010). Millennials prefer autonomy on when and where to accomplish their work (Ng, Schweitzer, & Lyons, 2010) while demanding very precise instructions on what is to be done and what the quality standards are (Hershatter & Epstein, 2010) and close monitoring (Marx & Squintani, 2009) . This dual need makes it difficult to allow them room for creativity and discovery since they view any ambiguity with distrust (Hershatter & Epstein, 2010). Their familiarity with online searches can lead them to indiscriminately accept online sources as being based in legitimate authority and expertise when many such sources have problems with accuracy, validity and reliability (Hershatter & Epstein, 2010).

Learning Team and Classroom Management Implications

When instructors choose to use learning teams in a classroom setting with Millennials, instructors may need to modify their classroom environment to better meet these students base orientation. From that basis, instructors can then craft experiences to allow Millennials to move beyond their generation's cultural blinders and allow them to join a work force without creating strong conflicting tensions as is currently the case (Deal, Altman, & Rogelberg, 2010).

Instructors can craft term projects so that they have explicit milestone to meet along the way where peer evaluations can be submitted to enable Millennials to become accustomed to asserting peer based authority. Such evaluations will need to impact their grades or they will be perceived as busy work and will have minimal attention paid to them given their long standing exposure to the use of teams in an education setting. Collaborative learning teams entered into in K12 education before they entered school (Smith, Johnson, & Johnson, 1982). These milestones need to have explicit grading rubrics or the instructor faces the potential backlash of being seen as being biased and unfair by the

students (Hershatter & Epstein, 2010). The instructor will also need to take on a nurturing and/or coaching orientation (Piper, 2012) to help the students move beyond their current self-centered and often puffed up opinion of their ability (Twenge J. , 2010) to seeing the feedback as opportunities for improvement that do not undermine their value as an individual. The instructor also needs to encourage students to hold each other accountable for dysfunctional behavior and low quality work (Lencioni, 2002).

Even with this type of team structure, will Millennial students actually hold each other accountable? This particular question is decomposed into the earlier set of three questions: How well do Millennials provide feedback to their peers? How well do they receive feedback from their peers? Do either of these events increase later team output quality or personal output quality?

We have the following hypotheses with respect to the ability to give high quality peer evaluations.

Hypothesis 1: Students with previous high academic standings will have variation in their peer evaluations given to other students.

Hypothesis 2: Students with previous high academic standings will receive low variation in the evaluations across their peer set.

Hypothesis 3: Students with previous low academic standings will have little to no variation across peers in their peer evaluations given to other students.

Hypothesis 4: Students with previous low academic standings will receive high variation across peers in the evaluations from their peer set.

We will use the following methods to examine these hypotheses.

Methods

This examination of the use of peer evaluations and its impact on subsequent behavior of Millennials was supported by a quasi-experimental study held in two regular semesters and one summer term. These undergraduate students were from teams in a capstone strategy class in a college of business in a comprehensive regional university located in the mid-Atlantic area of the United States.

Participants

There were a total of 117 students with 21% not turning in their first peer evaluation. These 117 students were in 25 groups with an average of about 5 team members in each group (4 to 6 members).

There were 462 peer evaluations with 92 self-evaluations. About 30% were female and 70% were male which is slightly more male intensive than the male/female ratio in the college of business which is typically 65% male and 35% female. Minorities were about 18% of the participants which mirrors the number of minorities in the university.

Procedures

These teams were formed at the beginning of the term. The teams had 3 main team assignments. The initial team assignment related to the forming of the teams and training in team process roles. The second assignment was a presentation of a limited case about half way through the term. The final assignment had 3 milestones throughout the term and finished the term with the submission of a major strategic analysis report and presentation. The teams were either formed by having students seek others from other business majors with elements of diversity in the teams or assigning them randomly and then allowing shifting if the team needed better diversity present. All teams had at least two dimensions of diversity present (from among gender, age, work experience, ethnicity, or national background) and had representations from at least 3 functional areas in business. Given the class and team sizes, either an accounting or a finance majors were allowed to enable at least one of those majors on a team.

Measures

Demographic data such as the ethnicity of the student, the gender of the student, the student's previous earning of presidential or dean's excellence awards, the student's previously being on probation, the student's grade on the first exam in the class and the first team assignment grade were all collected. Then two types of peer evaluations were collected: Quality of Assigned Task contributions and Quality of Team Spirit Behaviors. Team Spirit behaviors are based in effective team process roles (Kim, Baek, & Kim, 2011). Each team member was assigned to do a peer evaluation after each team assignment except for the first assignment in which they formed the team.

Teams earned a grade on their accomplishing of a team milestone towards their term project. These milestone grades were transformed from a single team grade to a grade that reflected the peer's evaluation along both task completion quality and team role behavior quality. To determine if a member's actions warranted adjustment from the team grade, the peer evaluation scores were calculated as a percent of the total possible peer evaluation score. If this peer evaluation score fell below 90%, students would receive an adjusted team score of their peer evaluation score times the team base score earned on the associated assignment. Peer evaluations scores made a difference to the individual's grade if they were not perceived by their peers as earn at least an A. Subsequent team grade on the next milestone will be used as an indication for an improvement in effort or learning on the part of the students.

Analysis

We begin the analysis by identifying the average peer evaluation scores as determined by self-reports and peer evaluations. We next look at the variance in those scores by individual component for both self assessments and peer assessments.

Summary of Responses

The students were separated into three categories based on their performance on the first graded assessment. Students scoring less than 80% were considered low performers, students scoring 80% up to 88% were considered moderate performers, and students scoring above 88% were considered high performers. The self and peer evaluations are summarized below. Note that some students did not provide peer evaluations which in changes in the sample sizes.

Table of Self and Peer Evaluations

	Self-Evaluation	Evaluation of Peers	Evaluation by Peers
High Performers (n=29)	Average = 95.5% Variance = 0.0048 n = 25	Mean = 97.4% Variance = 0.0100 n = 26	Mean = 93.7% Variance = 0.0090 n = 29
Moderate Performers (n=26)	Average = 94.9% Variance = 0.0061 n = 20	Mean = 89.7% Variance = 0.0098 n = 20	Mean = 93.6% Variance = 0.0094 n = 26
Low Performers (n=41)	Average = 94.8% Variance = 0.0028 n = 31	Mean = 87.7% Variance = 0.0111 n = 31	Mean = 88.9% Variance = 0.0106 n = 41

Hypothesis Testing

For Hypothesis 1 (*Students with previous high academic standings will have variation in their peer evaluations given to other students*) we compared the variance of high performers' evaluations of their peers to the variance of low and moderate performers' evaluations of their peers. The variance of low and moderate performers' evaluations is not shown in the table above, it was omitted for clarity. Comparison was done using the F distribution. The p-value of the test was found to be 53.6%. The ratio between the variances was insufficient to support the hypothesis, and the high performers did not have significantly more variation than the others.

With Hypothesis 2 (*Students with previous high academic standings will receive low variation in the evaluations across their peer set*) we compared the variance of high performers' evaluations by their peers to the variance of low and moderate performers' evaluations by their peers. The p-value was found to be 31.2%, and again we failed to find a significant difference in the variance.

Considering Hypothesis 3 (*Students with previous low academic standings will have little to no variation across peers in their peer evaluations given to other students*) we compared the low performers' evaluation of peers to the moderate and high performer's evaluation of their peers. The F distribution test found a p-value of 49.9% (the variances were nearly identical), and again no significant difference in variance was found.

The last hypothesis to be considered, Hypothesis 4 (*Students with previous low academic standings will receive high variation across peers in the evaluations from their peer set*) compared low

performers' evaluations by peers to moderate and high performers' evaluations by their peers. The p-value of 32.2% indicates there was not a significant difference in variance between the two groups.

Discussion and Implications

In this paper, we looked at agreement if you will over the scores awarded on peer evaluations. We looked at high performing students and low performing students as indicated by individual quiz scores and the scores and variance with respect to peer evaluation scores. We failed to find significant support for all of our hypotheses. We do note that there is a difference as predicted in both the high and low performing students' evaluation by peers, however the difference is not large enough to be statistically significant.

The implication from failing to accept Hypothesis 1 (*Students with previous high academic standings will have variation in their peer evaluations given to other students*) is that even high performing students may not be applying critical thinking in their evaluation of peers. Millennials may find peer pressure to be an overwhelming influence. This implies that development of skills to hold team members accountable may be stunted by the effects of peer pressure. A student may tolerate average performance in order to not disrupt group relationships. Whether this is based on lack of skills or the desire to be "liked" by peers needs further investigation.

Hypothesis 2 (*Students with previous high academic standings will receive low variation in the evaluations across their peer set*) implies that strong performance may not be recognized by peers. This may also be another example of the lack of accountability skills or the inability to apply critical thinking criteria in a peer evaluation context. Perhaps the implied competition for academic success is distorting perception or willingness to acknowledge strong performance in a peer. It could be a coping mechanism based on the egocentric nature of the Millennial generation. Another explanation is that high performing individuals may choose not to make large contributions to the team. That possibility is observed within the data by the similar evaluation by peers between high and moderate performers. Only low performers appear to have a different (and lower) evaluation by their peers. Further investigation is warranted.

The results from the testing of Hypothesis 3 (*Students with previous low academic standings will have little to no variation across peers in their peer evaluations given to other students*) implies that students with low skill sets do have variation in their peer evaluations of others. Note that the average peer evaluation given by low performers (87.7%) is lower than the averages by moderate (89.7%) and high (97.4%) performers. If their low performance has been noted and voiced by the team, low skill set (implied by the low grade on the individual assignment) Millennials may choose to defend their ego aggressively through the survey instrument. Alternatively, they may attempt to lessen the perceived performance difference between themselves and others by increasing the variation of their evaluations (i.e. adding more “low” performers to the group). Despite this potential reasons for the variation, overall scores remained at the top end of the scale. Is this the Lake Wobegon effect migrating to the workplace? There are opportunities for additional research in this area too.

The lack of significant statistical evidence in support of Hypothesis 4 (*Students with previous low academic standings will receive high variation across peers in the evaluations from their peer set*) implies that all team members recognize when there is a low performer. This interpretation is supported by the relative low score given to low performers by their peers (88.9% for low versus 93.6% and 93.7% for moderate and high performers respectively.) The team members with previous low academic scores seem to perform poorly in team work to the point that their peers evaluate them lower than other team members. Do poor students perform poorly in teamwork, or is this a halo effect? Further research is needed.

One limitation of the study to consider is the academic success of students on the first graded assignment may not be an accurate measure of true team performance. The first assignment was individual, and not related to the team assignments. The implied assumption is students that perform well on academic assignments will also perform well as a team member. That assumption may not be valid. They may choose to not perform or may underplay the amount of additional work that they do to get the quality of the group effort up to personal standards.

As an aside, we note that the only variation in variance that appears to be significant within the evaluation categories is between low performers and moderate or high performers in the self-evaluation category. The variance for the low performers' self-evaluation is 0.0028, moderate performers' is 0.0061, and high performers' self-evaluation is 0.0048. Thus, low performers have some folks who recognize their low performance and others who do not or choose not to acknowledge it.

Conclusions

The study indicates that Millennials need to develop additional skills to hold teammates accountable for their performance. This may be as simple as showing them how to apply critical thinking in the team and peer evaluation context. Note that students recognize gross malfeasance, but it does not appear to impact their peer evaluations to the same degree that it may impact grades or quality of their team output. Furthermore, excelling personally may have no benefit within a team environment since peers do not appear to recognize a difference between moderate and high performing students. This is problematic in the work environment where employers call for applicants with a strong work ethic. On the other hand, there is a cost for being a low performer, both in preparing for the work environment and in the team environment. Furthermore, these two peer pressures without correctly applied accountability measures may drive team work efforts towards mediocrity. Mediocrity or poor performance in the work environment has much harsher consequences than the educational environment. As faculty, we are concerned about this potential harmful effect and the apparent need for training in accountability that exist in the Millennials found in our classrooms.

Works Cited

- Alsop, R. (2008). *The Trophy Kids Grow Up*. San Francisco, CA: Jossey-Bass.
- Berman, J. Z., Westerman, J. W., & Daly, J. P. (2010). Narcissism in Management Education. *Academy of Management Learning and Education*, 9(1), 119-131.
- Cannon, M. D., & Witherspoon, R. (2005). Actionable Feedback: Unlocking the Power of Learning and Performance Improvement. *Academy of Management Executive*, 19(2), 120-134.

- Cestone, C. M., Levine, R. E., & Lane, D. R. (2008). Peer Assessment and Evaluation in Team-Based Learning. *New Directions for Teaching and Learning*, Winter, 69-78.
- Compton, M. (2007, Jul/Aug). Personal Accountability in a Team. *Women in Business*, 59(4), pp. 14-16.
- English, D. E., Manton, E., Pan, E. Y., Schirru, S., & Bhowmik, D. (2012). A Comparison of the Views of Business Deans and Human Resource Managers on Selected Workplace Qualities. *SEInforms Proceedings*. Myrtle Beach, SC: SEInforms 2012 Annual Meeting.
- Fredrick, T. A. (2008). Facilitating Better Teamwork: Analyzing the Challenges and Strategies of Classroom-Based Collaboration. *Business Communication Quarterly*, 71(4), 439-455.
- Kelley, R. (2009, April 27). Generation Me. *Newsweek Magazine*. Retrieved from <http://www.thedailybeast.com/newsweek/2009/04/17/generation-me.html>
- Lerner, J. S., & Tetlock, P. E. (1999). Accounting for the effects of accountability. *Psychological Bulletin*, 125(2), 255-275.
- Mumford, T. V., Van Iddekinge, C. H., Morgeson, F. P., & Campion, M. A. (2008). The Team Role test: Development and validation of a team role knowledge situational judgement test. *Journal of Applied Psychology*, 93(2), 250-267.
- Twenge, J. M., & Campbell, W. K. (2003). Isn't it fun to get the respect that we're going to deserve? Narcissism, social rejection, and aggression. *Personality and Social Psychology Bulletin*, 29(2), 261-272.
- Westerman, J. W., Berman, J. Z., Berman, S. M., & Daly, J. P. (2012). Are Universities Creating Millennial Narcissistic Employees? An Empirical Examination of Narcissism in Business Students and Its Implications. *Journal of Management Education*, 36(1), 5-32.

USING PEER EVALUATION TO SUPPORT CLASS PARTICIPATION GRADING IN MANAGERIAL COMMUNICATION COURSE

Suzanne J. Smith, Department of Business Administration,
Presbyterian College, 503 S Broad St, Clinton, SC 29325
(864) 833-8454, ssmith@presby.edu

ABSTRACT

Class participation is an important part of Managerial Communication course, yet, measuring this component of a student's grade is difficult to do. Rather than using the traditional Likert scale forms of feedback, this paper presents an alternative approach. Students vote for fellow students based on three attributes of participation and write three descriptors of the quality of their contributions throughout the course. The result is that students receive a written summary of how their peers perceive them and the instructor has supporting documentation in assigning class participation grades.

INTRODUCTION

Most Business Communication classes employ some kind of peer evaluation in the grading process (Lynch & Golen, 1992). Many classes include class participation as a relatively small part of the final average, and at least one university reported that 93% of classes employed class participation as a part of the grade (Tiew, 2010). Using peer evaluation to objectify class participation often takes the form of a Likert-scale type question (Gueldenzoph & May 2002). This objective format may not completely capture the subtle contributions of each student. And it overlooks an additional writing opportunity for students.

In some Business Writing classes, students receive written feedback from peers about their written work. One study (Lynch & Golen, 1992) found that about half the faculty they surveyed required only written comments on fellow students' writing and the other half expected students to complete a rating instrument and provide written comment. Few classes included oral feedback. The four most common qualities rated were organization, clarity, grammar, and tone. Faculty responded that peer evaluation improved students' writing skills as well as their attitudes.

One study explored a comprehensive approach for collecting feedback at multiple stages in the writing process (Gueldenzoph & May 2002). This paper discussed collecting feedback at three different phases of the course using formative and summative evaluation. While this system may guide students toward remedying their deficiencies earlier in the course, the collection and reporting process requires a more sophisticated support system than most faculty have available.

THE CLASS FORMAT

This paper reports on the use of peer input into class participation grades in a Managerial Communication class at a liberal arts college in the southeastern United States. Each week in this case-based class, students discuss a case which includes a communication challenge

during the Tuesday afternoon period. Three hours before the next class on Thursday, students turn in the assigned problem-solving letter or memo in the role of the protagonist in the case to the instructor with their names lightly printed on back. The instructor compiles all fifteen documents, numbers them, and distributes them to the students to read as they arrive in class. All students read all documents and vote on the top three which do the best job at addressing the problem.

The students and instructor spend the rest of the Thursday afternoon class period discussing why the winners won, improvements they might still make, and how the remaining documents could have become winners. At the end of each class, the top three authors reveal themselves, and the other authors remain anonymous. The competitive environment strengthens everyone's writing.

Class participation typically counts 15-20% of the student's grade. During discussion of the documents, students learn to speak up to tell specifically what they liked and did not like about the documents. Authors will occasionally critique their own work in public without acknowledging their authorship. The public format keeps them accountable to do their best work and embarrasses students who do not write well.

Students in the class are usually senior business administration majors who are looking for practical business writing and speaking skills in the class. The fifteen students and instructor sit around a square of tables in seminar-style, where the faculty member leads discussion during the first six weeks of the class. After students learn how the system works, they take on more of the discussion leading roles. By the end of the semester, the professor talks less than 25% of the time during class.

PEER EVALUATION

At the end of the semester, each student completes peer evaluations in Excel by voting for three students in three categories of peer contribution and completing three descriptors for each peer. Students e-mail their spreadsheets to the instructor, who copies/pastes their votes in the relevant cells on the master table, tallies the votes, and produces an individual set of descriptors for each student.

The voting categories reflect multiple dimensions of class participation based on the case discussion and peer evaluate writing goals of the course.

Table 1. Categories for Peer Evaluation Voting

Categories	Why This Category Supports Good Participation
Students from whom they learned the most	Students who participate at a healthy level should share relevant information. The purpose of class case discussion is to sort through the relevant points in the case and find good solutions. Similarly, class discussion of the written documents students generate should stimulate new learning about best practices in writing. Students who receive large numbers of votes in this category are teachers and leaders through their helpful suggestions and good examples.

Students you would most like to work alongside in the future	This category sorts out how peers view the relative levels of conscientious effort and collegial spirit students bring to the class discussion. Students who receive votes in this category are team players.
Students who brought out the best in their fellow classmates	While the clash of ideas is important to the learning process, the class environment should not be unhealthy or overwhelmingly negative. This category identifies the positive students who spark enthusiasm in class discussion. While they are not exclusively goofy or funny, they keep the spirit of the class moving in a constructive direction.

In addition, to voting, students complete a table with short descriptors about each classmate. The purpose of requiring the descriptors is

1. To give students a chance to express nuanced qualities about people they work with using a 360-degree-type performance appraisal. In both giving and receiving feedback, they learn to value more specific feedback rather than the broad generalizations people lapse into
2. To give the recipients a picture of how their classmates see them. Students treasure this reflection. Sometimes they reveal blind spots or inspire confidence in students who may need more affirmation. The recurring themes are particularly valuable.
3. To give the instructor guidance in assigning class participation grades. Although the instructor usually agrees with the comments, it provides documentation from multiple sources, further validating the instructor's ideas.
4. To give the instructor peer descriptors which can later be used in reference letters as direct quotations from fellow students. As more employers do background checks and as students go to graduate school or request recommendations on LinkedIn, these comments give faculty a ready arsenal of descriptors. It is particularly useful when former students as for graduate school recommendations five years later.

THE SPREADSHEET

Each student fills in a blank spreadsheet. Since the instructor receives them via e-mail, there is no anonymity, which is actually a good thing. This document is from a recent class. To protect the identity of the students, it includes first names only.

As students e-mail the instructor the spreadsheet, the instructor copies/pastes each block of votes and descriptors onto a spreadsheet that looks like this. This document protects the identity of students by removing all names. Note that the column headings show the identity of the voter so that students cannot vote for themselves. The actual document tracks their identity with names.

Tracking information in Excel allows all kinds of data sorting, summarizing, and reporting processes. The spreadsheet can be fairly wide, but columns can stay narrow since the

spreadsheet does not have to display all the content to retain it in the transferring to another worksheet.

Table 2. Managerial Communication Voting & Descriptor Ballot

Vote for up to 3 in each category by putting an x in the cell next to their name

Write three short descriptors for each classmate

Number	Name	I have learned the most from these students	I would most like to work with these students	Students who brought out the best in fellow class members	Descriptor1	Descriptor2	Descriptor3
1	Renee						
2	Chris						
3	Rob						
4	Kayla						
5	Liz						
6	Ben						
7	Kat						
8	Lindsay						
9	Justin						
10	Colin						
11	Rob						
12	Jessica						
13	Taylor						
14	Katie						
15	Anna						

The numbers show the sum formula for votes in each category across their row. Colors reflect first and second place in each category. Yellow=First place, Green=Second Place.

Table 3. Voting Spreadsheet

Num	Name	learn the most	would most like to work with	brought out the best															
					S15	S4	S13	S2	S3	S10									
1	S1	5	3	2	X				x		X			x		x		x	
2	S2	0	6	3		X					X								x
3	S3	1	4	5						X			x			x			x
4	S4	6	3	0								x		x	x				
5	S5	0	1	2								x							x
6	S6	0	0	0															
7	S7	3	5	4	X		x			X	X		x			x	x		x
8	S8	2	1	2	X														
9	S9	7	4	6	X	X		x	x	X	X		x			x			
10	S10	3	3	0				x	x				x						
11	S11	6	2	6	X			x	x	x	X			x					x
12	S12	2	4	2	X														x
13	S13	2	1	0														x	
14	S14	0	0	1		X													
15	S15	6	6	4							X	x			x		x	x	

Because the instructor identifies both first and second place winners in each category and there are often ties, several students have the distinction of receiving awards in a relatively small class. In this class, for example, seven out of fifteen students won in at least one category.

Having multiple categories helps students who might not be fabulous writers find opportunities to play a supporting role in the class discussion.

These results are not publicly available to all students. Only the winners know their identity.

Table 4 Partial Descriptor Spreadsheet (actual worksheet includes all fifteen sets of comments)

Num	Name	S9			S8		
		1	S1	even-keeled	great business mind	didn't say a lot in class	good comments, always constructive and helpful
2	S2	coachable; humble	succinct	good input into classmates' work	got straight to his point	his writing was concise, just like his comments	great public speaker, one of the best in our speeches
3	S3	really enjoyed his recommendation letter	very impressive resume	quiet	I think he had the best comments	he thought of things that I wouldn't have, got me to see things in a different way	really great writing
4	S4	great writer	great presenter	consistent quality	great writing	gave us the point of view of an English major, not just business	her grammatical tips were very helpful
5	S5	kind	fun	attentive	really good comments	different point of view than everyone else	straight forward in her comments
6	S6	seemed a little nervous during presentation	compassionate	quiet	quiet, but had constructive comments when she spoke	always had something nice to say about each assignment	was good at framing her criticisms in a friendly and helpful way
7	S7	good-natured	coachable; takes criticism very well	thorough	solid, insightful comments	strong writing skills, just wrote a lot	I enjoyed her letters because she always added something unique to hers from her research
8	S8	cultured	good writer	observant			

9	S9				her assignment was the easiest to spot	always had great content, usually a winner	hilarious comments, kept me laughing the whole time
10	S10	honest	business-savvy	CEO-like	pointed out things that I wouldn't have thought of	he is a great writer, I usually liked his assignment	he had strong, constructive comments. I liked that he always talked about ways to make it better rather than just saying what was wrong
11	S11	energetic	knowledgeable	could listen better	always had something to say about every letter, this is good and bad	constructive comments, but could have been more to the point	strong writing skills
12	S12	good business writer	enjoyed her recommendation letter	pleasant personality	quiet, but had good things to say when she did speak	her assignments were well written and had good content	had something nice to say about everyone's letters, usually about the clean layout
13	S13	reserved	neat ambitions-pastry chef	hard-working	great public speaker, definitely the best in our speeches	had great comments	solid writing
14	S14	hard worker	cheerful	sometimes seems to lack confidence in writing skills	relevant and insightful comments	always had something constructive to say about each letter	gave strong comments without being harsh
15	S15	sophisticated	respectable	very skilled with presentations	her comments made me think and would start a conversation	gave us the point of view of a non business major	very strong writing skills

In order to transfer the descriptors to a separate, printable sheet, the entire spreadsheet contains a unique worksheet summarizing each student's descriptors using VLOOKUP functions. The students receive a printout which might look something like this:

Table 5 Sample Personalized Descriptor Summary Given to Each Student
Student1

Concise	Sincere	Conversationalist
knowledgeable	well-spoken	will be very successful
Pleasant	Positive opinions	Polite
Deliberate	Confident	efficient
great voice for a radio personality	concise	more chill than a hammock
got straight to his point	his writing was concise, just like his comments	great public speaker, one of the best in our speeches
Strong public speaker.	Writes to the point.	Clear and concise.
insightful	bright	honest
delightful	hard working	dependable
coachable; humble	succinct	good input into classmates' work
gave a good perspective	good at presentations	good at not adding too much fluff to assignments
always willing to help	logical	cautious
good short and to the point writing	funny	quiet but gives good feedback
straight to the point	very good at public speaking	is able to identify the good in almost everyone's work

Student you would most like to work alongside in the future ***** **First place winner**

Table 6 Sample Personalized Descriptor Summary Given to Each Student
Student2

smart	helpful	good criticizer
professional and mature writing	constructive editing comments to rest of class	has a great future ahead of him-any employer is lucky to have him!
Good business writer	Future CEO of a Fortune 500 company	Laid back
Has creative and unique ideas.	Quiet. But when he talks, everyone listens.	Going to be very successful in his career.
Diplomatic	Should have spoken more	raised the bar
Quiet	friendly	SMART
Your intelligence about a variety of topics shines through in your writing.	The way you used strong verbs and impressive vocabulary always reminded me to do the same.	You defined the term constructive criticism.
intelligent	hard worker	dependable
most intelligent in the class	great vocabulary	strong ability to write clearly
Woah!	Intense writer	SMART!
professional	pleasant	reliable
class genius	learned a lot from him. Very attentive, articulate, helpful to others.	provided different perspectives on how to view other's work
Intelligent	Good evaluations	Reserved
mature	When he speaks, you want to listen	pleasant

Students from whom they learned the most ***** Second place winner *****
 Student you would most like to work alongside in the future ***** Second place winner *****

CONCLUSIONS

This paper outlines an alternate way to gather, summarize, and deliver peer evaluation information to support the class participation component of the grade. The instructor has observed a few surprises during the course of administering this assignment.

While students are usually polite, one student who was the weakest in the class received some frank, anonymous comments from peers that said things like “not living up to his full potential” and “distracting.” It was important for him to see how others perceived him. The comments might have privately motivated him to change his behavior.

The majority of students share positive comments, though some descriptors such as “quiet” are neutral. The instructor has never filtered an unkind comment, but students know that

the instructor can identify the author. Students would rather receive specific comments than vague ones, and as a result, they learn to deliver feedback with more specificity.

This system could be used in any small, seminar-style course in which class participation is crucial for the success of the course. One student so enjoyed receiving the feedback that she said, "I wish ALL classes offered this kind of peer review system." Indeed, it would be cumbersome and less meaningful to administer for large classes, but for classes with 20 or fewer students, it proves beneficial for all constituents.

REFERENCES

Gueldenzoph, L.E. & May, G.L. (2002). Collaborative Peer Evaluation: Best Practices for Group Member Assessments. *Business Communication Quarterly*, 65(1), 9.

Lynch, D.H. & Golen, S. (1992). Peer Evaluation of writing in Business Communication Classes. *Journal of Education for Business*, 68(1), 44.

Monippally, M. (2008) Use of Peer Feedback in Teaching Analytical Writing to Bright MBA Students. Proceedings of the 2008 Association for Business communication Annual Convention, <http://businesscommunication.org/conventions/abc-convention-proceedings/2008-annual-convention-proceedings/>

Tiew, F. (2010) Business Students' Views of Peer Assessment on Class Participation. *International Education Studies*. 3(3), 126.

Where Does Theory and Practice Intersect in Contemporary Business Education?

Christopher Ziemnowicz
The University of North Carolina at Pembroke
School of Business
ziemnow@uncp.edu

Introduction

This essay reviews an aspect of school of business education in the United States: the basis of curriculum design and format, which in turn has a role in the work of faculty teaching in the business disciplines. This essay focuses on the problem of focusing on theory-based approach in business education, in contrast to the more practice-based curriculum emphasis and teaching techniques. Of course, problems exist in any approach and there are no perfect solutions. Nevertheless, the objective of this essay is an opportunity to examine the situation and spur discussion of potential approaches to equip graduates of business schools with tools to be successful in dynamic global business environments and meet the future needs of our society.

Concerns and problems

There is an appreciation of the problems of emphasizing theory at the expense of practice in the delivery of business administration programs and vice-a-versa. There are many complaints against the pure professional model that has been adopted by most American universities. Theory-driven business education encourages a preference for analytic detachment over insight and innovation. Some reports in the popular business press are critical of business education. Schools of business have been denounced as being too theoretical and out of touch with the real world, for producing narrow-minded technicians lacking in desired skills such as interpersonal and communication proficiencies, as well as for concentrating on esoteric research that is not relevant within the business world.

Some of the complaints that have been leveled at school of business programs include:

1. They emphasize the wrong model.
2. They ignore important work.
3. They fail to meet society's needs.
4. They foster undesirable attitudes.

The focus has been on the transmission of knowledge, with less emphasis on practicing skills necessary to be able to make effective decisions. It is also easier to measure the quality of transmission and use that as a proxy for learning effectiveness. However, is more difficult to evaluate how graduates have gained from their studies to cope with complex business environments. As a result, many academic-focused business programs suffer the risk of leaving their graduates with the impression that the business problems they will encounter during their careers – such as financial and management dilemmas – can be put into neat technical solutions and standardized packages. Moreover, the emphasis on theoretical competencies could lead to innovative and highly profitable solutions – such as complex financial instruments and derivatives – that never consider the consequences of their

application in the economy until they cause a crisis. Another concern has been leveled at institutions of higher education in that they may be preparing individuals that may be unemployable in future. This is sometimes viewed that students are in an academic environment, and only upon graduation do they enter the “real” world.

What is needed for business school graduates is an ability balance pure theory, as well as to be able to function in the “real” world. Under this perspective, the learning outcomes change from their ability to build theoretical constructs and “correct” solutions to open-ended questions that include: can graduates think independently, are they able to serve a coaches in teams, function without sufficient data or extrapolate beyond the given information, change their approach to tasks in midstream, effectively negotiate, as well as continually reflect and inquire? For example, can a newly minted graduate deal with a decision that has less to do with marginal cost analysis of a product-line decision, than with the personal affinity to that product line on the part of an executive? The ultimate business decision may rest more on the individual executive’s preferences, rather than an unambiguous analytical solution. The success of the graduate’s career within that company could then depend on the degree of emphasis on theoretical solutions and exposure to applied simulations that students get from the faculty and in the school’s curriculum.

Concerns have been identified with the relevance of the curriculums at U.S. schools of business. Questions have been raised if the curriculum addresses the environments within which graduates will function. For example, the AACSB (the international accreditation body for schools of business) has noted that global relevance is lacking in curricula and learning to cover the complex opportunities and challenges resulting from rapid developments in business is developed, transacted, and consumed in real time without regard for national boundaries. Increasingly, business operations, outsourcing, supply chains, partnerships, as well as financial and consumer markets are all linked in real time through the Internet. In many cases, these are issues that do not fit into currently exiting disciplinary fields. The AACSB noted that some of the inadequacy results from the reality that business faculty themselves lack global exposure and training in international business strategy and practices. Other problems are the result of new cross-disciplinary areas that may not have found a home at some universities.

The split between theory and practice (that theory is done in school and practice at work) is not a recent phenomenon. Nor was it invented in the U.S. business schools. It has been a tradition of the German Wissenschaft (where the professor-scientist perceives activities to be quite different from those of the manager-doer). In other words, the work of the academician is applicable in the sense of serving the overall preparation of people to the business fields It is not an apprenticeship preparation of learning by doing. However, it is then a particular company’s responsibility to provide appropriate field training that is directly responsive to its business environment and problems.

This is not to depreciate the value of basic theories in throwing light on the assumptions underlying practice; however, there is also a need for a theory of practice to identify incongruities between theory and practice. Traditional faculty will point out the problems that include explanations by practitioners, which may be at best speculative and not informatively reflective. For example, learning from their actions during indeterminate situations may be driven by “gaining by experience” rather than stepping back to recapitulate what they accomplished using meaningful, cohesive, albeit abstract management theories.

It is also true that professor/scientists are also not necessarily well equipped to explain the neat categorization approaches and theories of action that often challenge the assumptions underlying practice. Yet, it is theory that introduces students to principles that can be applied to new and different problems across different contexts – a central aspect of management education if students are to develop the capacity to deal with change and with the future.

However, theory is often taught and researched separately from practice. Moreover, the knowledge base is further broken up into separate disciplines that are stored in territorial units that are further subdivided into courses, most often each being the exclusive province of a particular professor. Actual business problems or solutions rarely present themselves in neatly organized, vertical silos. For example, the transformational role of technology has blurred the lines among business functions, industries, and markets.

Another problem are the rewards structure for business faculty. Business faculty members are typically evaluated on the basis of three broad areas: teaching, scholarship, and service. Although the percentages allocated to the categories may vary between institutions and among particular faculty members, this discussion focuses on the second criterion, intellectual contributions and their role in job security, as well as in promotion and tenure decisions.

While business faculty perceive teaching and research activities to be mutually supportive and espouse the view that research activities made them better teachers, surveys conducted by AACSB show that teaching faculty would spend less time in scholarly publication pursuits, if this activity would not have such a strong impact on their job security. The truth is that business faculty pursue publications because that measure of professional development is often easiest to measure and it also a requirement in meeting faculty qualification standards for accreditation. Simply put, writing articles for publication in peer reviewed journals are sometimes more important activities than providing a contribution to the advancement of business knowledge. Nevertheless, there seems not to be a clear link how many of these irrelevant intellectual contributions in academic journals actually improves student learning of real world business topics.

New Models

The issues raised may lead to the development of new models to provide new solutions to the intersection of theory and practice.

Students may have derived knowledge about management, but they are often likely lacking in knowledge about their own capacity to take action, or even how to take action. Thus, the value of experience can be summarized in three learning roles: the activist, who learns from having the experience; the reflector, who learns from reviewing the experience; and the theorist, who learns by deriving conclusions from the experience.

Business administration is a holistic skill that blends theory and action. Theory makes sense only through practice, but practice makes sense only through reflection as enhanced by theory. Students need exposure to both, and they need interaction between the two if they are to prepare themselves to cope with the ever-changing landscape of business environments. Business schools must not only prepare graduates for a global business environment, but they also have to compete in an increasingly global marketplace for students as well as with a

growing number of competitors. Therefore, schools need to deliver business theory for their students to be successful and practice business to attract students and faculty in the competitive global marketplace for business education.

Because business schools are accountable to both professional and academic audiences, they should pursue two simultaneous models: academic and professional.

- The academic model treats the field of business as a science; its objective is to develop in students habits of mind and analytic competence that will be useful in analyzing future problems that are today unknown. In this model, the function of a manager is to allocate the organization's resources to maximize long-term value using sophisticated decision-making models. Faculty who subscribe to the academic model emphasize graduate instruction and have little relationship with the business community.
- The professional model is essentially "field driven," or responsive to the perceived needs of the business community. This model challenges faculty to work with students in helping them deal with developing judgment in resolving complex and unstructured practical problems. In the professional model setting, linkages with the professional community are critical and faculty regularly pursue consulting and executive development activities. Research, while not as critical as in the academic model, supports the investigation of applied problems of current concern to managers.

A key element to survive, thrive, and sustain into the future is innovation. This is a major factor underlying the success of individuals, organizations, and countries. Yet, despite the widespread recognition of its critical role, the concept of innovation is deceptively complex and often misunderstood. Students need insights into both the innovation process and its role and value. On the other hand, AACSB found that supporting innovation by business schools remains underdeveloped, undervalued, and often unnoticed.

Business schools are vital societal institutions that create value in a myriad of ways. Ample evidence is presented that dismisses the sometimes-cited critical perception that business schools exist exclusively to serve profit-seeking businesses or salary-minded students. Rather, business schools play a pivotal role by developing effective leaders and providing support for the engine driving sustainable growth in their communities and throughout the world.

One of the AACSB recommendations is to motivate business school leaders to elevate the concept of innovation to be one of characteristics in the mission of their schools. This includes schools developing approaches to explore new frontiers and provide an even higher integration between the school, the community, and the global environment. Business education can make a difference, but new conceptual frameworks must be integrated so that schools can be a catalyst for innovation.

Some of the potential approaches include:

- Program Innovations
Business schools face increasingly fragmented consumer marketplace at the same time they must differentiate their programs and offer new opportunities to gain competitive advantages. This means offering curricula with large set of options, including schedules (full time, part time during the week, weekend), length (from several months to multiyear), locations (single campus, distributed, international, on-site at companies,

and virtually), flexibility (lockstep on campus, credit accumulation from various sources), and mode of delivery (face-to-face, partially online, fully online).

- Networks of Education Providers

The business world is full of alliances and networks of providers, often among direct competitors, because of numerous compelling strategic arguments that include leveraging unique core advantages without wasting their resources to develop capabilities in non-core areas. Schools of business should have alliances where each partner can be more responsive to customer needs and yet retain focus on their individual core competencies. The strength of developing and fostering such innovative networks includes capturing the differential advantage of a particular business school while offering context and an environment for sharing knowledge throughout the network providing benefits and allowing for a better understanding and insight into new developments, information, research, as well as debate. Such networks foster an active dialogue and promote exchange of best practices among the organizations. This should lead to more projects and activities between academic institutions and corporations; thus leads to networking among professionals and better bridging the divide between the academic and business worlds

- Corporate Education

Companies have long paid for employee education and training. They have also set up internal universities that have the advantages of immediacy, relevance of training and education to their particular and regulatory environment, as well as immediate access to on-site training or through intranets. With billions of dollars spent on training and education (degree and non-degree) by IBM, Disney, and others make them arguably the largest providers of business education. Company programs target investments in, as well as and returns from, management education and training. They are increasingly making management education available to their customers and suppliers, and even in the open market. These corporate universities and some for-profit consulting organizations have greater capacity for scalability of their services than do traditional business schools that need to rely on a fixed core of faculty for teaching obligations.

- Updating Curricula

Business education providers are increasingly differentiated around mission-focused curricula and program features. However, even AACSB has identified broad areas to for change:

- Management skills that alumni and corporate recruiters specify as both the greatest need and deficiency in school of business curricula should be addressed. Included among basic management skills are communications, interpersonal skills, multicultural skills, negotiation, leadership development, and change management. Changes should emphasize skill development for global assignments—sensitivity and flexibility in responding to local conditions, as well as managerial effectiveness in a dispersed operation. This means identification of management skills that span traditional functional areas of expertise and prepare graduates for global adaptability.
- Design outward-facing curriculum to enhance the relevancy of a school of business to its particular target markets or niches. This is to ensure that curricula are relevant to the emerging needs and cycle time of employers, as well as to local conditions for regionally focused programs. Boundary-spanning content, alternative pedagogical approaches, diversity of participants and deliverers, and, ultimately, business school

structures would evolve from closer discourse between schools and their business and local market constituencies.

- More “clinical” content in curricula and a greater business familiarity among faculty members who import their experiences into the classroom. There has been increasing criticism of the schism between typical business school curricula and learning experiences with requisite real-world management skills. An outward-facing curriculum and experiential education can create the critical intersection between classroom and business learning that keeps faculty and students connected to rapidly changing business models. However, business professionals rarely contribute to, nor do they control the design and approval of curricula. Business schools would also need to support faculty development so they are equipped to successfully design and deliver outward-facing curricula.
- Moving from the traditional course-based curriculum and discipline-divided programs to problem-based learning formats. This format has a theoretical base in cognitive constructivism, which puts students into exactly the type of projects and work situations that will face leaders in the knowledge-based organizations of the future. More than just learning the business concepts, the objective is to use business concepts to maximize the ability to both recall and apply those concepts in the real world. The problem-based learning process employed is a derivative of Reiterative Problem-Based Learning that was developed by Howard Barrows (1985), and follows closely the concepts of cognitive constructivism (Savery and Duffy, 1994), as well as cognitive apprenticeship (Collins et al, 1990).

There are no “best” solutions to improve the intersection of theory and practice in business education. It is an area of broad opportunities, answers, as well as challenges to schools of business and the affected faculty members. Change itself should be continuous activity.

Conclusions

Innovation is about economic and social prosperity, not just business performance, and that it is as much about leadership and management as it is about science and technology. Therefore, innovation serves as a bridge that connects the historical strengths of business schools in management education and research to a much broader social purpose. Moreover, opportunities and innovation successes are not built solely on theory, science, or technology. In short, innovation is less about financial success for individual companies, but more about the benefits across people and nations.

Attempting to answer the question of where theory and practice intersect in contemporary business education is not an easy task. There is further debate about the ability of future business school graduates to function independently in dynamic environments without having sufficient data, as well as being able to change their approaches in completely uncharted territories. However, there is something that Steve Jobs, the innovative business leader, had brought to attention several decades ago. It relates to the intersection of theory and practice in the real business world. His work has contributed to technological advances and major changes in the lives of countless millions of people, yet this process started with people. He stated:

“Innovation has nothing to do with how many R&D dollars you have. When Apple came up with the Mac, IBM was spending at least 100 times more on

R&D. It's not about money. It's about the people you have, how you're led, and how much you get it." (Dormehl, p.202)

Although the theories are well known, they are often not put into practice. It is the truly innovative managers that use basic human practices and apply simple principles to new and different approaches across different contexts to actually create change and shape the future. This type of model and attitude should be a cornerstone of business school education to meet the future needs of our society.

References

- Barrows, H. S. *How to Design a Problem-based Curriculum for the Preclinical Years*. New York: Springer Publishing Company, 1985.
- Collins, A., Brown J., and Newman, S. "Cognitive Apprenticeship: Teaching the Craft of Reading, Writing, and Mathematics," in L. B. Resnick (ed.), *Cognition and Instruction: Issues and Agendas*. Hillsdale N.J.: Lawrence Erlbaum Associates, 1990.
- Dormehl, L. *Different thinking: Steve Jobs, the counterculture and how Apple Inc. took over the world*, London: Virgin, 2012.
- Savery, J. and Duffy, T. "Problem-based Learning: An Instructional Model and its Constructivist Framework," *Educational Technology*, August, 1994, 1-16.

Recommended reading:

- Diamond, Robert M. 1998. *Designing and Assessing Courses and Curricula: A Practical Guide*. San Francisco: Jossey-Bass.

ARE WE REALLY GOING GREEN PART TWO

Craig G. Harms, The University of North Florida, 4567 St. Johns Bluff Rd. So.,
Jacksonville, Fl 32224, 904-620-2780, charms@unf.edu

ABSTRACT

This paper is a follow-up to “Green, Part One.” In Part One the topic of interrupted time series (ITS) is used to develop a multiple regression model to predict the usage of electricity at the author’s home. After using this case for several terms, the continued frustration of the students finally led me to “dummy down” the topic, yet continue to present Interrupted Time Series to the class. In Part Two a less intense presentation is used to develop a case for use in a quantitative method classroom. Rather than presenting a model with 19 independent variables, a smaller model that attempts to predict water usage by month. We hope to continue our glorious attempt to save the planet by using less of its natural resources.

Topics: time series, seasonality, multiple regression analysis, interrupted time series, and meaningful learning.

INTRODUCTION

“Going Green” is a loyal cry from the conservation crowd. Yet all of us, even us evil capitalists are aware of the need to reduce our consumption of the limited natural resources of dear Earth. Even if we have three Chevy Camaros--all with V-8s--we can find other ways to appease Mother Nature. In the first paper twenty years of monthly electrical usage data was used in a multiple regression model to prove that our family does strive to reduce scarce resources. In Part Two the reduction of water usage is studied, again with seasonality, to see if over Time, the usage of water is reduced.

SUMMARY OF PART ONE

A Time series model with monthly seasonal indexes is used to determine reduction of electricity. If the B-coefficient of the Time variable is negative, then electrical consumption is being reduced on a monthly basis. However, since the “Real World” nature of the problem included an addition of 700 square feet to the house, the addition of a baby, and the installation of a more efficient heat pump and A/C unit, the model became much more difficult. At the beginning of the study, the “Are We Going Green” was a resounding “NO!” To show that the three critical events had a great effect on the overall electrical usage, an interrupted time series model is used--with three sets of two variables each. Once the effects of those three important events are removed, it can be shown that the net overall electrical usage is in fact being reduced.

Students went “nuts.” The model was just too complicated. Although they had studied both simple and multiple regression and time series with seasonal adjustment, they did not have seasonal adjustment in a multiple regression model and did not have six more independent

variables pertaining to the three critical events. It was also extremely difficult for them to define the meaning of those six interrupted time series variables.

RESEARCH GOAL OF PART TWO

The research goal of part two is to show that water usage is lower in the great humanitarian goal of “going green.” Although still using a multiple regression model with monthly seasonal indexes, there is only one significant event and therefore only one pair of interrupted time series variables. Further, as the reader will see, the critical event, the addition of a well and water pump to draw water from a shallow aquifer rather than the city line to water the grass, plants, and flowers should be a “no brainer.”

In the context of assigning the case, it is the students’ assignment to defend or refute the professor’s statement, “I am going green.”

VERTICALLY INTEGRATED CASE APPROACH

Table One presents a list of tasks the students and faculty must accomplish during the six class assignment:

TABLE ONE
Steps to Perform a Vertically Integrated Research Case

- 1) Statement of the model--the dependent variable (class #1)
- 2) Hypothesize the quantitative model and the relationship of each of the independent variables to the dependent variable (class #1)
*It should be noted that the available independent data is limited to what is recorded over the years. We could not play “Star Trek” and go back in time to collect data.
- 3) “Collect” the data and build the database. This includes going back to personal files of utility bills over the past several years.
- 4) Make database available on-line for retrieval and use in an Excel program. (class #2)
- 5) Analyze the data: model validation & statistical tests.
 - a: time series with trend and seasonality (class #3)
 - b: multiple regression using interrupted time series (class #4)
- 6) Present student model and discuss results. (class #5)
- 7) Draw conclusions--review hypotheses. (class #6)

DEVELOPING A CAUSAL MODEL

Students are familiar with developing a causal model. They have worked with income, people, inflation, unemployment rates, and other econometric variables in Economics Class. This model is a more personal model that encourages students to develop their own causal model with common variables.

As stated before, to not make this second case complicated, the students are given the model. In the process “good” independent variables are discussed. It is important to understand that if the presenter wants the reader to “buy into” the model, the independent variables must pass three tests:

- 1) The proposed independent variable must be logical. We must be able to sit back and say, “Yes, that makes sense to me.”
- 2) The proposed independent variable must be quantifiable. We must be able to develop a number to represent the variable value.
- 3) The proposed independent variable must be obtainable. Beyond overcoming the proprietary problems in many corporate databases, we must be able to get our hands around the data in a timely manner and without spending an arm and a leg. In this case, there is no propriety, merely availability.

THE DEPENDENT VARIABLE -- UTILITY BILL IN DOLLARS

In my town water usage is charged on the monthly utility bill. Also included in that bill are the recycle charges, the garbage collection fees and the sewer rates. The sewer charge is directly related to the amount of city water the customer uses. Therefore if the customer has a well, there will be no water charge and no sewer charge to water the lawn. From this point on “water” represents the charges for water and sewer. Water is charged as a fixed cost each month (small) plus a variable cost charge per 1,000 gallons used. There is no charge until 1,000 gallons are used. The customer simply gets less than 1,000 free for one month and then the charge appears on the next monthly bill. Therefore the bill is “lumpy.” Although slightly affecting the seasonal indexes, the data does not seem to cause damage to the overall model or the interpretation of their meaning.

DISCUSSION ABOUT INDEPENDENT VARIABLES

There are two independent variables, Time and the Well. 108 months of data are retrieved. Using monthly seasonal indexes in a time series model is very easy. However, when the second independent variable is added, the well pump, then a multiple regression model is required. Seasonality in a multiple regression model is a much more difficult process. At first glance merely doing a trend model with the addition of the interrupted time series variables (one pair) for the one critical event may be sufficient to create a good model. However, in Florida, there is seasonality of water usage and it is deemed essential to forge ahead with the more difficult multiple regression model.

The first two models will be time series models. First, a simple time series model using only a trend component, hopefully with a negative B-coefficient and a second time series model that includes trend and seasonal components. Students have studied time series models in previous courses.

The third model will include the following variables:

TABLE TWO

Independent Variables and Hypotheses

<u>Independent Variable #</u>	<u>Independent Variable Group</u>	<u>Hypothesis(increase/decrease)</u>
1	Time	Decrease (going green)
2-13	Seasonality(months)	Sine Curve
14-15	11/6/2011 Well and Pump Installation	Big Decrease

IMPORTANCE OF USING INTERRUPTED TIME SERIES

Using a time series, even with the addition of seasonal indexes, most likely will include a large negative B-coefficient. A residual analysis might reveal large negative residuals for the observations after the well and pump are installed. Sometimes this might lead to wondering if the data is flawed. Determining a value for the effects of the well--the B-intercept coefficient on well installation could be interpreted as the dollar savings due to the well.

A FIRST MODEL -- A SIMPLE TIME SERIES WITH TREND

The class is prepared to start the analysis process. The data, all 108 months is stored in a file for student access. Table Three presents the statistical analysis for the trend model.

TABLE THREE

<u>Trend Model of KWH Usage per Day</u>	
B-zero	\$82.59642
B-one	\$0.388642 / month
Standard Deviation	\$30.8656
R-square	0.135695
F-statistic	16.6419
T-statistic (time)	4.07945

This model reveals surprisingly poor results including a weak R-square. The B(1) coefficient is not negative. It is important to define in English the meaning of the various numbers before we

move to the next and more involved model. Quite possibly not doing a good job defining numbers contributed to the lack of understanding in Part One.

The B(0) of \$82.59 represents a lot of costs: garbage, sewer, recycling, and the fixed component of the water charge. The B(1) represents the increase or decrease in the cost and/or the increase in usage of water per month plus any increases in other costs that are part of the utility bill. Although there have been some cost increases in garbage collection and recycle fees, these have been very small as compared to the increases in the cost of water per thousand gallons. Therefore the positive value of \$0.38 per month reflects two things: 1) the increase in the usage of water, and 2) the increase in the cost of that water. It is virtually impossible to use actual water used as the dependent variable because of the lumpy billing and small numbers of the 1000s of gallons of water used. Students need to learn that sometimes the “perfect” variable is not easily obtained and compromises must be made if you want any model.

ACCOUNTING FOR SEASONALITY

Seasonality in a time series model is straight forward. Seasonality in a multiple regression is far more complicated and takes several steps. The steps and results are described below. The results for both the Time Series model with seasonal indexes and the Multiple Regression model with seasonal indexes are presented in Table Four.

Step 1: Develop a matrix of 11 dummy variables--January through November--for this case. There is no December dummy variable. Thus when the computer calculates the B-coefficients for each of the eleven months, that figure is the difference between the particular month and December. For example, the November index from the computer program is 6.091882. This means that the use-of-water cost coefficient in November is 6.091882 (per month) greater than in December. Thus to calculate the additive seasonal indexes so that we can talk about the usage in November relative to November, more steps are required.

Step 2: Add up the values of the eleven B-coefficients, January through November. For this case, that summation is 69.33242. The 12th month, December is given a seasonal index value of 0.0. Divide this summation by the 12 months. This average is 5.7777016.

Step 3: Subtract 5.7777016 from each of the twelve seasonal indexes (11 from the computer output plus December) and add 5.7777016 to the B-zero value (77.36881). to become 83.146511. December's index becomes -5.7777016

Table Four presents the numerical results of the above three steps and the statistical measures from the computer output.

TABLE FOUR

A Second Model that Considers Trend and Seasonality

<u>Measure or Variable</u>	<u>Trend & Seasonal Model Multiple Regression Model</u>	<u>Trend & Seasonal Time Series Model</u>
B-zero	\$83.1465	\$82.5964
B-one	\$0.378549 /month	\$0.38864 /month
Standard Deviation	29.06934	27.5215
R-square	0.312923	0.312832
F-statistic	3.605	
Sum of Squares Regression	36561.62	36551.06
Sum of Squares Error	80277.52	80288.09
Sum of Squares Total	116839.1	116839.1
	<u>Seasonal Index</u>	<u>Seasonal Index</u>
January	-7.2129	-7.1979
February	-20.1470	-20.1420
March	-23.3856	-23.3906
April	+0.9270	+0.9119
May	+28.6129	+28.5877
June	+16.9199	+16.8846
July	-5.9687	-6.01407
August	+6.1028	+6.0473
September	+0.4057	+0.4612
October	+9.2094	+9.2548
November	+0.3142	+0.3450
December	-5.7777	-5.7525

The two models are very similar. The difference must be in the actual calculation equations. The measures of performance show improvement in the model versus the Trend model. However we have not looked at the key independent variable in this study: the well and water pump. The B-zero and B-one coefficients barely changed. That is expected. The R-square for the seasonal model has doubled. However for a model using aggregate data, the measures are still very weak. It is very probable that the seven months of utility bills at the reduced level due to the well and yet currently not accounted for makes the bottom line measures still very poor.

The numeric values of the seasonal indexes seem to “bounce around a lot.” This could be because of the lumpy billing. It could just be because of the rain cycles in Florida. At least the Winter months show the lowest amount of watering. This is very reasonable. The next step to account for the critical event--installation of the well and the water pump presented in Table Two.

USING INTERRUPTED TIME SERIES -- GENERAL MODEL STATEMENT

Each critical event requires the addition of two independent variables. The basic model is developed from the model used in Coleman and Wiggins [2].

$$\text{Dependent Variable} = B(0) + [B(1) * \text{TREND}] + [B(2, 3, \dots, 13) * \text{DUMMY}] + [B(14) * \text{SHIFT}] + [(B15) \text{TRCHGE}] \quad (1)$$

- Where:
- Dep. Var is the dollars of the utility bill
 - TREND is for the time series variable.
 - DUMMY is for the matrix of 11 dummy variables for the months or the seasonality + December calculated from output regression information. (a total of 12 variables)
 - SHIFT is the change in usage due to the critical event. This could be thought of as the immediate decrease in the city water usage, or another B(0) for the model. SHIFT = 0 for all pre-event months and event month. SHIFT = 1 for all post-event months.
 - TRCHGE is the change in the trend component due to the effects of the critical event. TRCHGE = 0 for all pre-event months and the even month; TRCHGE = 1 for the first post-event month; TRCHGE = 2 for the second post-event month, etc.

During the next phase of the research, the critical event is tested. The students hope to confirm their hypotheses about the critical event as presented in Table Two. Table Five presents the results.

The results are much improved. The numbers that should not change too much did not change too much. The numbers that hopefully should change for the better did. The adjusted R-square is 0.57 versus 0.22. The B(0) for the well and pump is minus \$66.59. The students can conclude that the installation of the well and pump reduced the average monthly utility bill by \$66.59. The B(1) coefficient is minus \$4.45 which is difficult to explain. Quite possibly as more monthly bills are paid at the reduced water usage this number may become smaller. The t-statistic for the Pump, B(0)[shift}, is very significant. The t-statistic for the B(1) [change] is weak.

TABLE FIVE

Taking Into Account the Installation of the Well

<u>Measure or Variable</u>	<u>Trend & Seasonality Multiple Regression Model Well and Pump Installation</u>	<u>Trend & Seasonality MultipleRegression Model</u>
B-zero	\$73.707355	\$83.1465
B-one	\$0.652147 /month	\$0.378549 /month
Standard Deviation	21.5513	29.06934
R-square	0.630307	0.312923
Adj R-square	0.574654	0.226134
F-statistic	11.32571	3.605
Sum of Squares Regression	73644.52	36561.62
Sum of Squares Error	43194.63	80277.52
Sum of Squares Total	116839.1	116839.1
B(0) [shift]	-66.5877	
B(1) [change]	-4.45924	
<u>Month</u>	<u>Seasonal Index</u>	<u>Seasonal Index</u>
January	-12.2745	-7.2129
February	-17.5881	-20.1470
March	-20.6048	-23.3856
April	+3.9297	+0.9270
May	+31.8374	+28.6129
June	+20.3663	+16.9199
July	-2.3004	-5.9687
August	+9.9030	+6.1028
September	-3.5615	+0.4057
October	+4.9686	+9.2094
November	-4.2002	+0.3142
December	-10.5657	-5.7777

USING THE MODEL

The final step is to use the model to predict the utility bill for the next month, September 2012 using all three models.

$$\text{Trend model: } \$124.95 = 82.5964 + 0.38864 * 109 \quad (2)$$

Seasonal Model

$$\text{Time Series: } \$125.42 = [82.5964 + 0.38864 * 109] + 0.4612 \quad (3)$$

Seasonal Model

$$\text{Multiple Regression: } \$124.81 = [83.1465 + 0.378549 * 109] + 0.4057 \quad (4)$$

$$\text{Well Model: } = [73.707359 + 0.652147 * 109] - 3.5615$$

$$- 66.5877 (1) + (-4.45924 * 8)$$

$$\$38.968 = 141.22992 - 66.5877 - 35.67392 \quad (5)$$

This forecast for the monthly utility bill is wonderfully low; just a bit lower than expected. Bills after the well and pump installation are averaging \$61.42 with the lowest bill of \$54.47. I am sure with more data points with the well effects in the data, the forecast will move toward the average bill after well installation.

CONCLUSION

The time had finally come to wrap it all up. As a class we had come a long way. The goal of learning was reinforced by the process of discovery. When everyone is involved in building the model, meaningful learning becomes a more pleasant experience. The interaction of the students, the professor, and the database itself made the project interesting and engaging. We are not spoon fed a sterilized, meaningless, laboratory tested batch of data from a textbook.

Somehow, we all are invested in the project and the enthusiasm for the subject infected the entire class. The class performed the analysis and learned that *real* data does not always come easy or have simple conclusions. The hypotheses are not always validated which is very frustrating. Finally, even though it is challenging material, the class managed to have fun with it! Here are a few reasons why this case is such an effective method of learning:

- 1) The data is real and timely.
- 2) The situation is realistic and not just a “classroom exercise.”
- 3) Students are encouraged and expected to interact throughout the case.
- 4) The computer is used extensively
- 5) Sophisticated models are developed using the computer.

- 6) Many steps are needed to reach a conclusion.
- 7) There is not one clean, final answer, thus reinforcing the “real” idea of the case.
- 8) The students enjoyed the realistic and far-reaching discussions.
- 9) When it makes sense, it sinks in!

REFERENCES

1. Andrews, Robert L., “A Data Collection and Analysis Project for a Statistics or Quality Management Course,” Proceedings of the Southeast Decision Science Institute, 1995, page 127.
2. Coleman, B. Jay and Wiggins, C. Donald, “Using Interrupted Time Series Analysis to Access an Allegedly Damaging Event,” Litigation Economics Digest, 1986.
3. Davis, Arthur and Harms, Craig G., “Are We Really Going Green? The Development of a Student Case Using Multiple Regression. Proceedings of the Southeast Decision Science Institute, 2009.
4. Harms, Craig G., “Using Interrupted Time Series Analysis and Multiple Regression to Predict Daily Prices of a Closed End Mutual Fund,” Proceedings of Southeast INFORMS, October, 2002.
5. McDowall, D. R., McCleary, E. E., and Hay, R. A. Jr., Interrupted Time Series Analysis, Sage University Paper Series; Quantitative Applications in Research Methods, Beverly Hills, Sage Publications, 1986.
6. Neter, J, Wasserman, W. , and Kutner, M. H., Applied Linear Statistical Models, 3rd edition, Richard D. Irwin, Burr-Ridge Illinois, 1990.

APPLYING UNIVERSAL DESIGN OF INSTRUCTION

George S. Lowry, 804-752-7306, glowry@rmc.edu
Edward D. Showalter, 804-752-3716, eshowalt@rmc.edu
Randolph-Macon College, Ashland, VA 23005

INTRODUCTION

Universal Design (UD) is a term given to the design of products (goods and services) that allows those products to be utilized by as many different users as possible. Such adaptations to products has been practiced since the first implements were created, but the study and application of general UD principles has become more formalized over the last 45-50 years. Often associated with increased awareness of disabled persons, such attention is only part of the focus. The most common application of UD is in the field of building construction, where architects, engineers, and designers work to create accessible and usable facilities. Extensions obviously lead to the products in general use that can be as complex as controls for operating jet airliners or as simple as a ball point pen. All must attend to the normal variations present among the product's users. In 1997, seven principles of universal design were developed by the North Carolina State University Center for Universal Design. These 7 principles are listed, along with guidelines for their implementation, are provided in the appendix of this paper.

A good example of UD exists in an everyday set of items. Almost everyone is familiar with the OXO brand of kitchen utensils. It seems Sam Farber watched as his wife, Betsy, struggled while using some kitchen implements one day. Betsy had mild arthritis in her hands. Farber employed a user-centered research process where he made prototypes of differently styled grips, then observed a variety of users work with them. Through an iterative process, he eventuated in the design we now recognize as

OXO. OXO aspires to a philosophy of “making products that are easy to use by the widest possible spectrum of users”. A quick review of the 7 Principles of UD while examining or using any of a number of OXO products drives the UD idea home. And if that’s not enough, the name OXO is, itself, a result of UD. No matter which way it’s viewed, it says “OXO”.

Inasmuch as UD can be applied to virtually all products, so, too, can it be applied to instruction (Universal Design of Instruction—UDI). The approaches can vary and include the materials to be used, the facilities where instruction will occur, the modes employed (e.g. lecture, discussion, seminar, tutorial), testing methods, and evaluation tools. The key to successful implementation of UDI is in the planning. A great deal of effort is required at the front end to ensure the applicability and appropriateness of the UDI methods to be used.

Shaw, Scott, and McGuire (2001) expand the 7 Principles of Universal Design by adding two more: #8, A Community of Learners (promoting interaction between and among students and faculty) and #9, Instructional Climate (where instruction is welcoming and inclusive AND where high expectations of students is the norm). Their work translates the principles of UD (plus their two) for application for college students with learning disabilities, however many of their ideas are applicable to all students.

This paper presents two applications of UDI in order to demonstrate their connection to the 9 principles. The first details several teaching modes used in an introductory business course. These include a mix of lectures, in-class simulation exercises, and small group discussion sessions (called tutorials). These modes and applications have been in use for 19 semesters across nearly 10 years, with several

changes and improvements. The second application involves a semester-long, project based course where students learn in a studio environment by designing and building prototypes of products according to general specifications and best practices. This approach has been in use for 4 years and has rather extensive documentation of the processes employed and the products produced.

TWO APPLICATIONS

BUSINESS 213, Principles of Management

This course employs three distinct teaching/learning modes, and each have been developed with UDI in mind. They include lectures, seminars, and tutorials. Lectures are scheduled in 2-hour blocks of time, which allows time for active and passive learning approaches. The passive approach utilizes PowerPoint presentations that include a significant amount of visual imagery and iconic messaging coupled with verbal presentation of content. This combination of content and concept presentation provides accommodation to students with either visual and verbal preferences. The content of these presentations are, of course, supported by the readings and textbook assignments, but often include active participation by some or all of the students to reinforce their learning.

The UDI principles emphasized in this mode include #1, Equitable Use, #2, Flexibility in Use, and #4, Perceptible Information (multiple delivery modes) and #6, Low Physical Effort (mixing lecture delivery with in-class activities). Principle #3, Simple and Intuitive Use is a given, inasmuch as students are conditioned to lecture formats, however the key adaptation here is the content/concept media presentation approach

that provides vivid visual reinforcement of the spoken words and/or complex concepts. Of course, #8, A Community of Learners and #9, Instructional Climate are an inherent part of the course design.

Seminars are in-class exercises in which students are divided into teams and given a practical problem to solve. For example, in one seminar students are provided with a brief case study and expected to develop an organizational chart (OC) for the fictitious firm. They present their charts to the class, answering several specific questions regarding the choice of design, why it's appropriate, and how it supports the firm's strategy. The second phase of this same seminar is a continuation of the same case study, but with expanded markets in differing geographic regions. The teams revise their OC, and present their rationale to the class. In the third, and final, version of the case study, students are sometimes asked to make revisions and present in class; at other times may be asked to work outside class in teams to prepare a presentation for the next class period; or may be asked (without prior knowledge) to address the final version as a test question on a subsequent exam. Three or four seminars are held during the semester, each reinforcing lecture materials, assigned readings, or both.

Using a team approach relies on Principles 1, 2, and 3. Specifically, the seminar call for accommodating the various skills and talents of each member in each team. Holding each team accountable for the same objective provides a basis for reinforcing the underlying content (OC) while affording individuals and teams to critique the designs of others—Principle 4 and 5.

Tutorials are a transplanted from the British Tutorial System, in use for more than 400 years. This mode requires students to accept the responsibility for their own

learning by requiring each to research, write, and orally defend their ideas. The class is divided into smaller groups that meet in four, 1-hour sessions to address up to three different tutorial questions. These questions are actually statements, and are generally drawn from urban myths about management, from the headlines, or from Fayol's Principles of Management. One example from the latter source states, "Whoever assumes authority also assumes responsibility" (which gets at Fayol's parity principle). Students must define the key terms or concepts contained within each tutorial question, then formulate a thesis statement that supports or refutes the tutorial question. They must support their thesis using examples drawn from the popular press (most usually business periodicals) by way of a written report and in break-out session discussions supervised by the faculty.

In many of the same ways as in seminars, Principles 1-4 are part of tutorials. Because there are four separate tutorials scheduled throughout the semester, Principle 5 is designed into the process because most students are not trained in the methods of tutorial education. Instead, they acquire the skills through trial and error via the four tutorials. By design, the structure of each succeeding tutorial session changes to accommodate the evolving abilities of the students, and therefore demand attention to Principles 1-5. Principle 6 is key to the tutorial system in that each successive tutorial stresses differing approaches to defining and analyzing the new tutorial questions. In this way, the "bar" is raised each time, which sets higher and higher expectations on both the students and the faculty (Principles 8 and 9).

BUSINESS 342, Project and Design Management

The use of UDI in this course was more a result of the overall design than an intentional effort to check all of the boxes for Principles 1-9. Starting out as a way to convey the core content of a traditional operations management course more comprehensible by the students, this course has taken on a different set of learning objectives than those of operations management. Realizing, at the outset, that most students have no idea about how things are made reveals their inability to grasp the importance of such topics as facility location and layout, inventory and quality control, or scheduling and project management. Instead, by assigning them a semester-long project that requires the application of these and other OM topics along with sound principles of design, they are forced to manage their individual projects.

The project scope is simple and clear: “Design a house of no more than 1,500 square feet to accommodate 4 occupants, one of which has a physical disability”. They must, then, define the occupants, the physical disability, and apply the principles of Universal Design to their houses. Along the way, they create 2-D designs (bubble diagrams, floor plans, room finish schedules, etc.) and eventuate into 3-D models (first out of poster board, then out of foam core board) along with site plans.

The unique aspect of this course is they learn about UD while operating in a UDI environment. The class is run in studio format, utilizing a large room with a single six foot long table for each student. They are briefed on the tools and materials they will need and are expected to design and create their own workspace, including the tack board space above their table. The tables are arranged around the perimeter of the

studio space and against the outside walls so there is clear visibility from any workspace to any other. This promotes dialogue and makes critiques flow more easily.

The design process relies on a four-stage model: Research, Ideation, Creation, Refinement. It utilizes an immersive techniques called user-centered research whereby the student spends time observing and/or experiencing the needs of the house's proposed occupants. Secondary research related to the project and to the course-specific topics supports the development of various prototype designs which evolves through the ideation and creation phases. Near the end of the creation phase, designs are finalized and 3-D model construction begins. As is often the case, difficulties arise, particularly in the construction of the roof which necessitates a retreat to the ideation phase (and sometimes back to research). The refinement phase is where the student evaluates the final 3-D model, room schedules, sample board (with paint chips and samples of floor finishes, windows, doors, and other details), site plan, and other elements representing the final version of the project. There have been instances in the past where students completely re-build their final model because it doesn't meet their own quality standards.

Throughout the semester, students make formal presentations detailing their project status for each phase of the design process. These presentations are critiqued by all in the class (and sometimes by visitors), and the revisions are included in what becomes a printed and bound "process" book. This is the portfolio piece they can take with them to demonstrate the project to other faculty, students, and potential employers.

This course exemplifies each of the principles of UDI, both as a learning tool for the students (they employ UD in their projects), but also as it is modeled in the structure

of the class. The course is set up to provide Equitable Use as all are working on the same project goal; it offers Flexibility in Use, whereby students design a house for the occupants they define; it relies on the Intuition each student has about the concept of “house”; student gain Perceptible Information by translating their readings and research into a tangible output; employing the art and science of critiques introduces a means for establishing a Tolerance for Error; the variety of tasks employed to complete the project Lowers Physical Effort; and the use of studio space with appropriate furnishings and lighting support provides the right environment for all aspects of the course. As noted before, the 8th and 9th principles of UDI are integral to this course. Students depend upon each other and the faculty member to move through the project to learn as much as possible in order to prosecute their projects. And the critique (not criticizing) culture constantly raises the bar so that students are always striving for better quality outcomes.

CONCLUSION

The effective use of UDI can extend beyond the traditional view of meeting the needs of students with demonstrated disabilities. Employing some or all of the principles of UDI takes forethought and effort, but the payoff is a more engaged group of students who learn and retain a great deal from the experience. This paper has explained the expanded application of Universal Design into the realm of education under the guise of Universal Design of Instruction. Two courses employing UDI in different ways were detailed, drawing connections to the principles of UDI.

Appendix: Seven Principles of Universal Design (The Center for Universal Design, 1997, North Carolina State University)

Principle 1: Equitable Use

The design is useful and marketable to people with diverse abilities.

Guidelines:

- 1a. Provide the same means of use for all users: identical whenever possible; equivalent when not.
- 1b. Avoid segregating or stigmatizing any users.
- 1c. Provisions for privacy, security, and safety should be equally available to all users.
- 1d. Make the design appealing to all users.

Principle 2: Flexibility in Use

The design accommodates a wide range of individual preferences and abilities.

Guidelines:

- 2a. Provide choice in methods of use.
- 2b. Accommodate right- or left-handed access and use.
- 2c. Facilitate the user's accuracy and precision.
- 2d. Provide adaptability to the user's pace.

Principle 3: Simple and Intuitive Use

Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

Guidelines:

- 3a. Eliminate unnecessary complexity.
- 3b. Be consistent with user expectations and intuition.
- 3c. Accommodate a wide range of literacy and language skills.
- 3d. Arrange information consistent with its importance.
- 3e. Provide effective prompting and feedback during and after task completion.

Principle 4: Perceptible Information

The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

Guidelines:

- 4a. Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.
- 4b. Provide adequate contrast between essential information and its surroundings.
- 4c. Maximize "legibility" of essential information.
- 4d. Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).
- 4e. Provide compatibility with a variety of techniques or devices used by people with sensory limitations.

Principle 5: Tolerance for Error

The design minimizes hazards and the adverse consequences of accidental or unintended actions.

Guidelines:

- 5a. Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded.
- 5b. Provide warnings of hazards and errors.
- 5c. Provide fail safe features.
- 5d. Discourage unconscious action in tasks that require vigilance.

Principle 6: Low Physical Effort

The design can be used efficiently and comfortably and with a minimum of fatigue.

Guidelines:

- 6a. Allow user to maintain a neutral body position.
- 6b. Use reasonable operating forces.
- 6c. Minimize repetitive actions.
- 6d. Minimize sustained physical effort.

Principle 7: Size and Space for Approach and Use

Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

Guidelines:

- 7a. Provide a clear line of sight to important elements for any seated or standing user.
- 7b. Make reach to all components comfortable for any seated or standing user.
- 7c. Accommodate variations in hand and grip size.
- 7d. Provide adequate space for the use of assistive devices or personal assistance.

PROBLEM SOLVING IN THE WORKPLACE THROUGH APPLICATION OF BUSINESS KNOWLEDGE AND QUANTITATIVE METHODS

Robert T. Barrett, School of Management, Lander University, Greenwood, SC 29649,
864-388-8232, rbarrett@lander.edu

Sam Tolbert, School of Management, Lander University, Greenwood, SC 29649,
864-388-8220, STolbert@StrategicDirectionsInc.com

ABSTRACT

Graduates of an undergraduate business program were asked to rate the importance of business knowledge and skills areas in the workplace. Twelve knowledge areas and twelve quantitative skills areas were included in the survey, specifically addressing frequency of use and importance of the knowledge and skills. The graduates identified communication and operations management as the most important knowledge areas in business. The most frequently used quantitative skills include basic statistical analysis, budgeting, and financial analysis. Insights gleaned from this analysis will help with curriculum planning.

INTRODUCTION AND BACKGROUND

Recent concentrated focus on Assurance of Learning by accrediting bodies has encouraged business programs to evaluate curricula placing specific emphasis on measurable learning goals. These learning goals are set by faculty who are experts in the disciplines covered in the program. Numerous studies have named knowledge and skill areas demanded by employers of business graduates and further discuss means of building student strengths in these areas [2, 4, 5, 6, 7, and 8]. Communication, critical thinking and problem-solving skills are of particular interest to employers [3, 4, 6, and 7]. In addition, Bommer and others have found that teamwork and decision-making were highly demanded skills [2 and 5]. Studies have determined that experiential learning and presenting practical applications helped to bridge the gap between theory and the real world [1 and 3]. Collegiate education is important. In a survey of “the skills that the 21st-century workplace should have,” Peckham notes that, “58.6 percent of the respondents said there would be efficiency in developing the skills of students compares to developing the skills of experienced workers” [8].

ALUMNI SURVEY PROVIDES INPUT

A recent survey of graduates of an undergraduate program with a bachelor of science in business administration asked the graduates to rate the importance of knowledge and skills learned in the program. The purpose of the survey was to gauge the current business practices of the program’s alumni in order to broadly assess the curriculum. Faculty should regularly assess curricula and it was determined this type of outside input would greatly augment the expertise of the program’s faculty. From a research perspective, this type of information can greatly benefit the broader academic community whose business programs are attempting to become more practical and real-world focused.

The business administration program is a part of a small public university with a total of approximately 3,000 students. The university was originally a “teachers college” and offered a program in business education for many years. The undergraduate degree in business administration was initiated in the mid 1960’s and the business education program was phased out. Records of the university’s alumni office revealed contact information on 2,809 alumni with degrees in business administration. Email addresses were available for 1,308 of the alumni (49%) and the researchers determined the most cost-effective method for data collection would be to conduct an online survey.

The researchers, with input from the business faculty, developed a survey instrument that gathered a profile of the respondent (age, year of graduation, etc.); asked for feedback from alumni regarding the current mission and learning goals of the program; and solicited information regarding current business practices in five broad areas:

- Communications
- Teamwork
- Ethics
- Application of Business Knowledge
- Problem-solving

The survey instrument was lengthy with 75 questions with several having subparts. The instrument was approved by the university’s IRB in June 2012 and survey conducted in August. Email invitations were sent with two follow-up reminders to non-responders over a three week period. A total of 1380 emailed surveys were sent to alumni. Of those sent, 251 usable responses were received, an 18.2% response rate.

The business administration program offers four emphasis area and the respondents reported the following distribution by emphasis area.

Table 1. Emphasis Areas of Survey Respondents

Emphasis Area	% of Respondents
No Area Indicated	8.60%
Accounting	24.60%
Economics/Finance	12.90%
Health Care Management	11.30%
Management/Marketing	42.60%

The program began offering emphasis areas within the Bachelor of Science in business administration in the early 1980s. The Health Care Management emphasis was added within the business program in 2001. A separate Bachelor of Science degree in health care management was offered prior to 2001, but it did not include the same core courses and the graduates of that program were not included in this study.

The year of graduation of the responders was compared with the overall database to determine if the sample was representative. Figure 1 shows the distribution by year of graduation of responders is nearly identical with the historical data.

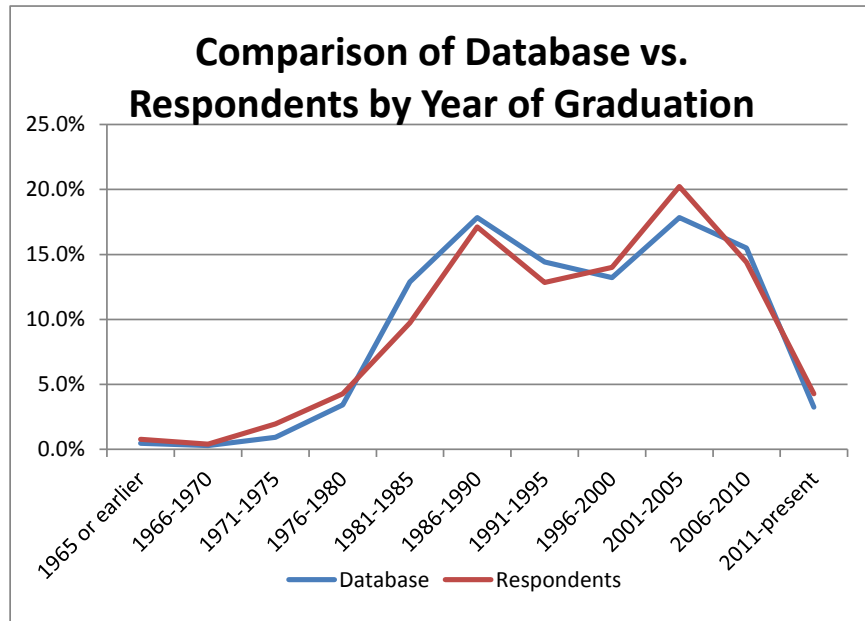


Figure 1. Percent of Respondents by Year of Graduation

The respondents represented a broad range of industries and were relatively evenly divided by level of management as shown on Table 2.

Table 2. Respondent Level of Management

Level of Management	% of Respondents
Top Management / Senior Staff	28.20%
Middle Management	33.50%
First-Line Supervisor / Junior Staff, with no direct reports	38.30%

ANALYSIS OF RESULTS

We extracted from the survey information on the respondents’ opinions regarding the application of business knowledge and their use of specific quantitative methods in their work.

Application of Business Knowledge

Here we compared respondents’ stated use of “standard” areas of business knowledge with the perception of the importance of that area to their work, and the level of emphasis that it should receive in an undergraduate business program. It is hoped that insights gained from this study will help in the modification and continuous improvement of business programs.

The survey asked respondents to provide feedback on their practices in 12 business knowledge areas. In each, three questions were asked:

1. How often do you apply this knowledge? (1=Rarely or never, 5=Very frequently on a daily basis)
2. How important is it to your work? (1=Not important at all, 5=Critical to my success)
3. How much emphasis should this topic receive at the undergraduate level? (1=Not important at all, 5=Needs very heavy emphasis)

The average response calculated for each area and question is displayed in Table 3. In addition the difference (in percent) between the ratings for each question is shown.

Table 3. Use and Importance of Business Knowledge Areas

Business Knowledge Discipline	Use of Knowledge	Importance in Work	Importance to Teach	Import vs Use	Teach vs Import	Teach vs Use
Accounting	3.35	3.40	3.80	1.7%	11.8%	13.7%
Communication	4.84	4.83	4.82	-0.2%	-0.2%	-0.4%
Economics	2.63	2.67	3.30	1.5%	23.9%	25.8%
Finance	3.44	3.38	3.82	-1.6%	13.0%	11.3%
Legal Matters	2.76	3.03	3.44	9.9%	13.5%	24.7%
Operations Management	4.11	4.12	4.25	0.3%	3.3%	3.6%
Human Resources	2.68	2.75	3.31	2.4%	20.4%	23.3%
Strategic Management	3.13	3.39	3.79	8.1%	12.1%	21.2%
Marketing Management	2.59	2.70	3.47	4.2%	28.5%	33.9%
Personal Sales	2.55	2.64	3.07	3.3%	16.3%	20.2%
Analytical Methods	2.94	3.02	3.49	2.9%	15.3%	18.6%
Management Info Systems	3.09	3.26	3.72	5.3%	14.1%	20.2%

It is interesting to note that each Business Knowledge Discipline is used by practitioners, and all score above average on the 5 point scale of rarely used to very frequently used. In each discipline, the “Importance in Work” and Importance to Teach” categories scored higher than the “Use of Knowledge” category. Maybe these managers believe they need more knowledge in these areas. Continued and increased focus on these disciplines is important for graduates as they prepare for their business careers.

Application of Quantitative Skills

Further analysis of the data provides insight on quantitative skills. Business programs cover a variety of topics in the quantitative area with varying titles: quantitative methods, quantitative analysis, business analytics, analytical studies, management science, operations research, production and operations management, and statistics, to name a few. Business faculty members consider math skills to be very important as students work to develop their critical thinking and analytical skills. One of five learning goals of the university conducting the survey states that business graduates will be capable problem solvers. From problem formulation, to hypothesis testing, to advanced topics in regression analysis, business students are challenged to expand their capabilities in preparation for careers in business.

To address this topic, respondents were asked about the quantitative tools and methods applied in problem solving. Table 4 presents the frequency of use of key quantitative methods, with “occasionally” defined as once a year to once a month and “regularly” as twice per month to weekly.

Table 4. Frequency of Use of Quantitative Techniques

Technique	Never	Occasionally	Regularly	Daily
Basic Statistical Analysis	25.9%	33.0%	25.0%	16.0%
Budgeting	16.5%	41.5%	26.9%	15.1%
Hypothesis Testing	59.0%	27.9%	9.4%	3.8%
Financial Analysis	9.6%	31.8%	24.3%	24.3%
Inventory Control	51.2%	24.8%	15.5%	8.5%
Lean Operations Analysis	64.6%	20.7%	11.4%	3.3%
Linear Programming	83.6%	13.7%	1.9%	0.9%
Forecasting / Linear Regression	54.0%	29.1%	12.2%	4.7%
Material Requirements Planning	62.1%	22.8%	9.0%	6.2%
Quality Analysis, Control Charts, etc.	59.0%	21.9%	13.4%	5.7%
Scheduling – People	36.0%	20.8%	20.9%	22.3%
Scheduling – Processes	37.9%	23.2%	18.5%	20.4%

The extremes in Table 4 are interesting. Here we see techniques that this set of respondents never use and use on a regular basis. Over 50% of the managers responding never use hypothesis testing, inventory control, lean operations analysis, linear programming, forecasting and linear regression, materials requirement planning, and quality analysis control charts. For these seven quantitative areas, less than 10% of the managers use these techniques on a daily basis. Faculty discussion on depth of coverage in these areas will lead to improved curricula. These results are interesting in that many of these topics are from Operations Management. Operations Management was second only to Communication in Table 3 as the most used Business Knowledge Discipline. Scheduling People and Processes and Financial Analysis were the techniques with the greatest daily use among respondents. We believe that many of these techniques help build students’ build skills in problem solving and critical thinking. As indicated earlier, research has shown that problem solving and critical thinking are essential skills for business graduates. Further study will be done to assess the need for specific quantitative skills. Curricula will be designed to meet the changing needs of today’s workforce.

CONCLUSIONS AND FUTURE RESEARCH

Managers today use quantitative skills. Managers believe that quantitative skills are important and need to be covered in business schools. Questions were raised by these results regarding coverage of some traditionally covered quantitative topics. Faculty will consider these recommendations critically when developing curricula. It is important to address additional questions in future research. Does academic major of the manager affect the opinion on importance and use of the techniques? Does management level have an effect? Does the industry of the respondent play a role in the importance of certain quantitative techniques? This study has brought to light numerous questions to be addressed.

REFERENCES

- [1] Badawy, M. K. "The Management Clinic: Meeting the Challenge of Relevancy in Management Education." *Academy of Management Review* 1.4 (1976): 129-133. *Business Source Premier*. EBSCO. Web. 21 July 2011.
- [2] William H. Bommer, et al. "Assessing the Effectiveness of Whole Person Learning Pedagogy in Skill Acquisition." *Academy of Management Learning & Education* 9.2 (2010): 192-203. *Business Source Premier*. EBSCO. Web. 2 Aug. 2011.
- [3] Brzovic, Kathy, and S. Irene Matz. "STUDENTS ADVISE FORTUNE 500 COMPANY: DESIGNING A PROBLEM-BASED LEARNING COMMUNITY." *Business Communication Quarterly* 72.1 (2009): 21-34. *Business Source Premier*. EBSCO. Web. 21 July 2011.
- [4] Fletcher, Geoffrey H. "AN EYE ON THE FUTURE." *T H E Journal* 34.7 (2007): 26-27. *Business Source Premier*. EBSCO. Web. 2 Aug. 2011.
- [5] "Future Workforce Is ill-Prepared, Report Says." *Professional Safety* 51.12 (2006): 6. *Business Source Premier*. EBSCO. Web. 2 Aug. 2011.
- [6] Holter, Norma C., and Donald J. Kopka. "Developing a Workplace Skills Course: Lessons Learned." *Journal of Education for Business* 76.3 (2001): 138. *Business Source Premier*. EBSCO. Web. 21 July 2011.
- [7] Holter, Norma C., and Donald J. Kopka. "Developing a Workplace Skills Course: Lessons Learned." *Journal of Education for Business* 76.3 (2001): 138. *Business Source Premier*. EBSCO. Web. 2 Aug. 2011.
- [8] Peckham, Susanne. "Technically speaking." *Tech Directions* 70.1 (2010): 4. *Business Source Premier*. EBSCO. Web. 2 Aug. 2011.

Note Taking: An Important Part of the Learning Process

Paula Ruby, Arkansas State University, pruby@astate.edu
Ralph Ruby, Jr. Arkansas State University, rruby@astate.edu

Introduction

Note taking is an extremely important part of the learning process. A good set of notes will not only help students do better in school, but it will also help students enter virtually any of the careers that they may be planning to enter (Note Taking Introduction, 2012). Therefore, note taking is one of the most important skills students can use to improve their understanding and retention of material they read and are taught in class. Yet it is also one of the most erratic and unmonitored student activities that occurs in the classroom (Glencoe, n.d.). The purpose of this paper (presentation) is to review the importance of note taking, examine the abbreviation method, and look at digital note taking software. We will also discuss the results of a questionnaire about note taking.

Literature Review

“Note taking is the practice of recording information captured from a transient source, such as an oral discussion at a meeting or a lecture.” (Liquori, 2012, p. 1) “Note taking facilitates both recall of factual material and synthesis and application of new knowledge, particularly when notes are reviewed prior to exams (Dezure, Kaplan, & Deerman, n.d, p. 2).” In spite of its widespread use note taking has been ignored as a skill that should be taught, not at the university level or the secondary level, but at the elementary school level. Instead it is assumed that students know intuitively how to take notes or it is assumed that learning has taken place somewhere in the curriculum. Note taking involves listening to information, often new and unfamiliar, transcribing that information quickly enough to keep up with a lecture, then

organizing that information into proper form. According to Dezure, et. al. faculty can improve note taking skill by focusing on three areas: lecture strategies, handouts, and strategies for engaging students. Taking notes is a process in the classroom for active learning to take place. Instructors can emphasize that good notes: “(1) Are correct (or have been corrected) (2) Identify all main points and selectively include subsidiary points or support (3) Connect supporting materials to the appropriate main point (4) Connect examples or stories to the concepts they demonstrate (5) summarize the main points of class discussions (6) describe interactive experiences in the classroom (7) include student comments (8) use abbreviations (Dezure, et al., n.d., p. 6).” Research strongly indicates students who take notes increase their retention levels (Rutgers Preparatory School, 2011).

. . . the result of taking notes is much more than the production of a passive “external” information store, as the note taking action itself is part of the memorization process and results in the creation of a form of “internal” storage (Boch & Piolat, 2005, p. 104).

Note taking should be used as part of Writing Across the Curriculum for two reasons: it helps students learn, and it helps students learn to write, according to Boch and Piolat (2005). Also the reasons note taking skills are taught very little or not at all is that “Teaching how to condense information through the use of abbreviations leads to classes at two levels: (a) between teaching correct spelling, which is never completely successful, and abbreviation techniques that alter words; (b) between the syntactical organization of ideas and the telegraphic style (p. 107).”

The Common Core State Standards sets up the need and shows the importance of note taking. “...the CCSS were developed to provide a clear and concise framework to prepare students in the K-12 environment for college and careers (Holmes, 2012, p. 9).” The Common

Core State Standards focus on core conceptual understandings and procedures starting in the early grades, thus enabling teachers to take the time needed to teach core concepts and procedures well—and to give students the opportunity to master them.

As an example, the Common Core State Standards for Grades 3 and 4 are:

“G-3 Recall information from experiences or gather information from print and digital sources, take brief notes on sources and sort evidence into provided categories.” “G4- Recall information from experiences or gather relevant information from print and digital sources, summarize or paraphrase information in notes and finished work, and provide a list of sources (National Governors Association Center for Best Practices, Council of Chief State School Officers, 2010).”

The Purpose of Note taking

Note taking consists of two major functions. The initial function is the actual process of taking notes. The second function is the management and/or organizing of notes for the purpose of studying. It is important that the student be actively engaged in both functions for learning to be maximized.

The purpose of taking notes is to actively engage the student in the learning process, by taking as many notes as possible in the shortest period of time, without being distracted from the listening and observation process.

Note taking helps maximize learning by:

- Increasing retention levels by moving information into long-term memory
- Assisting in studying for exams
- Reminding yourself of the key points of a lecture
- Recording information for future reference
- Building a better understanding of the subject

- Clarifying ideas that are not fully understood
- Listening better (more actively) in class
- Helping students to become actively involved in the learning process
- Increasing reading comprehension
- Condensing information

The management and organizing of notes includes:

- Making notes readable
- Having a starting point when studying
- Helping ideas flow and helping in planning
- Listing words that need to be looked up in a dictionary
- Providing a record of where information comes from
- Organizing notes in folders/files by subject, topic, date, etc.
- Summarizing the notes enough to explain them to someone else
- Integrating multiple sources from files, mind maps, images, etc.
- Organizing notes in order to memorize them

Use of Abbreviations

Dr. Walter Pauk, developer of Cornell Notes, Educational Testing Service, colleges such as Harvard, Columbia, Cornell, Dartmouth, and Princeton and Stanford and the University of Chicago, MIT, Oxford, the Imperial College of Science, Technology and Medicine, the University College of London, the University of Pennsylvania, California Institute of Technology, the University of Michigan and international universities such as Cambridge and Staffordshire to mention some all recommend taking notes using abbreviations (*U. S. News and World Report*, 2012). “Develop your own abbreviations for words you commonly use. Be careful

not to go overboard with abbreviations, however. Abbreviating words may save you time to begin with, but you don't want to waste that time later trying to decipher your unfamiliar shorthand (Pauk & Ross, 2011, p. 369).” And at Rutgers Prep first grade students are introduced to note taking skills before their first research project (Rutgers Preparatory School, 2011).

It is very important to use abbreviations because the average business speaker or school lecturer speaks at 120-160 words per minute. The average person writes at 25-30 words per minute (ERA Learning, 2004). If using digital note taking software however, the average person types at 42.67 words per minute (rankmytyping.com, 2009). When students use abbreviations, symbols, and paraphrases they are encoding or transforming information into their own comprehension system. This is referred to as efficiency in Carrell, Dunkel & Mollaun (2002). This efficiency only works when the students remember their abbreviations or paraphrases correctly. These abbreviations should be developed for words and phrases that appear frequently in the students' subject area. These abbreviations should not be developed too quickly and they should be used consistently (Kanar, 2008). By using abbreviations students can simultaneously take notes and listen more quickly and efficiently (King, 2012). In addition to creating their own abbreviations students should make their notes as legible as possible (Virginia Tech, 2009).

There is one time that note takers do not want to use their personal abbreviations and that is when they are taking notes for visually impaired students. It is possible that the software on the students' computer will not recognize the abbreviations (University of Cambridge, 2011).

Following is a table of symbols and abbreviations one might use.

!	Important	Emp	Employee
“	Inches	Et al	And others
%	Percent	Etc	And so on

**	Remember this	Frdm	Freedom
:	Follow	Hosp	Hospital
^	Increasing	Ibid	In the same place
~	Approximately	Illus	Illustration
+-	Give or take	Inst	Institute
<>	Does not equal	K	Thousand
-->	Leads to	Lb	Pound
Admin	Administrative	Mgmt	Management
Aka	Also known as	Na	Not applicable
Ass'n	Association	Para	Paragraph
Avg	Average	Pp	Pages
b/c	Because	Re	Regarding
B4	Before	Sch	School
Bkgrd	Background	Soc	Social
c/o	Care of	Sts	Students
Ch	Chapter	Tech	Technology
Cnst	Constant	V	Decreasing
Coop	Cooperative	Vs	Versus
Def	Definition	w/i	Within
Dist	District	w/o	Without

Apple Store Apps

The following are iPhone or iPad apps located in the App Store under the heading: note taking retrieved on 7/31/2012. Today it is more efficient to keep notes on a computer because the notes are easier to search and sort through (Anthony, 2011). It appears that even our state departments of education recognize that cursive writing, handwriting, is not as important as it has been for 100's of years (Rodreguez, 2011). So much so that 46 states have adopted the Common Core State Standards for English, a new set of standards students are expected to learn before graduation, which doesn't include cursive writing (McNeil, 2009). These apps are more note taking management systems than direct note taking apps. They have a variety of uses after shorthand notes have been taken and deciphered.

Name of App	Functions
MindNode	Is a mind mapping software app that is used for collecting, organizing, and outlining. iPhone, iPad, iPod Touch
Nebulous Notes	Is a text editor and is backed up by Dropbox. Includes a macro system that allows you to add frequently used keys to a toolbar such as { }[]=%, etc. iPhone, iPad, iPod Touch
PhotoText	Takes photos of things you want to take notes of. iPhone, iPad, iPod Touch
MyTymz	To-Do Lists and Task Alerts. Has text, photo, voice, video & location. Useful for journaling. iPhone, iPad, iPod Touch
SoundNote	Records audio while taking notes. iPad
Popplet	Brainstorming and mind mapping. iPhone, iPad, iPod Touch
JustType	Allows you to take notes of a document you have on a screen

	(annotate). iPhone, iPad, iPod Touch
Outline	Type anywhere on a page. Format text create lists. Reads OneNote files. Syncs notes with USB. iPad
MobileNoter	Can take standalone notes but it's power comes to play when used with Microsoft OneNote. iPad
Note Taker HD	Used for writing and organizing handwritten notes and can be used to annotate PDF files. iPad
Sticky Notes	Ability to save short notes to keep yourself organized. iPad

The following summary of note taking apps was taken from the Fletcher Graduate Writing Program at Tufts University (2011).

Name of App	Functions
Microsoft Word	Drawbacks are that it is unstructured, difficult to search and rearrange notes.
Google Docs	Lacks advanced collaboration features. Good for sharing team documents.
Microsoft OneNote	Makes virtual note cards. Categorizes notes by your headings. Allows notes to be taken with a stylus.
Evernote	Distinguished by its sync function. Transfers notes from a web server to as many computers as necessary.
Endnote	Is good for research papers. Allows you to take notes directly in the citation manager. It is not useful for classroom notes, however.

Papers	An application for note taking and library organization. It is good for searching, storing, browsing, note taking, and comparing anything related to research papers.
Skim	A program for annotating PDFs. Allows you to add sticky notes, underline, highlight, and draw circles and boxes

The Questionnaire

The purpose of the questionnaire is to identify whether students are taught specific note taking methods, if they take notes at all, if they use abbreviations and if they take notes digitally. The questionnaire will be given during this semester to students in two freshman and one sophomore class. These classes are First Year Experience (Freshman), Microcomputer Applications (Freshman), and Visual Basic Programming (Sophomore). The questionnaire is in Appendix A.

References

- Anthony, S. (2011). *The best apps for taking notes in class*. Retrieved from http://www.msnbc.msn.com/id/44177668/ns/technology_and_science-tech_and_gadgets/t/...
- Boch, F. & Piolat, A. (2005). *Note taking and learning: A summary of research*. The WAC Journal, 16. Retrieved from <http://WAC.colostate.edu/journal/Vol16/boch.pdf>
- Carrell, P., Dunkel, P., & Mollaun, P. (2002). The effects of note taking, lecture length and topic on the listening component of the TOEFL 2000 (TOEFL Monograph Series No. MS-23). Princeton, NJ: ETS.
- Dezure, D., Kaplan, M. & Deerman, M. (n.d.) *Research on student note taking: Implications for faculty and graduate student instructors*. CRLT Occasional Papers, Center for Research on Learning and Teaching, University of Michigan, 16. Retrieved from http://crlt.umich.edu/publinks/crlt_no16.pdf
- ERA Learning. (2004). *Personal shorthand*. Retrieved from <http://www.eralearning.com/01/ps.php>
- Glencoe. (n.d.) *Note-taking: An essential learning tool*. Retrieved from <http://www.glencoe.com/sec/teachingtoday/weeklytips.phtml/1-5>
- Holmes, R. (2012). *What is the purpose of the common core state standards?* Retrieved from <http://theholmeseducationpost.com/2012/02/what-is-the-purpose-of-the-common-core-stat...>

- Kanar, C. (2008). *Note taking and test taking tips*. Retrieved from [http://www.ilile.org/events/past/Seminar_08_03/lesson_plans/Wheelersburg/Note takingS...](http://www.ilile.org/events/past/Seminar_08_03/lesson_plans/Wheelersburg/Note-takingS...)
- King, Y. (2012). *Common Abbreviations in Note-Taking*. Retrieved from [http://www.ehow.com/info_8489900_common-abbreviations-note taking.html](http://www.ehow.com/info_8489900_common-abbreviations-note-taking.html)
- Liquori, E. (2012) *Rules for effective note-taking in a “designer to client” meeting*. Retrieved from <http://www.devgarage.com/note-taking-designer-client-meeting/>
- McNeil, M. (2009). *46 states agree to common academic standards efforts*. Retrieved from <http://www.edweek.org/ew/articles/2009/06/01/33standards.h28.html>
- National Governors Association Center for Best Practices, Council of Chief State School Officers. (2010). *Common core state standards*. National Governors Association Center for Best Practices, Council of Chief State School Officers, Washington D.C.
- Note Taking Introduction. (2012). Retrieved from <http://www.notetakinghelp.com>
- Pauk, W. & R. Owens. (2011). *How to study in college, (10th Ed)*. Wadsworth, Cengage Learning: Boston.
- Rank My Typing. (2009). Retrieved from <http://www.rankmytyping.com>
- Rodriguez, R. (2011). *Cursive vs. typing: Which should schools teach?* Retrieved from http://articles.cnn.com/2011-08-24/us/cursive.writing.irpt_1_cursive-handwriting-lessons-penmanship?_s=PM:IREPORT

Rutgers Preparatory School. (2011). *Language arts common core standards*. Retrieved from <http://www.rutgersprep.org/index.php/academics/lower-sh=chool/369-core-standards>

Tufts University. (2011). *Note taking software*. Retrieved from <http://wikis.uit.tufts.edu/confluence/display/FletcherGraduateWritingProgram/Note+Takin...>

U.S. News and World Report. (2012). *World's best universities – Top 15*. Retrieved from <http://www.usnews.com/education/worlds-best-universities-rankings/top-400-universities-in-the-world>

University of Cambridge, Disability Resource Centre. (2011). *Additional information for note-takers*. Retrieved from <http://www.admin.cam.ac.uk/univ/disability/nma/currentnma/notetakers.html>

Virginia Tech. (2009). *Note taking and in-class skills*. Retrieved from <http://www.ucc.vt.edu/stdysk/notetake.html>

APPENDIX A

Note taking Questionnaire

1. What is your classification? Circle One **Fr** **So** **Jr** **Sr**

2. What is your gender? Circle One **F** **M**

Directions for the following questions: Answer the following questions by circling either **Y** for **Yes** or **N** for **No**.

1. Is the ability to take effective, meaningful notes a crucial learning skill?	Y N
2. Have you been taught a formal note taking method?	Y N
3. Do you take notes in class? NOTE: if the answer is no, hand in your questionnaire.	Y N
4. Does taking notes help you make better grades?	Y N
5. Do you look at your notes before going to class?	Y N
6. Do you print the PowerPoint slides prior to a lecture if they are available?	Y N
7. Do you re-read your notes after class?	Y N
8. Do you type your notes after class?	Y N
9. Are you able to take notes in class, keep up with the instructor, and understand the concepts at the same time?	Y N
10. Do you tune in to a lecture before it begins by reading previous notes or	Y N

assigned material?	
11. Do you pay attention to the speaker's gestures, tone of voice, and body language when deciding what to write in your notes?	Y N
12. Do you use a smart phone, tablet, or laptop computer to take notes during class?	Y N
13. Do you take notes as a general reminder of what was discussed in class?	Y N
14. Do you use notes to discuss the class with your study group?	Y N
15. Do you use notes to prepare for tests/quizzes?	Y N
16. Do you take notes only when you realize that the content is not covered in the textbook/readings?	Y N
17. Do you use abbreviations / symbols instead of writing out long or frequently used words?	Y N
18. Do you read the textbook assignment that is related to the lecture before attending the lecture?	Y N
19. Do you draw diagrams in your notes?	Y N
20. Do you outline your notes?	Y N

Thank you for completing the questionnaire. Your responses are valuable.

ENGAGEMENT AND IMPACT IN A COLLEGE INCLUSION PILOT PROGRAM FOR INDIVIDUALS WITH DISABILITIES

James P. Lawler
Pace University
Seidenberg School of Computer Science and Information Systems
163 William Street – 2nd Floor
New York City, New York 10038
212-346-1013
lawlerj@aol.com

ABSTRACT

Colleges are expanding inclusion programs for individuals with disabilities. In this paper, the author explores the features of an activist pilot program for individuals with developmental and intellectual disabilities at a school of computer science of a major metropolitan university. The author is exploring if the program is facilitating engagement in learning and in socialization of the individuals. The author is exploring further if the program is furnishing impact of the learning and of the socialization on the individuals with disabilities and impact in the learning of service on mentor students without disabilities. This research-in-progress study will benefit administrators and educators in colleges evaluating inclusion programs for a population excluded historically from opportunity in a university.

Keywords: College Inclusion, Disabilities, Higher Education Opportunity Act (HEOA), Individual Education Plans (IEP), Individuals with Developmental and Intellectual Disabilities (IDD), Intellectual and Other Disabilities (IDD), Intellectual Disabilities (ID), Mentoring, Postsecondary Education Programs (PSE), Service-Learning

BACKGROUND OF PAPER

College inclusion programs are expanding in the country for an increasing inflow of graduating high school individuals with intellectual disabilities (ID) [18]. Estimates indicate a mean of 25 students in 149 programs [11] and indicate 42% of the programs in colleges of 4 years and 58% in community colleges of 2 years [19], in an estimated 200 institutions in 41 states [22]. Features of postsecondary education programs (PSE) for students with intellectual and other developmental disabilities (IDD), including autism and Down syndrome, furnish opportunity for engagement in learning and in recreation and sociality of these students with peer students without disabilities [20]. Though learning for employment opportunity is indicated in the literature to be of frequent interest of students with disabilities in postsecondary education programs, opportunity in socialization with students without disabilities is indicated often to be of higher interest of students with disabilities [20]. The core outcomes of postsecondary education programs for students with developmental and intellectual disabilities are life planning or practical skills for inclusion in society [18].

Literature defines the main models of postsecondary programs for individuals with developmental and intellectual disabilities as the more frequent *hybrid / mixed* model, the *substantially separate* model and the less frequent *totally inclusive* model [23]:

- *Hybrid / mixed* model engages students with disabilities in academic classes for audit or credit and in programs of recreation and sociality with students without disabilities, engaging them further in life planning courses or programs of transition with students without disabilities;
- *Substantially separate* model engages students with disabilities in classes for audit or credit and life planning and self-advocacy programs of transition with only students with disabilities, but may be engaging them further in programs of recreation and sociality with students without disabilities; and
- *Totally inclusive* model engages the students with disabilities in courses for audit or credit in a certificate or degree program with students without disabilities, engaging the students through individualized person-centered planning [12] services if not technologies of the non-profit organization and of the university, engaging them further in the matching of their courses of study to gainful vocation visions.

Students with developmental and intellectual disabilities may also enter the programs as continuing education students. Literature indicates a mix of options and prerequisites for postsecondary education programs that involve age, completion of high school, desirability to be at the campus of a college, location in the neighborhood and navigability of the university [20], but the mix may not include placement testing [11]. More programs at the colleges of 4 years are inevitably informal and not for credit or audit and are open enrollment [20], in contrast to more programs at the community colleges of 2 years for credit, for students having a condition of less impairment or mild in developmental and intellectual disabilities.

Students with developmental and intellectual disabilities desiring to be included in college benefit from legislation of non-discrimination, equal opportunity and accommodation from the Rehabilitation Act of 1973 and the Americans with Disability Act (ADA) of 1990 to the Individuals with Disabilities Education Act (IDEA) of 2004 and the Higher Education Opportunity Act (HEOA) of 2008. The Higher Education Opportunity Act furnishes Federal Pell Grants, Federal Supplemental Education Opportunity Grants (FSEOG) and Federal Work-Study (FWA) Grants, if the college has a Comprehensive Transition and Postsecondary Program (CTP). Importantly the Department of Education Office of Postsecondary Education (OPE) furnishes Transition and Postsecondary Programs for Students with Intellectual Disabilities (TPSID) Grants to institutions with inclusive projects. Students with developmental and intellectual disabilities benefit from legislation, but few of them in high schools consider colleges in individualized education plans (IEP) for enrolling in postsecondary education programs [4] [8], even with the grants, and they have the lowest percentage of students with disabilities in the programs [3] – evidently guarantee of inclusion is not in the legislation

[3]. Students with developmental and intellectual disabilities can be daunted by more difficulty in learning, in mastering requirements and in socialization at a college [10] than those without disabilities, and the colleges may moreover not be prepared to properly serve those with these disabilities. Those with these disabilities can be identified inevitably as a minority in colleges [13], a condition hindering the “American Dream” [6].

INTRODUCTION TO PROGRAM AND STUDY

The author of this paper considers features of a pilot postsecondary education program for benefiting students with developmental and intellectual disabilities in facilitating engagement in learning and in socialization at a college, at which he is the administrator-instructor of the program. The model of the pilot program is an access *hybrid / mixed* non-credit and non-degree program, in the Seidenberg School of Computer Science and Information Systems of Pace University in New York City, for students with developmental and intellectual disabilities engaging in academic courses of the school with students without disabilities. The students with disabilities are from AHRC New York City, a non-profit organization partnered with the school.

The students with disabilities fulfill computer science course requirements like the students without disabilities, as metrics are not lowered by the instructors, and the students interact in programs of reciprocal socialization of the school and of the university with students without disabilities. The students with disabilities are encouraged and helped by the author and by paraprofessionals at the non-profit organization in cultural sensitivity as they join the school, and they are further helped by mentor students without disabilities in the semesters [5]. The mentor students are junior or senior students funded by a grant from AHRC New York City. The instructors and the mentor students are helped by the author and by the paraprofessionals in disability sensitivity and in the learning of the disability services of the school. The school is furnishing assistive communication and augmentative instructional technologies in helping the students with disabilities [1] if they need tools. The goal of the program is in engagement in an experience of learning and sociality for the students with developmental and intellectual disabilities. The objective of the program is focused on intermediate computer science projects and planning, problem-solving and productivity skills learned from these projects. The outcomes of the postsecondary education program are in marketable practical skills with pronounced self-advocacy skills of the students.

The program consists of 13 students with disabilities engaging in 7 computer science courses of 7 instructors in the school, from the fall 2010 into the spring 2013 semesters, of which 7 students already completed courses in the initial semesters. The program concurrently consists of the students engaging in computer and gaming clubs of the school and in events of sports and theater of the university. The decision for enrollment into the program is from a mix of prerequisites involving an age of 21+ years, completion of a “diploma” individualized education plan (IEP), demonstration of motivation, desirability to be at a college, determination to be free from disruptive disorders, education interest, eligibility from the New York State Office for People with

Developmental Disabilities (OPWDD) and eligibility from a OPWDD Home and Community Based Waiver (HCBW). The decision on enrollment of the students is from the AHRC New York City non-profit organization, the author and the individual instructors. The enrollment of the students is from the person-centered plans [22] of the students matched to the courses and to the extra-curricular practices of socialization. The students with disabilities are matched to the mentor students without disabilities, or recently 6 mentor students, by the author for the duration of the semesters, during which the mentor students are engaging in the classes as though they are class members, engaging in the clubs and event programs, and following the classes and the programs, engaging in the labs with the students with disabilities, and helping them on the course projects as tutors. The mentor students are helping the students with disabilities, as the students with disabilities post progress on the projects of the semesters on an e-Portfolio system of the university [15] and reflect on the learning and on the socialization of each of the 14 semester weeks. These postings and reflections are helping the author in exploring the engagement in the learning and in the socialization of the students with disabilities, and in exploring the impacts of the learning and of the socialization and of the service on the students with and without disabilities respectively.

Finally, the students with disabilities in the program are granted certificates of completion for the courses in the program by the school, after an anticipated 3 years, as they do not graduate or matriculate like other students without disabilities. The funding of the postsecondary education program is feasible through the New York State Office for People with Developmental Disabilities (OPWDD) Home and Community Based Waiver (HCBW), and insurance of liability is furnished by the non-profit organization. In short, these courses and the practices of the pilot program are founded on a *hybrid / mixed* model of a postsecondary education program for students with developmental and intellectual disabilities.

Therefore, this study is attempting explore if the courses and the overall practices of the program are facilitating engagement in the learning and in the socialization of the students with disabilities, and if the practices are furnishing impact of the learning and of the socialization on these students. The study is also attempting to explore if the practices of the program are furnishing impact in the learning of service on the mentor students. The program may be facilitating and furnishing higher engagement of and higher impact on the students with disabilities and higher impact on the mentor students. The mentor students fulfill an obligation to be in a program of service, but in the program they learn the potential of students with disabilities to be productive in the school if not in society.

The impacts on the mentor students without disabilities and on the students with disabilities from the *hybrid / mixed* model are important in eventually exploring the potential of the program to be extended from the Seidenberg School of Computer Science and Information Systems into the other schools of Pace University, such as the Dyson School of Arts and Sciences, in order for the students with disabilities to be included in courses of liberal arts and to be further involved in the university. The practices of the pilot program form a foundation for the potential of the students with disabilities to be

involved more in the learning and in the socialization in the university. There are few studies exploring the impacts of postsecondary programs on students with developmental and intellectual disabilities. This research-in-progress study will benefit the field for administrators and instructors attempting to plan postsecondary education programs for a neglected population of potential students.

FOCUS OF STUDY

“We are entering a new phase ... when the questions focus ... more on ‘how can students with intellectual disabilities go to college?’”[7]

The focus of the study is to evaluate the engagement in the learning and in the socialization, and to evaluate the impact of the learning and of the socialization, of the students with developmental and intellectual disabilities, in a *hybrid / mixed* model program. The focus further includes the impact of the learning and of the socialization on recognition and sensitivity to service of the students without disabilities mentoring the students with disabilities. The exploration of the pilot postsecondary program is in progress, in interpreting the postings and reflections of both groupings of students in the fall 2010 – fall 2012 semesters, and will be progressing into the spring 2013 semester, at the school. The exploration is focused on the increased or non-increased engagement in and impact of the learning and of the socialization on practical skills with pronounced self-advocacy skills for the students with disabilities, and on increased or non-increased sensitivity to service for the students without disabilities. This study will be beneficial to other institutions pursuing special programs for these students.

RESEARCH METHOD

The methodology of this study will explore the pilot postsecondary education program for students with developmental and intellectual disabilities, in the fall 2010 – spring 2013 semesters, at the Seidenberg School of Computer Science and Information Systems of Pace University. There will be content interpretation of engagement and of impact from the postings, products and reflections in 7 courses in the e-Portfolio system of the 13 students with disabilities by the author and by 3 paraprofessional staff of the AHRC New York City non-profit organization, for each of the 14 weeks of the 6 semesters. There will be independent interviews of 7 instructors and of 6 mentor students without disabilities by the author and by collectively 3 paraprofessional staff for each of the individual mid-term and final reflections weeks of the semesters. The mentor students will have posted pre- and post-reflections on the service. There will be interviews of the 3 paraprofessional staff by the author for each of the final weeks of the semesters, but due to non-disclosure protection not the individual students with disabilities. These interviews will be from open-ended questions of the author. The methodology will be focused on the population presented in Table 1.

Table 1: Research Methodology Population

Course	Students with Disabilities				Mentor Students without Disabilities	Instructors in Network
	2010-2011	2012	2013*	Total	Total	Total
Courses in Curriculum						
Community Empowerment thru Information Systems	n=1	n=2	n=1	n=4		
Introduction to Computer Technology	n=3	n=3	n=2	n=8		
Multimedia Technology	-	n=1	n=1	n=2		
Social Media Networking Technology	n=1	n=1	-	n=2		
Web Design for Non-Profit Organizations	n=1	n=1	n=1	n=3		
Sub-Total	n= 6	n=8	n=5	n=19	n=6	n=7
Continuing Education Sessions						
Basic Microsoft Tools	n=1	-	-	n=1		
Intermediate Microsoft Tools	n=1	-	-	n=1		
Sub-Total	n=2	-	-	n=2		
Total	n=8	n= 8	n= 5	n=21		
(Number of Course Students with Disabilities)	n=21					

Number of Individual Students with Disabilities in Postsecondary Education Program	n=13		
---	-------------	--	--

*Estimated

Note: Table is excluding 3 paraprofessional staff.

This collectively documented information will furnish notation of opinions on increased or non-increased practical skills and on increased or non-increased pronounced self-advocacy skills of the students with developmental and intellectual disabilities, and notation of opinions on increased or non-increased sensitivity to service of the mentor students without disabilities, from the learning and the socialization furnished by the postsecondary education program. The methodology will be guided more by an interest in the findings of the particular program and less by generalization of the findings to other institutions, and will be performed in principles of a qualitative study [17] by the author. The methodology will be reviewed for reliability by experts in post secondary education programs for individuals with disabilities at the non-profit organization and by a co-author at the school. The findings of the study will be finalized in summer 2013.

PRELIMINARY FINDINGS

The findings from a preliminary evaluation of the initial opinions or perceptions of the instructors, paraprofessional staff, students with disabilities and student mentors without disabilities, in the fall 2010, spring and fall 2011 and spring and fall 2012 semesters, are independently indicating increased engagement of and impact of the pilot program on the students with disabilities and increased impact on sensitivity to service on the students without disabilities. The practices of the postsecondary education program are evidently furnishing practical skills and self-advocacy skills of the students with disabilities and increased sensitivity to service of the students without disabilities. The results are implying encouraging potential of the learning and of the socialization in the pilot program of the school, which will be expanded in interpretation for conference presentation in early 2013.

POTENTIAL IMPLICATIONS OF STUDY

The preliminary findings are encouraging in benefits of the pilot program in the Seidenberg School of Computer Science and Information Systems for the students with disabilities. Instructors are indicating the benefits of the learning and of the socialization with the students with disabilities [10]. Paraprofessional staff is indicating the benefits especially of the socialization at the school. Students are indicating the fun of peer socialization at the university. The study may eventually prove the potential of the

program to be an official program in the school and in the other schools of Pace University, a program not a pilot but systematic throughout the university.

These preliminary findings are encouraging further in the benefits of the program for the mentor students without disabilities. They are indicating increased sensitivity in service to the students with developmental and intellectual disabilities [14]. This study may eventually reveal the potential of the program to be a provider of service-learning skills throughout the university.

Lastly, these preliminary findings are highlighting the importance of an official program, if the program is provided in the other schools of the university. Such a program involves the Office of Disability Services of the university, in providing sensitivity standards [9] of Universal Design for Learning [2] and Transition [21] that may include dormitory living at the university. The official program may moreover be providing individualized plans for employment (IPE) for the students with disabilities through the non-profit organization or through vocation rehabilitation organizations [16]. The official program may be the most positive postsecondary program for students with disabilities from the non-profit organization. This study may show the potential of the pilot program to be positioning Pace University as a University Center for Excellence in Developmental Disabilities (UCEDD).

LIMITATIONS AND OPPORTUNITIES

The paper is a research-in-progress study at one school of one university. The paper is of a small sample of students with disabilities, though the mean in the research shows 25 students with developmental and intellectual disabilities is typical [11]. The population of students of the research is moreover only one segment of the spectrum that if further researched with students with multiple disorders (PMD) may strengthen this paper. However, the population of students with developmental and intellectual disabilities is only a recent research topic. This paper may spur further study of proactive programs at other postsecondary institutions.

CONCLUSION OF PAPER

The paper explores the features of a pilot inclusion program for students with developmental and intellectual disabilities in a school of computer science. Exploration of engagement and impact of learning and of socialization of the postsecondary education program is indicating increased practical skills and increased self-advocacy skills of these students with disabilities. Exploration of the impact of the program is further indicating increased sensitivity to service of the students without disabilities that are mentoring and tutoring the students with disabilities. The research-in-progress paper is implying the potential of the postsecondary education program to be extended into other schools of this major metropolitan university. This study when finalized will be relevant to institutions that will be pursuing postsecondary programs for students with developmental and intellectual disabilities excluded from life in a university.

REFERENCES

- [1]Armstrong, A.J., Gentry, T., & Wehman, P. Using technology from school to adulthood: Unleashing the power. In Wehman, P. (Ed.), *Life beyond the classroom: Transition strategies for young people with disabilities*. Baltimore, Maryland: Brookes Publishing Company, 285-308, 2013.
- [2]Bremer, C.D. Universal design in secondary and postsecondary education. *Impact: Institute on Community Integration (UCEDD)*, 2003/2004, 16(3), 4-5,32.
- [3]Bruder, M.B., & Morgo-Wilson, C. Student and faculty awareness and attitudes about students with disabilities. *The Review of Disability Studies (RDS)*, 2010, 6(2), 4.
- [4]Cameto, R., Levine, P., & Wagner, M. *Transition planning for students with disabilities: A special topic report of findings from the National Longitudinal Transition Study – 2*. Menlo Park, California: SRI International, 2004.
- [5]Fifolt, M., & Abbott, G. Differential experiences of women and minority engineering students in a cooperative education program. *Journal of Women and Minorities and Science and Engineering*, 2008, 14(3), 253-267.
- [6]Getzel, E.E., & Wehman, P. *Going to college*. Baltimore, Maryland: Brookes Publishing Company, 2005.
- [7]Grigal, M., Hart, D., & Lewis, S. A prelude to progress: Postsecondary education and students with intellectual disabilities. *Impact: Institute on Community Integration (UCEDD)*, 2010/2011, 23(3), 4.
- [8]Grigal, M., Hart, D., & Weir, C. Framing the future: A standards-based conceptual framework for research and practice in inclusive higher education. *Insight: A Think College! Brief on Policy, Research, & Practice*, 2012, 10, 1-8.
- [9]Grigal, M., Hart, D., & Weir, C. *Think College! Standards, quality indicators, and benchmarks for inclusive higher education*. Boston, Massachusetts: Institute for Community Inclusion, University of Massachusetts, 2012.
- [10]Harris, J., Taiping, H., Markle, L., & Wessel, R. Ball State University's faculty mentorship program: Enhancing the first-year experience for students with disabilities. *About Campus*, 2011, May-June, 27,29.
- [11]Hart, D., Grigal, M., & Weir, C. Think College!: A snapshot of postsecondary education for students with intellectual and developmental disabilities. *Think College! Fast Facts*, 2010, 1, 1.
- [12]Holburn, S., Gordon, A., & Vietze, P.M. *Person-centered planning made easy: The picture method*. Baltimore, Maryland: Brookes Publishing Company, 2007.
- [13]Johnson, D.R., & Nord, D. Students with disabilities in higher education: Participating in America's future. *Impact Newsletter*, 2011, March, 1-3.
- [14]Jones, M., Weir, C., & Hart, D. Impact on teacher education programs of students with intellectual disabilities attending college. *Insight: A Think College! Brief on Policy, Research, & Practice*, 2011, 6, 6.
- [15]Lawler, J. Engaging community service students through digital portfolios. *Proceedings of the Information Systems Educators Conference (ISECON)*, New Orleans, Louisiana, 2012, November 1-4.

- [16]Migliore, A., Butterworth, J., & Hart, D. Postsecondary education and employment outcomes for youth with intellectual disabilities. *Think College! Fast Facts*, 2009, 1, 1.
- [17]Padgett, D.K. *Qualitative methods in social work research*. Thousand Oaks, California: Sage Publications, Inc., 2008.
- [18]Paiewonsky, M., Mecca, K., Daniels, T., Katz, C., Nash, J., Hanson, T., & Gragoudas, S. Students and educational coaches: Developing a support plan for college. *Insight: A Think College! Brief on Policy, Research, & Practice*, 2010, 4, 1.
- [19]Papay, C.K., & Bambara, L.M. College programs for students with intellectual and developmental disabilities: Results of a national survey. *Think College! Fast Facts*, 2012, 3, 1.
- [20]Papay, C.K., & Bambara, L.M. Postsecondary education for transition-age students with intellectual and other developmental disabilities: A national survey. *Education & Training in Autism & Developmental Disabilities*, 2011, 46(1), 2,5,8.
- [21]Thoma, C., Bartholomew, C.C., & Scott, L.A. *Universal design for transition*. Baltimore, Maryland, 2009.
- [22]Weir, C. Using individual supports to customize a postsecondary education experience. *Impact Newsletter*, 2011, March, 1-4.
- [23]Weir, C., Fialka, J., Timmons, J., Nord, D., & Gaylord, V. Postsecondary education for students with intellectual disabilities: An overview of current program types, *Impact Newsletter*, 2011, March, 1-2.

APPENDIX

Study Terminology

Terminology	Abbreviation	Grants
Americans with Disabilities Act	(ADA)	
Comprehensive Transition and Postsecondary Program	(CTP)	
Federal Supplemental Education Opportunity Grants	(FSEOG)	<i>Grants</i>
Federal Work-Study	(FWS)	<i>Grants</i>
Higher Education Opportunity Act of 2008	(HEOA)	<i>Grants</i>
Individuals with Developmental and Intellectual Disabilities	(ID)	
Individuals with Disabilities Education Act of 2004	(IDEA)	
Individualized Education Plans	(IEP)	
Individualized Plans for Employment	(IPE)	
Institute on Community Integration	(UCEDD)	
Intellectual and Other Disabilities	(IDD)	
Intellectual Disabilities	(ID)	
New York State Office for People with Developmental Disabilities	(OPWDD)	
Home and Community Based Waiver	(HCBW)	
Postsecondary Education Programs	(PSE)	
Students with Multiple Disorders	(PMD)	

Transition and Postsecondary Programs for Students with Intellectual Disabilities United States Department of Education	(TPSID)	<i>Grants</i>
Office of Postsecondary Education	(OPE)	
University Center for Excellence in Developmental Disabilities	(UCEDD)	

ACKNOWLEDGEMENTS

The author acknowledges funding grants of \$2,000 from AHRC New York City for scholarships for mentor students without disabilities in the postsecondary education program at the Seidenberg School of Computer Science and Information Systems of Pace University.

Reaching Millennial Students: Experiential Learning, New Class Design and Technology-Based Term Projects

Janice A. Black
Department of Management & Decision Sciences
E. Craig Wall, Sr. College of Business
Coastal Carolina University
Conway, SC 29528
janblack@coastal.edu
(843) 349-5012

Dmitriy A. Nesterkin
Department of Management & Decision Sciences
E. Craig Wall, Sr. College of Business
Coastal Carolina University
Conway, SC 29528
dnesterk@coastal.edu
(843) 234-3468

Reaching Millennial Students: Experiential Learning, New Class Design and Technology-Based Term Projects

Abstract: Despite calls for innovative pedagogy and program content, a persistent gap between head knowledge and behavior appears to exist in college of businesses. This paper examines the gap between the skill sets desired by employers, current student learning expectations and preferences, traditional college demonstration of acquisition of knowledge and the new college classroom. Engaging students today requires moving way beyond the sage on the stage, beyond using case studies, to experiential learning where the faculty member takes on the roles of a deep structure provider and coach. Examples using technology preferences of students are provided.

Despite calls for innovative pedagogy and program content, a persistent gap between head knowledge and behavior appears to exist in higher education business classes (Schramm, 2012; Henricks, 2004; Mitchell, 2011). There have been continued calls to embed experiential learning with the theoretical basis in the programs (Gendron & Greene, 2004). From practitioners, we learn that case studies just are not sufficient involvement for learning to occur to its greatest level (Martinsuo, 2009; Munoz, Mosey, & Binks, 2011; Barbosa, Kickul, & Smith, 2008). It is important to include activities that involve students learning from failure (Shepherd, 2004). This is particularly important for entrepreneurial students (Gendron & Greene, 2004) (Gilbert, 2010) and students engaged in applied information technology. Furthermore, many regional accrediting bodies are requiring that universities explicitly implement programs to meet stated missions (Palmer & Short, 2008). The issue is combining all of these in a responsible and efficient fashion for the faculty member with such a diverse set of goals from the faculty's stakeholder sets.

This paper examines the gap between what current employers want, what current students expect in the learning environment and the format of traditional lecture or computer lab based courses. Two experiential learning projects are presented that are immersed in the technology preferences and backgrounds of the students. We conclude with evidences of learning and meeting the employer goals and student comments.

Skill Sets Needed By Current Employers

Currently the professional communities rank, as the most critical, leadership, communication, and systems thinking skills (Brimhall, Wright, McGregor, & Hernandez, 2009; Tanloet & Tuamsuk, 2011). When the self-employed or job jumpers are queried, basic disciplinary skills are needed along with life-long learning, self-assessment, work/life balance, opportunity identification adaptability, and crafting professional networking (Bridgstock, 2009). The creation and managing of teams is a highly used skill in today's work world (Bohmer, 2010; Anderson, 2010; Tanloet & Tuamsuk, 2011). Given that 18% of a manager's time is spent addressing conflict (Hignite, Margavio, & Chin, 2002), team management needs to include the opportunity to manage conflict between team members.

Yes, analytical thinking and planning are important (Tanloet & Tuamsuk, 2011) but so too is being creative and innovative (Adler, Hecksher, & Prusak, 2011). Successful firms rely on members being able to foster both innovation and maintaining existing businesses (Tushman, Smith, & Binns, 2011; Hitt, Ireland, Sirmon, & Trahms, 2011). Gaining a deep and guiding understanding of the link between strategic goals and technical skills (those used in production activity) is still critical (Zinn & Haddad, 2007). Thinking and acting entrepreneurially is recognized more and more as a global maxim and as being worthy of study (Brixiova, 2010; Seikkula-Leino, 2011; Papayannakis, Kastelli, Damigos, & Mavrotas, 2008). However, taking a global perspective on entrepreneurship is not necessary to see its impact and the impact of the entrepreneurial mindset on a wide range of industries (Gatewood & West III, 2005).

An emerging trend is towards an organizational context that supports specific customized projects typically by using cross-functional or multidisciplinary teams (Nieto-Rodriguez, 2011). Qualified project managers (Wheatley, 2009; US News & World Report, 2011) and/or those who

can supervise computerized management networks (Farley, 2011) are in increasing demand so that customized and not standardized products can be produced (Farley, 2011). These new practices require new ways to organize work, and consequently how business students should be taught. An example of a new higher education educational emphasis is in experiential learning and its associated practical experiences (Economist, 2011).

What Current Students Prefer in Educational Settings

Most high school students expect to continue their education on to higher education (Milliron, 2008) but 57% of these students do not test high enough on entrance exams to show that they have the foundation or the ability to be successful at college (College Board, 2012). They expect to spend the same amount of time on college classes as they did on all of their high school classes which was only about 3 hours per week (Kuh, 2003). Contrast that expectation with the traditional college faculty expectation that students will spend 2 hours outside of class for every hour of face-to-face time. It isn't a wonder that millennial-aged students (Alsop, 2008) are considered a bit lazy by faculty and employers (Hershatter & Epstein, 2010). Getting the students to engage with and pull their own weight during their educational process is critical for it to be successful (Turnbull, 2005).

Current students do not have grade anxiety in any great amount (Milliron, 2008) and consistent with the earlier statement regarding anticipation of similar low levels of outside of class work required for "good" grades (Kuh, 2003) desire classes with low out-of-class workloads (Milliron, 2008). They believe themselves to be ready for college and the workforce but in actuality are faced with a large gap between those skill levels and the levels needed in the workplace (Casner-Lotto & Barrington, 2006).

Teaching Practices that Reach the Millennial Student

Effective teaching for the millennial student is teaching that adequately engage students. Some research has shown that this includes having a coaching orientation (Kutzhanova, Lyons, & Lichtenstein, 2009), utilizing their preferences for technology interfaces (Deal, Altman, & Rogelberg, 2010) and sparking a passion for a topic (Ng, Schweitzer, & Lyons, 2010). One way to do this is to flip the classroom experience on its head (Bergmann & Sams, 2012). This requires moving individual learning of basic vocabulary and foundational material to independent study units that occur outside of the class room and which are then used in class in projects or problems. This incorporates a bit of action learning, problem based learning and experiential learning (Bergmann & Sams, 2012). While flipping the classroom experience is just taking hold in the K-12, through the use of technology more and more college faculty are seeing the hybrid experience as very valuable to take students from where they are, provide customized learning to get them prepped for increasingly difficult or modularized problems and projects.

Instructors don't always have positive experiences trying to equip students with the practical skills that they need for a successful transition to the work place (Hershatter & Epstein, 2010). Students are lost without recipe like sets of instructions and grading rubrics (Hershatter & Epstein, 2010; Twenge & Campbell, 2003). Unfortunately, these types of assignments do not enable students to handle real world situations with missing data, tight time deadlines, and a need for students to have self-discipline, initiative and a strong work ethic (English, Manton, Pan, Schirru, & Bhowmik, 2012; Placeholder1). Both the course and the project need careful designing (Volkema, 2009). Some of the critical attributes of these new course structures is that they are customized to meet the students where each student is both for the content of the course and in their learning preferences (Kutzhanova, Lyons, & Lichtenstein, 2009). When you add the project component, especially a project where the student is interacting with real businesses as found in college of businesses, the

instructor needs to have a tolerance for ambiguity, strong people skills and the motivation and ability to relinquish control (Papamarcos, 2005).

Two Current Course Designs and Projects

Two case studies of faculty who have taken on this task of engaging the students in learning in non-traditional ways are presented. Both incorporate the use of learning technologies, both build from student knowledge bases in personalized fashions and both use major projects which are a large portion of the student's grades.

The Hands-On Approach to Teaching Management Information Technology

The purpose of the Management Information Systems course is to give business students a comprehensive and practical introduction to the subject. First, to facilitate an overview of fundamental concepts, take-home essay exams are used to direct students to engage in exploratory learning through the use of a variety of external sources (e.g., documents, videos) and a textbook. Second, to provide a practical grounding to the topics, individual and group project assignments, and in-class tutorials are utilized. In delivering their individual projects, students learn the fundamentals of web technologies by constructing a personal website using HTML (Hypertext Markup Language), CSS (Cascading Style Sheets), JavaScript (browser-based interpreted programming language), and jQuery (a popular JavaScript library). In working on their group projects, the students work in teams of four and analyze an existing small to mid-size business and document, in detail, what particular information system solutions the business can implement to improve their marketplace standing and internal functioning. Lastly, In-class tutorials give students an intermediate-level exposure to the relational databases and spreadsheet software through the use of Microsoft Access and Excel, respectively. Overall, the use of traditional (Power Point-based) lectures is almost completely eliminated. Instead, the course embraces and applies experiential

learning philosophy by directing students to "play," as much as possible, in the sandbox of technology.

Experiential Learning and the Entrepreneurial Leadership Class

There is both an information foundation and an experiential foundation that are the goals of this course. Students are exposed to what entrepreneurship is and who entrepreneurs are. Considerable time is spent facilitating the development of creativity and innovation thinking in the students. This is done through linking in-class lectures that convey information through exercises and mini-lectures to active searching by the students to find examples and applications of the concepts learned in class. Blogging on course member restricted sites allows the students to share their attempts at understanding and being creative without worrying about exposure and ridicule by others. This is particularly important for business students who typically have focused on developing the logical side of their brains and not the creative sides (Penaluna & Penaluna, 2008). To enable students to develop this searching for creative and innovative opportunities, scanning their environments and blogging about new ideas is required throughout the whole semester. To provide the students with creativity exercises and ideas beyond those discussed in class, students also read a popular business press self-help book on creativity and/or entrepreneurship and link those readings to class topics and examples. The concept development portion of the course goes hand in hand with the development of the undergraduate students into a research assistant complete with obtaining a certificate on the treatment of human subjects in research, following a research manual, and practicing interviewing techniques using interview protocol guides. This is all in preparation for the student to engage both individually and in small teams in seeking a practicing entrepreneur or small business owner, getting permission to interview them for the research project and video tape that interview, to then gather additional information and use the additional information and the raw video to create 5 minute video documentaries about the entrepreneurs and their businesses. Students

show their entrepreneurial documentaries to the broader public as they determine themes common in their presentations. They then build a themed web interface and post their documentary efforts online. They finish the term with a reflection paper and a “science fair” like presentation of what they have learned in the term, their current standing on pursuing becoming and entrepreneur and a proposal for an elective to take in support of that goal.

Works Cited

- Adler, P., Hecksher, C., & Prusak, L. (2011). Building a collaborative enterprise. *Harvard Business Review*, 89(7/8), 94-101.
- Alsop, R. (2008). *The Trophy Kids Grow Up*. San Francisco, CA: Jossey-Bass.
- Anderson, B. (2010). Project leadership and the art of managing relationship. *T & D*, 64(3), 58-63.
- Barbosa, S. D., Kickul, J., & Smith, B. R. (2008). The Road Less Intended: Integrating Entrepreneurial Cognition and Risk in Entrepreneurship Education. *Journal of Enterprising Culture*, 16(4), 411-439.
- Bergmann, J., & Sams, A. (2012). *Flip Your Classroom: Reach Every Student in Every Class Every Day*. Washington, D. C. : International Society for Technology in Education.
- Bohmer, R. M. (2010). Managing the new primary care: The new skills that will be needed. *Health Affairs*, 29(5), 1010-1014.
- Bridgstock, R. (2009). The graduate attributes we've overlooked: enhancing graduate employability through career management skills. *Higher Education Research & Development*, 28(1), 31-44.
- Brimhall, B. B., Wright, L. D., McGregor, K. L., & Hernandez, J. S. (2009). Critical Leadership and Management skills for Pathology Practice. *Archives of Pathology & Laboratory Medicine*, 131(10), 1547-1554.
- Brixiova, Z. (2010). Unlocing productive entrepreneurship in Africa's least developed countries. *African Development Review*, 22(3), 440-451.
- Casner-Lotto, J., & Barrington, L. (2006). *Are They Really Ready to Work? Employers' Perspectives on the Basic Knowledge and Applied Skills of New Entrants to the 21st Century Workforce*. The College Board. Retrieved from [Http://www.conferenceboard.org/pdf_free/DED-06-Workforce.pdf](http://www.conferenceboard.org/pdf_free/DED-06-Workforce.pdf)
- College Board. (2012). *SAT Report 2012*. Retrieved from <http://Collegeboard.com>
- Deal, J., Altman, D., & Rogelberg, S. (2010). Millennials at work: What we know and what we need to do (if anything). *Journal of Business & Psychology*, 25(2), 191-199.

- Economist. (2011, April). *Education Topics*. Retrieved September 16, 2011, from http://www.economist.com/blogs/freeexchange/2011/04/education_1
- English, D. E., Manton, E., Pan, E. Y., Schirru, S., & Bhowmik, D. (2012). A Comparison of the Views of Business Deans and Human Resource Managers on Selected Workplace Qualities. *SEInforms Proceedings*. Myrtle Beach, SC: SEInforms 2012 Annual Meeting.
- Farley, S. N. (2011). Core competencies of the new industrial organization. *Journal of Manufacturing Technology Management*, 22(4), 422-443.
- Gatewood, E. J., & West III, G. P. (2005). Responding to Opportunity and Need. *Peer Review*, 7(3), 12-14.
- Gendron, G., & Greene, P. (2004). Practitioner's Perspectives on Entrepreneurship Education: An Interview with Steve Case, Matt Goldman, Tom Golisano, Geraldine Laybourne, Jeff Taylor & Alan Webber. *Academy of Management Learning & Education*, 3(3), 302-314.
- Gilbert, D. (2010). Integrating Theory and Practice for Student Entrepreneurs: An Applied Learning Model. *Journal of Enterprising Culture*, 18(1), 83-106.
- Henricks, M. (2004, May 15). Extra Credit. *Entrepreneur*, 32(5), pp. 72-76.
- Hershatter, A., & Epstein, M. (2010). Millennials and the World of Work: An Organizational and Management Perspective. *Journal of Business & Psychology*, 25, 211-223.
- Hignite, M. A., Margavio, T. M., & Chin, J. M. (2002). Assessing the conflict resolution profiles of emerging information systems professionals. *Journal of Information Systems Education*, 13, 315-325.
- Hitt, M. A., Ireland, R. D., Sirmon, D. G., & Trahms, C. A. (2011). Strategic entrepreneurship: Creating value for individuals, organizations and society. *Academy of Management Perspectives*, 25(2), 57-75.
- Kuh, G. (2003). What we're learning about student engagement from NSSE. *Change*, 35(2), 24-32.
- Kutzhanova, N., Lyons, T. S., & Lichtenstein, G. A. (2009). Skill-Based Development of Entrepreneurs and the Role of Personal and Peer Group Coaching in Enterprise Development. *Economic Development Quarterly*, 23(3), 193-210.
- Martinsuo, M. (2009). Teaching the Fuzzy Front End of Innovation: Experimenting with Team Learning and Cross-Organizational Integration. *Creativity and Innovation Management*, 18(3), 147-159.
- Milliron, V. C. (2008). Exploring Millennial Student Values and Societal Trends: Accounting Course Selection Preferences. *Issues in Accounting Education*, 23(3), 405-419.
- Mitchell, A. (2011, December). Entrepreneurs Must Get Back to Basics. *Director*, p. 26.

- Munoz, C. A., Mosey, S., & Binks, M. (2011). Developing Opportunity-Identification Capabilities in the Classroom: Visual Evidence for Changing Mental Frames. *Academy of Management Learning and Education*, 10(2), 277-295.
- Ng, E. S., Schweitzer, L., & Lyons, S. T. (2010). New Generation, Great Expectations: A Field Study of the Millennial Generation. *Journal of Business & Psychology*, 25, 281-292.
- Nieto-Rodriguez, A. (2011). Voices: Totally Focused. *Business Strategy Review*, 22(2), 92-93.
- Palmer, T. B., & Short, J. C. (2008). Mission Statements in U. S. Colleges of Business: An Empirical Examination of Their Content with Linkages to Configurations and Performance. *Academy of Management Learning and Education*, 7(4), 454-470.
- Papamarcos, S. D. (2005). Giving Traction to Management Theory: Today's Service Learning. *Academy of Management Learning and Education*, 4, 325-335.
- Papayannakis, L., Kastelli, I., Damigos, D., & Mavrotas, G. (2008). Fostering entrepreneurship education in engineering curricula in Greece. *European Journal of Engineering Education*, 33(2), 199-210.
- Penaluna, A., & Penaluna, K. (2008). Business Paradigms in Einstellung; Harnessing Creative Mindsets, a Creative Industries Perspective. *Journal of Small Business and Entrepreneurship*, 21(2), 231-250.
- Schramm, C. (2012). Expanding the Entrepreneur Class. *Harvard Business Review*, July-August, 40.
- Seikkula-Leino, J. (2011). The implementation of entrepreneurship education through curriculum reform in Finnish comprehensive schools. *Journal of Curriculum Studies*, 43(1), 69-85.
- Shepherd, D. A. (2004). Educating Entrepreneurship Students about Emotion and Learning From Failure. *Academy of Management Learning and Education*, 3(3), 274-287.
- Tanloet, P., & Tuamsuk, K. (2011). Core competencies for information professionals of Thai academic libraries in the next decade (A.D. 2010-2019). *International Information & Library Review*, 43(3), 122-129.
- Turnbull, H. R. (2005). Individuals with disabilities education act reauthorization: Accountability and personal responsibility. *Remedial & Special Education*, 26(6), 320-326.
- Tushman, M., Smith, W. K., & Binns, A. (2011). The ambidextrous CEO. *Harvard Business Review*, 89(6), 74-80.
- Twenge, J. M., & Campbell, W. K. (2003). Isn't it fun to get the respect that we're going to deserve? Narcissism, social rejection, and aggression. *Personality and Social Psychology Bulletin*, 29(2), 261-272.
- US News & World Report. (2011, April). *Re-Inventing the MBA*. Retrieved September 17, 2011, from <http://www.usnews.com/education/best-graduate-schools/top-businessschools/articles/2011/03/14/reinventing-the-mba>

Volkema, R. J. (2009). Designing Effective Projects: Decision Options for Maximizing Learning and Project Success. *Journal of Management Education*, 34(4), 527-550.

Wheatley, M. (2009). Can you manage? *Engineering & Technology*, 4(19), 62-64.

Zinn, J., & Haddad, R. (2007). The new essential skills. *Industrial Engineer: IE*, 39(5), 35-39.

DECISION MAKING, ON-LINE TEACHING, AND SOCRATIC INQUIRY

William Swart, College of Business, East Carolina University, Greenville, NC
(252) 328-1414 swartw@ecu.edu

Kenneth R. MacLeod, College of Business, East Carolina University, Greenville, NC
(252) 328-1046 macleodk@ecu.edu

Abstract

With nearly two-thirds of higher education students enrolled in at least one online course, instructors choosing the use Socratic Inquiry as a method of instruction must adapt it to both face to face (f2f) and online environments. The use of Socratic Inquiry is considered to be most difficult for science based courses since Socratic Inquiry does not always lead to the “correct answer.” This paper describes how Socratic Inquiry is being successfully used in teaching decision making, a science based subject, to business students enrolled in both online and f2f classes. The success is achieved by mimicking Socratic Inquiry in the course materials and by allowing Socratic Inquiry as a means for exam preparation.

Introduction

Management Science is devoted to the task of data analysis with the goal of improving decision making. Decision making, considered as a skill, is a difficult thing to teach, and every aspect of the course should be directed to encouraging the student to be a better decision maker. With this in mind, some teachers have moved to a case-based approach to the class. This requires interaction between the professor and students and, as part of the case, the students are required to implement the management science tools to make (and defend) decisions. A teaching technique that can enhance this approach is Socratic Inquiry (engaging the students in conversations rather than lecturing).

In this paper, we present a brief overview of Socratic Inquiry (also known by terms such as the “Socratic Method” and “critical thinking”) followed by a discussion of some issues related to online learning at institutions of higher learning. We then discuss how online environments present certain advantages for the implementation of Socratic Inquiry into the learning process. Finally, we describe in some detail how we have leveraged those advantages to improve the learning of decision making in an MBA level course.

Socratic Inquiry

The belief that underlies Socratic Inquiry is that students learn better if they are forced to “discover” ideas for themselves. By struggling to come up with answers to the questions that are posed, students learn more effectively. Socratic Inquiry can help students develop "useful professional skills, such as careful preparation, reasoned analysis, and fluent oral presentations" (Rhode, 2001, p. B15). Moreover, the Socratic Method is effective at developing higher level cognitive skills (King 1990).

Drawbacks exist with the Socratic Method. The Socratic Method can become a forum for students vying for attention and status from the professor (Rhode, 2001). In larger classes, discussions often discourage participation from some students and do not offer adequate feedback on performance (Rhode, 2001). Additionally, instructors resort to lecturing because it is easier than controlling a discussion. Discussions tend to get off track as the students refuse to ask the questions that need to be asked to keep them on topic. In part, this becomes an issue due to the need to cover certain material, rather than letting the discussion range where it will. The further the classes stray off-topic, the less required material they will cover. Thus, lectures are still a common method of instruction in many business schools (Dow & Feldman, 1997).

Issues Thought to Influence Online Learning

The growth of on-line education has far outstripped the growth in overall higher education. The proportion of students taking at least one online course has increased from 1 in 10 to nearly one-third by 2010 (Allen et al, 2012). Faced with the financial and business reality that higher education budgets are directly linked with enrollment growth (Hall et al, 2012), nearly two-thirds of chief academic officers describe online learning as critical to their institution's long term strategy (Allen et al, 2012). The requirement to grow enrollment, for which online learning is the most obvious strategy, does introduce a puzzling dilemma to institutions of higher learning: Growing enrollments must be retained; Students engage faculty in negotiations to lower course standards so that they can obtain a desired grade using their ratings of the instructor as a bargaining chip; Faculty anxious to earn promotion and tenure will often agree to lower standards in order to receive good student evaluations; And, industry is not satisfied with the skills of recent graduates and is eliminating institutions that do not produce skilled graduates from their recruiting list (Swart and Duncan, in press).

The above dilemma is exacerbated in online environments. Not only is faculty facing pressure from students to lower their standards, but nearly two-thirds believe that learning outcomes for an on-line course are inferior or somewhat inferior to those for a comparable face-to-face course (Allen, 2012). The crux of the concern is perhaps best posited by Dave Wilson, CEO of the Graduate Management Admissions Council, which administers the GMAT exams, who states that he believes that online education is best suited for "rudimentary" courses in basic accounting or finance. "I'm not convinced that you can use technology for deeper Socratic inquiries between a professor and the students" (CNN, 2011). In this paper, we present one approach to ameliorate such concerns.

Socratic Inquiry in On-Line Courses

The American Heritage Dictionary (2009) defines the Socratic method, also referred to as Socratic Inquiry, as a pedagogical technique in which a teacher does not give information directly but instead asks a series of questions, with the result that the student comes either to the desired knowledge by answering the questions or to a deeper awareness of the limits of knowledge.

In a traditional environment, students involved in the Socratic Method will (Truffant, 2003):

- Relate ideas to previous knowledge and test theory against experience
- Look for patterns and underlying principles
- Check for evidence and relate it to conclusions
- Examine logic and arguments critically and question assumptions
- Acknowledge alternative perspectives and construct counterarguments
- Identify bias and generalizations
- Seek or provide clarification and build consensus through cooperation
- Employ active problem solving skills

Discussions, on line or face to face, support all these goals. Participants in a discussion should not compete to find the right answer, but rather collaborate in a process of evolution and development. While a discussion may converge on a consensus, it may also lead to divergent conclusions that yield a deeper understanding of the topic (Trufant, 2003). Although this may be an advantage in the social science arena, it is problematic in the scientific disciplines. We present one form of facilitator/instructor involvement that can serve to lead discussion toward the “correct” scientific answer.

Although the concern of many faculty and administrators is that the implementation of the Socratic Method (e.g. on-line discussion) cannot produce the same learning outcomes as a face-to-face environment, online discussions have one key advantage in that they make the Socratic method scaleable by facilitating its implicit reciprocity and inquiry (Trufant, 2003). In other words, online discussions:

- Overcome barriers of time and space
- Provide a risk-free environment that encourages a frank exchange
- Minimize the potential for confrontation
- Neutralize status indicators and social distractors
- Broaden the range of feedback by incorporating peer-to-peer exchange

For the above advantages to be realized, facilitators/instructors should take care to ensure that the online discussions create a space and time for informal, reflective thought and that facilitation is focused less on frequency and more on purpose, continually provoking students with selectively spaced, neutral, probing questions (Arend, 2009).

Implementing Socratic Inquiry in an Online Course on Decision Making

Teaching decision making is a natural fit for the Socratic Method, and since almost anything improves with practice, it makes sense to get students involved with decision making and Socratic Inquiry in every aspect of the course. Socrates developed this approach to force his students to think and, three thousand years later, we're still trying to accomplish the same goal. Involving students in discussions concerning some problem allows them to consider all aspects of the problem, such how a proposed solution will affect all aspects of the company. Rather than telling the students what to do (lecturing), the discussion forces the student to evaluate their

proposed solutions under many possible futures. This is thinking like a manager, rather than like a mathematician.

Starting these discussions can be difficult, as many students are not prepared for the use of Socratic Inquiry in the classroom. Most students have received a standard, lecture-based education, where the teacher talked and the students listened (maybe) - a passive learning situation. Effectively teaching decision making requires an active learning approach, with which the students may be uncomfortable. To make the students more familiar with the Socratic/active learning system, they can be introduced to it right from the start, with the lecture notes for the course material that mimic the Socratic Method.

Socratic Lecture Notes

A traditional text follows the format of a class lecture: the student is told what to do, how to do it, an example may be presented, and then a problem is assigned. This is an excellent approach for communicating instructions – telling the student what to do. Lecture notes in a Socratic Inquiry format will do much the same thing, for the portion that deals instructions. Where lecture notes that mimic the Socratic method will be different is in teaching the student how to use the instructions (calculations) to perform an analysis.

Any management science textbook can provide instructions for setting up a payoff table and calculating the rules for such a table. An example of such instructions in an SI format is shown below:

Q: What's the first decision rule?

A: An optimistic one.

D: If we are optimistic, we look at only the best outcome for each alternative (without worrying about which futures we are talking about). This rule is also called Maxi-Max, or Best of the Best, and I prefer the latter, because it tells you what to do. For each alternative, simply pick the highest profit (of course, if we were working with costs it would be the lowest cost) in that row (see Table 2). From among those best numbers, indicate the overall best (\surd), then the overall worst (\times). Since I have five

alternatives, I also chose to indicate the second place finish (*), which happens to be a tie. By itself, this rule doesn't tell us enough to make a decision, but it is a start.

	S ₁	S ₂	S ₃	S ₄	B of B
d ₁	-200	450	100	75	√ 450
d ₂	350	75	300	-100	* 350
d ₃	100	250	-100	350	* 350
d ₄	125	50	100	75	125
d ₅	100	-50	50	25	× 100

Table 2: Payoff Table with Best-of-the-Best Rule

Here, the “Q” indicates the question that is being posed, the “A” indicates the answer to the question, and the “D” indicates discussion that elaborates on the short answer. Even in this simple example, the SI format has advantages. The question/answer format automatically provides an outline (when combined with other sections) of the material, helping the student to organize the information. The “Discussion” section can be used, or that section can be broken down into a further sequence of questions-and-answers. The discussion section may be preferred just for space reasons (the Q&A can fill up a lot of pages very quickly), but should be limited to providing calculations or straightforward information.

Obviously, the remaining calculations would receive similar treatment. A difference occurs when you move beyond the simple calculations and begin teaching what to do with the information you have. The following example (below) shows the notes for the Maxi-Min rule:

Q: What's the second decision rule?

A: A conservative one.

D: When you are being conservative, you look at the worst that could happen. This rule is called Maxi-Min, but I prefer Best of the Worst. This time you pick the lowest number from each row, and again I have marked the winner, loser and second place, as in Table 3.

	S ₁	S ₂	S ₃	S ₄	B of W
d ₁	-200	450	100	75	× -200
d ₂	350	75	300	-100	-100
d ₃	100	250	-100	350	-100

d_4	125	50	100	75	$\sqrt{50}$
d_5	100	-50	50	25	* -50

Table 3: Payoff Table with the Best-of-the Worst Rule

The above notes are included primarily to help the next section make sense, but it does illustrate how the SI format builds on itself. The discussion for the second rule is much briefer, because part of the information is given back in the previous rule, and the student can find the information for the previous rule very easily, because the Q&A format provides the outline.

In the next section, the student asks a series of questions where the answers teach the student how to use the two rules to develop new information. For this reason, the questions are marked as “QS,” meaning “Question from Student.” To indicate a question from the instructor, simply use “Q” or the more precise “QI.” In this example, the value of the SI format is easier to see. First, it can be nearly impossible to get students to ask questions like this, but since the instructor controls the creation of the lecture notes, the questions are posed as needed. Further, not only is the information outlined for the student, but it is fed to the student in small pieces, which are easier to absorb. In addition, major points receive their own questions, highlighting that they are important:

QI: Do we have a problem, with one rule recommending d_1 , and the other recommending d_4 ?

QS: If each approach recommends a different alternative, then how are we any better off than we were originally?

A: We are better off if we remember that we don’t intend to use the rules to make the decision for us; but combinations of the rules are intended to tell us things about the alternatives.

QS: What do we learn by combining the Best-of-the-Best and Best-of-the-Worst rules?

A: Range.

D: Table 4 shows both rules tacked on to the end of the payoff table.

	S_1	S_2	S_3	S_4	B of B	B of W
d_1	-200	450	100	75	$\sqrt{450}$	$\times -200$
d_2	350	75	300	-100	* 350	-100
d_3	100	250	-100	350	* 350	-100
d_4	125	50	100	75	125	$\sqrt{50}$

d_5	100	-50	50	25	$\times 100$	$* -50$
-------	-----	-----	----	----	--------------	---------

Table 4: Payoff Table with the BoB and BoW Rules

This way, you can see the highest and lowest value for each alternative, which is the range of data for each alternative.

QS: How do you use the range?

A: As a measure of dispersion (NOT VARIANCE), but be careful. Most students tell me that a narrow range is better than a wide one because it has less variation, but it's not that simple.

QI: Is a wide range running from 50 to 100 better than a narrow range running from -10 to -5?

The notes attempt to mimic a discussion between the instructor and the student, so the following notes cover the analysis of an alternative. This is where the SI model really comes into its own – the teaching of the calculations is over and the process of getting the student to understand how to analyze the data begins. This is a long section, covering several pages:

Q: How do you analyze the rules?

A: Take the interpretations of the rules that we talked about in the section “Introduction to Payoff Tables” and apply them to the data that you see.

D: So, here's the row for d_1 :

	0.05	0.50	0.20	0.25					
	S_1	S_2	S_3	S_4	B of B	B of W	E. L.	E. V.	M/M R
d_1					$\sqrt{450}$	$\times -200$	106.25	$\sqrt{253.80}$	$\times 550$

Table 2: Decision Alternative d_1

Notice that I have blacked out the data for the alternative. That is because I don't want you to look at the data, yet. All you need to focus on for now are the rules. We'll get to the data later.

Move from the left to the right as you discuss the rules. That's the order they are presented in the table, so that is how your reader will expect them to be analyzed and there is little reason to do anything else.

QI: What is d_1 's Best-of-the-Best score and ranking?

A: 450, and it is the highest score on the table.

QI: What is d_1 's Best-of-the-Worst score and ranking?

A: -200, and it is the worst score on the table.

QI: What does that tell you about the data range for d_1 ?

A: That it is pretty big.

D: Here is how I would write that up:

Best-of-the-Best (BoB) gives us the highest score on the table at 450, while Best-of-the-Worst (BoW) gives us the worst score on the table at -200. Together, that means we have the widest possible data range for any alternative, which may be a cause for concern.

QS: How do you know we have “the widest possible data range?”

A: BoB collects all the highest payoffs from the table, and d_1 had the highest of all those payoffs. In the same way, BoW collects the worst payoffs on the table, and d_1 had the lowest of those. If you think of the payoffs as being arranged in order from highest to lowest, then that arrangement shows the total range of all the payoffs. Alternative d_1 goes from the top of that list to the bottom, so it encompasses the entire range, and no alternative could have wider range.

QS: Why did you repeat the payoff values in the analysis?

A: In a perfectly written analysis, the reader would not need to take his/her eyes off of the paragraph to look at the table.

QS: Then why do we insert the table?

A: In case the reader wants to study the table for any reason, such as disagreeing with your analysis and wanting to perform one of their own.

QI: What is the midpoint of the data range?

QS: How did you get the midpoint of the data range?

A: Add the BoB to the BoW (yes, I know it is negative, just do it) and divide by 2.

QI: What is the equally likely score and how does it compare to the midpoint of the data range?

A: Well, the midpoint is $[450 + (-200)]/2$ or 125, and the EL score of 106.25 is below the midpoint.

D: I would write this up as (this section would be attached to the italicized section above):

The midpoint of the data range is 125 and the equally likely (EL) score of 106.25 is substantially below that, indicating that the payoffs are grouped to the low end of the range, which again is a matter of concern.

QS: How do you know the EL is “substantially” below the midpoint?

A: Such statements are always personal. For me, knowing that the middle of the data range is 125, knowing that averages show much less dispersion than the data, and considering 20 as a percentage of 125, was enough to make me take notice. That is why I said “substantial.”

Q: What do you mean by “grouped to the low end of the range” and why is this “a concern?”

A: The only way the average (EL) can be less than the midpoint is if most of the payoffs lie below the midpoint.

D: The midpoint of a data range is exactly that, the halfway point between the highest value (BoB) and the lowest value (BoW). The average (which we call EL) measures something different, where the data is clustered. If the cluster is below the middle of the data range, then most of your payoffs must

be below the middle. Is that really where you want to find most of your payoffs? An exception to this can be created by an outlier, but since the outlier would also be affecting the data range, that doesn't happen all that often. It never hurts, though, to check for that later on.

QS: Why not check the data now, to figure out where the data is found?

A: You are introducing your readers to the problem data.

QI: How familiar are your readers with the data for this problem?

A: They have never seen it before.

QI: What will happen if you jump around from the rules to the data, back to the rules, mixing interpretations of the rules with explanations from the data, and then back to the rules, etc?

A: The reader will get confused and not follow either one.

D: Therefore, finish with all the rules first, then move on to the data.

As noted earlier, keeping the discussion on track is a problem in the Socratic Method, particularly in a scientific course where the goal is to reach a desired answer. In these notes, the hypothetical student always asks the right questions and never goes off on tangents that you don't have time for. In that sense, writing these notes is akin to writing a play (albeit a very boring one), rather than having a true conversation (where your partner often fails to live up to his/her side of the discussion).

Even so, it is a serious temptation to fall back into lecturing (too many "Discussion" sections). We would not be in this business if we did not love the sounds of our own voices, so the process of turning control over to the students (even in writing) is difficult. The discipline to do this, however, pays off dramatically. With the background set, via the lecture notes, for the students to get involved with the discussion by asking questions, it is necessary to force the students to get involved.

Toward the "Real Thing" – Letting Students Chart Their Own Inquiries

The Socratic Lecture Notes described above mimic the Socratic process although they do not allow students to engage in self-directed discovery. However, it is the intention that these

notes will attune the student to question what the instructor does and evaluate the given answer. In some instances, we have been told that students are anticipating what question will be asked next and even have their own. We direct students to ask their own question on the discussion board if the course happens to be online, or ask it in class if the course is f2f. However, this format is too guided, in our opinion, to be considered a true SI approach to learning.

A major challenge in courses, whether they are on line or f2f, is to engage students in meaningful interaction that leads to discovery –e.g. Socratic Inquiry. By providing lecture notes in a Socratic Inquiry format, we have introduced a desired thought process to our students while *simultaneously* managing to keep on schedule to cover the required core material of the course. But, the price has been to give up free SI for scripted SI. To overcome this shortcoming, we have provided an opportunity for engaging our students to the real thing - true SI- in our classes in decision making accompanied by the strongest incentive we know to do so. We are providing students with an advance copy of a complex problem/case study that must be correctly formulated *and* solved prior to a scheduled examination – typically scheduled at least a work week after the problem is made available. The examination itself consists of questions about the solution which cannot be answered correctly unless the formulation and solution are correct. Students are given the opportunity to interact without restrictions in their effort to obtain a correct solution prior to exam time. We try to make the problem complex enough so that even the best students are motivated to enter into a discussion regarding their approach and results, while the other students are, by necessity, motivated to question what appears on the discussion board so that they can understand it well enough to perform on the exam. True to the Socratic Method, it is not unusual for students to have agreed on a wrong solution to the problem (which in qualitative classes may simply mean that there is an alternative truth) and the overall class

performance of the class is dismal. Such mass disasters are not very common. A more common scenario is that subgroups agree to disagree on the solution with those that are correct performing better on the than those that do not. Even for those who have the correct pre-exam solution, performing well on the exam requires correct interpretation and manipulation of the solution which is rarely accomplished. Thus, exam grades are rarely what students expect. Naturally, this causes great stress to students, but provides us as instructors with a great opportunity to complete the “Socratic Loop” from beginning discussion to the discovery of truth (the correct formulation and solution). We close the Socratic Loop by giving students the opportunity to see their answers to the exam questions as well as the correct answers. They then are given the opportunity to retake the exam after they had time to reconsider their original formulation/solution to the exam problem. Such a retake is a valid pedagogical step since all questions about the problem solution are randomly generated from a question bank. Thus, no student received the same exam as another and on the original exam and their second exam is not the same as the first, although the random nature of the selection of exam questions does allow for the possibility of some questions being repeated.

One measure of success in fostering Socratic Inquiry is the number of posts that are placed on the course’s discussion board. During the Spring Semester of 2012, a class of 26 MBA students had three exams. They posted 199 questions and answers prior to exam 1, 233 prior to exam 2, and 142 prior to exam 3. A majority of students wrote in their course evaluations that they learned more in SI course than any other course in their MBA program.

Conclusion

The premise of this paper is that Socratic Inquiry is a benefit to the teaching of decision making. Further, it can be successfully implemented both on-line and f2f settings, but the entire

class should be built around the SI format. This means that not only class sessions should follow the SI model, but also the preparation material (lecture notes) *and* the exams. Information presented in the format of Socratic Inquiry will help students learn to be better decision makers and analysts. Active involvement by the students in the classroom (real or virtual) gives them the opportunity to improve their understanding by exploring the problem in many facets, both in learning the material (classroom sessions and lecture material) and in testing.

Since many students are not familiar with the Socratic Method, having the course material use that format will begin to prepare the students to participate in the classroom. The notes also have other advantages, such as the implicit outline provided by the format and the emphasis of important points.

Once the students are exposed to the Socratic Method, both by the lecture notes and the in-class discussion, they can be challenged to implement what they have learned while preparing for a test. Students are, generally, motivated to do well on tests, which will encourage them to participate in the pre-test discussions, reinforcing the training in the Socratic Method that they have already received.

The concept of involving students in a discussion, rather than lecturing them, is not new. Neither is case-based teaching, nor trying to get students involved in classroom discussions. On-line teaching has made much of this even more difficult, as the asynchronous nature of on-line course rather inhibits conversations. Designing the lecture notes, which the on-line students use, to teach (by example) the interaction between teachers and students can only help the on-line students adapt to this approach. Creating a situation where their natural inclination (to do well on a test) encourages them to get involved with the discussions reinforces the goal of the course.

References

Allen, E., Seaman, J., Lederman, D., and Jaschik, S., "Conflicted: Faculty And Online Education, 2012", A Joint Project of The Babson Survey Research Group and *Inside Higher Ed*, June, 2012.

Arend, B., "Encouraging Critical Thinking in Online Threaded Discussions", *The Journal of Educators Online*, Vol. 6, No. 1.

CNNMoney, "Online MBA's heading to the Ivory tower", <http://management.fortune.cnn.com/2011/01/27/online-mbas-heading-to-the-ivory-tower/> Accessed 10/18/2012.

Dow, J. and Feldman, D., "Current approaches to teaching Intermediate Accounting," in *Issues in Accounting Education*, 12(1), 61-75, (1997).

Hall, C., Swart, W. and Duncan, S. (2012), "Balancing Customer Needs and Standards in Higher Education," *Quality Approaches in Higher Education*, Vol. 3, No. 1.

King, A., Enhancing peer interaction and learning in the classroom through reciprocal questioning," *American Educational Research Journal*, 27(4), 664-87, (1990).

Rhode, D., "Kicking the Socratic Method and other reforms for law schools," *The Chronicle of Higher Education*, 47(20), B15-17, (2001).

Swart, W. and Duncan, S., and Hall, C., "Performance Standards In Higher Education: Truth And Consequences", in *Academic Performance: Predictors, Learning Strategies and Influences of Gender*, Nova Science Publishers, Inc., in press.

The American Heritage® Dictionary of the English Language, Fourth Edition copyright ©2000, Houghton Mifflin Company. Updated in 2009.

Trufant, L., "Move Over Socrates: Online Discussion is Here", <http://net.educause.edu/ir/library/pdf/ncp0330.pdf>, 2003.

An Exploration of Factors Influencing a Student's Decision to Join a Professional Computing Organization

Sathasivam Mathiyalakan
Department of Accounting & MIS
School of Business & Economics
Winston Salem State University
601 S. Martin Luther King Jr. Drive
Winston Salem, NC 27110
Email: mathiyalakansa@wssu.edu
Phone: 336-750-2288

George Heilman
Department of Accounting & MIS
School of Business & Economics
Winston Salem State University
601 S. Martin Luther King Jr. Drive
Winston Salem, NC 27110
Email: heilmang@wssu.edu
Phone: 336-750-2716

Sharon White
Department of Accounting & MIS
School of Business & Economics
Winston Salem State University
601 S. Martin Luther King Jr. Drive
Winston Salem, NC 27110
Email: whitesd@wssu.edu
Phone: 336-750-2352

Abstract

Professional organizations such the Association of Information Technology Professionals (AITP) and the Association for Computing Machinery (ACM) play an important role in the professional growth of a technology student. These organizations provide several benefits such as networking, career development, and providing a forum wherein students can learn about the latest technological trends and innovations. Research shows that despite the benefits, there is a low student enrollment in these professional organizations. As an example, at our institution only about 10% of eligible students are active members in a professional computing organization at any given time. While researchers have found that factors such as shared identity and assessment of the value generated by shared bond rather than purely monetary reasons play a key role in a student's decision to join a professional organization, they also note that students may be deterred from joining these organizations because of misconceptions about the organization or by a lack of time and money. In this study, using the sample from a business school located in southeastern U.S., we examine factors that play a part in a student's decision to join a professional computing organization.

Keywords: Computing, MIS Students, Professional Association, Student Perception, Technology

TEACHING AN INTRODUCTORY DATABASE COURSE: A COMPARISON OF PERFORMANCE FOR GROUP VS. INDIVIDUAL PROJECTS AND IN-CLASS VERSUS ONLINE QUIZZES

Cheryl L. Aasheim
Georgia Southern University
PO Box 8150
Statesboro, GA 30460-8150
912-478-5165
caasheim@georgiasouthern.edu

INTRODUCTION

Given the explosion in the amount of information and data available to organizations, the importance of the ability of an organization to understand and analyze that data to leverage the knowledge gained is increasing. In a university setting, where entry-level IT workers are educated, the course related to data is typically an introductory database management or design course. This course is the basis for all other courses related to data storage or data analysis. A database course is part of the core curriculum for most information systems (IS), information technology (IT) and computer science (CS) degree programs. However, many students struggle with the concepts related to database analysis, design and implementation, specifically, ER-diagrams, relational mapping, normalization, and SQL.

Faculty struggle with developing effective methods for teaching these difficult concepts. This paper compares multiple approaches used by a single faculty member for the introductory database course that is part of her degree program.

MOTIVATION

At my university, the database course is a core, first semester, junior level course in the information technology (IT) degree program. I have been teaching the undergraduate database course for the past four years. In the past three years I have given a project that students complete as a series of graded assignments. The assignments are related, with the exception of normalization, and take the students from the analysis phase through the maintenance phase of the systems development life cycle (SDLC). The assignments revolve around a company such as myFlix, a fictitious online DVD rental and streaming company, or a hotel with the need for an online hotel registration system. Table 1 provides a description of each assignment. The reason the normalization assignment does not continue with the same company is that typically there is not much normalization to be done when the ER-diagram is well-designed. Therefore, for the normalization assignment, the students are given a set of problems with relations that are not well-structured.

In addition to assignments, the students have labs in the course. The labs are typically shorter versions of what they will be expected to do in the assignments. They work individually in labs, but can get as much help with completing the lab as needed. The idea is for them to have something that works to use as a guide for the assignments.

With the exception of this semester, I have allowed students to work in teams of 2-3 members for all projects. They keep the same team throughout the semester. The students have not been doing as well in the course as I had hoped. They struggle with difficult concepts like normalization, ER-diagrams, SQL, and procedures. The failure rate, defined as a D or an F as they must pass the course with a C to progress in the degree program, is not high (less than 5% per semester), but the percentage of students that I feel

understand the concepts fully is relatively low. This may be due to the fact that the nature of the concepts is difficult or may be due to all members of a group not participating in completing every assignment despite my best efforts in class to advise to the contrary. It could also be that students do not really benefit from the online quizzes or may have a bank of questions and answers from students from previous semesters. As a result, this semester I have made the assignments an individual effort, but have reduced the workload on the assignments with the hope that this will increase student learning. I have also incorporated short in-class quizzes that are announced a class period ahead of time with the idea that the level of preparation required for an in-class quiz is higher than for an online one.

Table 1: Assignments

Assignment Number	Description
1	Identify entities and attributes for a given project description.
2	Draw an ER-diagram given the business requirements.
3	Given the ER-diagram for the company, provide a relational schema.
4	Normalization (to 3NF)
5	Based on a data dictionary, create the database in Microsoft SQL Server.
6	Query the database.
7	Write stored procedures for the database.
8	Create views, triggers and constraints for the database. Create users and assign permissions.
9	Create reports for the company database.

The goal of this research is to determine if the change from group assignments to individual ones and the addition of in-class quizzes will increase the understanding of the material taught in the course. To achieve this goal, performance of students in past semesters will be compared to performance in this semester.

This paper is a proposal that is in the early idea stage. For the next phases of the project I will

- *Provide a review of relevant literature.*
The literature review will be divided into three sections: (1) teaching database courses effectively with specific attention to the use of group projects, (2) group versus individual projects in the classroom, (3) effectiveness of online versus in-class quizzes.
- *Describe the methodology used.*
The methodology will involve comparing students' performance in semesters where group assignments and online quizzes are used to this semester where the assignments are at the individual level and online quizzes have been supplemented by in-class quizzes. Specifically, assignment grades, the overall grade and the exam grades from previous semesters will be compared to this semester.
- *Provide results.*
- *Provide a conclusion, discussion on implications for teaching and limitations of the current research.*

By the time of the conference, an analysis of the data with respect to the aforementioned goals should be complete for this semester compared to the last.

The Research Trend on Global Software Development from 1999 to 2011: the Latent Semantic Analysis Approach

Yanjun Yu Ph.D.

Department of Management Information Systems

College of Business and Public Administration

Southern University at New Orleans

6801 Press Drive

New Orleans, LA 70126

Phone: 504-286-5169

Email: yyu@suno.edu

Yibai Li

The Operations and Information Management Department

Kania School of Management

The University of Scranton

Scranton, Pennsylvania 18510

Phone: (509) 432-8793

Email: yibaili@hotmail.com

Abstract

Given that research in the Global Software Development (GSD) area has increased over the last decade, and is beginning to mature, this paper surveyed hundreds of GSD studies and tried to obtain a consolidated view of the areas witnessing the highest concentration of research and areas receiving scant attention in the Information Systems (IS) discipline. After careful selection, 83 research articles remained in the study sample database due to their desired characteristics: behavioral study in the IS discipline, and publication between the year of 1999 to 2011. We reviewed these articles and conducted an objective data analysis by using Latent Semantic Analysis (LSA) approach. The research results show that there are 5 major research themes in the GSD area: virtue team, knowledge management, control, trust and risk. We also further streamlined these 5 themes to 3C (coordination, control and communication) research stream model. The consolidated view of GSD studies helps identify trends and patterns in this research area. This study also recommends the future research topics in the GSD area.

Keywords

Global Software Development, GSD, Information Systems, coordination, control, communication, virtue team, knowledge management, risk, trust, control, Latent Semantic Analysis

Introduction

Global software development (GSD) relates to software development undertaken at geographically distributed locations across national and international boundaries in a coordinated fashion involving synchronous and asynchronous interaction (Haq, Khan, & Tariq, 2011). GSD involves in communication for information exchange, coordination of distributed teams and their members, and effective control of teams by adhering to goals and policies related to a project.

Although GSD is becoming an effective technique, it suffers from many challenges such as poor communication, lack of trust and coordination. These challenges pose serious risk to the smooth execution of the GSD projects. In the past decade, GSD has become an area of active research in many disciplines e.g., Economics, Sociology, Management, Marketing, and Management Information Systems; and a large number of researches have worked on GSD topic from different aspects: for instance, offshore outsourcing advantages -- access to a large pool of qualified human resources, significant cost advantage (Layman, Williams, Damian, & Bures, 2006; Sarker & Sahay, 2004), speeding up of work by “following the sun” (Sarker & Sahay, 2004), and enhanced “strategic flexibility” (Robinson & Kalakota, 2004); and offshore outsourcing challenges -- cultural and language difference, trust and commitment, extended feedback loops, asynchronous communication, and knowledge management.

Many GSD studies have been conducted and provided researchers and practitioners with the lessons learned from GSD projects, and the tactics that can alleviate challenges. For instance, Carmel and Agarwal (2001) provided three tactics: 1) reduce intensive collaboration, 2) reduce cultural distance, and 3) reduce temporal distance. Other strategies were discussed as well such as keeping everyone informed, reducing dissonance or conflict, aiding project performance,

providing sufficient opportunities for face-to-face meetings, and using of more cue-laden communication modes such as video-conferencing (Lee-Kelley & Sankey, 2008).

Given that research in GSD has increased over the last decade, and is beginning to mature, it is perhaps the time to obtain a consolidated view of the areas witnessing the highest concentration of research and areas receiving scant attention evolving the GSD phenomenon. Such consolidated view of a phenomenon, as Dube and Pare (2003, p. 599) suggested, “help identify trends and patterns”, and therefore, “serve as an instrument to reflect as a research community on our progress”. Such a consolidated analysis also enables researchers to understand and pinpoint areas where more work needs to be done (Dube & Pare, 2003). The present study tries to play this role in Information Systems (IS) research discipline on topics in the GSD research stream. This study can contribute in the following ways: first, it focuses on IS-related research studies, especially those with a behavioral focus (versus the technical journals and conference) since this study attempts to be more relevant to IS. Secondly, it studies a large time period (i.e., 1999-2011), thereby enabling the capture of more recent developments. Thirdly, it will identify the critical topics that have been studied. Finally, it will make recommendations to scholars for future research areas in the GSD research stream. Through this examination, the present study attempts to answer the following research questions:

- What topics of GSD research are IS academics currently addressing?
- Which of the identified topics of GSD research are under-explored by IS academic?
- What is the trend in IS academic research in the GSD research?

In order to answer the aforementioned questions, the present study conducted a Latent Semantic Analysis (LSA) on the existing GSD literature. The analysis, based on the 83 GSD articles, reveals that GSD research in IS discipline has 5 major research themes: virtue team, knowledge

management, trust, control, and risk. And these 5 themes can be further classified into three research streams: coordination, which covers virtue team and knowledge management; control, which covers control and risk; and communication, which covers trust. The rest of the manuscript is organized as follows: first, the author describes the research method, followed by the results and discussions section; next, recommendations are presented; finally, it concludes with the contributions and limitations.

Method

Data Collection

The terms used for searching IS-related articles were “global software development”, “Information Technology outsourcing”, “offshore outsourcing”, and “communication”. The article search was accomplished by using ABI Inform (Proquest) online, Business Source Complete (EBSCO), and Google Scholar. Some articles were searched based on the reference lists of selected articles. The author also searched the premier IS journals such as *MIS Quarterly* and *Information Systems Research (ISR)*.

The search returned hundreds of articles, and the first author read through the abstracts first in order to determine whether these articles were Information Systems (IS) related. After careful selection, 83 articles remained in the database. These 83 articles were used to conduct the data analysis by using the Latent Semantic Analysis approach.

Data Analysis

A Brief Introduction to Latent Semantic Analysis

Latent Semantic Analysis (LSA) is a well-established text mining technique (Han, Kamber, & Pei, 2011). The technique was originally developed from the area of natural language processing in the computer science discipline. It has been adopted by some popular search engines (i.e.

Google and Bing) as one of their algorithms to process the textual data on the Internet (Hossain, Prybutok, & Evangelopoulos, 2011). In recent years, this technique has been introduced to other disciplines for the purpose of knowledge discovery from scholarly literature. For example, a study published in MIS Quarterly (Sidorova, Evangelopoulos, Valacich, & Ramakrishnan, 2008) adopts this technique to identify the intellectual cores of the entire IS discipline. A recent paper (li & Joshi, 2012) uses LSA to uncover the major research themes for an emerging discipline of social computing.

In contrast to other types of text mining techniques, Latent Semantic Analysis (LSA) is a special mathematical and statistical method used to identify the latent concepts within the textual data at the semantic level (Hossain, et al., 2011). LSA is able to extract the contextual-usage meaning of words and obtain approximate estimates of meaning similarities among words within the given textual data, thus providing the information at the semantic level (Hossain, et al., 2011). LSA has numerous applications in natural language processing, search engine and library indexing and many other areas (Hossain, et al., 2011). LSA simulates the way the human brain distills meaning from text (Sidorova, et al., 2008). The detailed mathematical explanation for LSA can be found in previous studies (Sidorova, et al., 2008). This section focuses on how LSA is conducted in this particular study.

Operationalization of LSA in This Study

First of all, we collected the abstracts from the previously identified 83 papers and compiled them into a spreadsheet. Each abstract in the spreadsheet was converted into a document object in Rapidminer 5.0 and each abstract was assigned a unique document ID. Then the documents went through a series of pre-processing procedures. 1) All the letters in these documents were transformed into lower case. 2) The documents then were tokenized with non-letter separators.

As a result, each document was split into a sequence of words (or tokens). 3) We removed the “stopwords” in the identified word list. “Stopwords” include the trivial English words such as “and,” “the,” “is,” “a,” “an” and so on. These stopwords don’t provide meaningful information about the documents and their presence unnecessarily increases the dimensionality. 4) We removed all the tokens that are less than two letters (i.e. “s,” “x,” and so on), because we found those tokens don’t contain meaningful information. 5) We also removed the words or tokens that appear only in one document, because these tokens are associated only with the specific study and shouldn’t be considered as a reflection of any research theme. 6) We applied term stemming techniques to word list. Terms stemming will identify the root of the words and regard all words with the same root as one token. For example, “collaborate,” “collaborating,” “collaboration,” and “collaborative” will be regarded as a single token, the “collabor-.” By doing so, different variants of the same word are combined and the dimensionality is further decreased. 7) Finally, we removed “author,” “paper,” “conclusion” and some other words that are associated solely with the writing style of scholarly articles and don’t provide additional information about the content. All these term reduction steps eventually resulted in a word list with 997 tokens. This word list represents a list of the key words that exist in these 83 collected papers and contain meaningful information which can be used to identify the research themes of the area.

Afterwards, we applied the Term Frequency Matrix Transformation which helps the unique and informative key words be assigned with more weight than common words. Then this matrix was decomposed into three matrices using Singular Value Decomposition. These three matrices are namely the term-by-factor matrix, singular value matrix (square roots of eigenvalues), and the document-by-factor matrix. The term-by-factor matrix shows the term loadings to a particular latent factor. The document-by-factor matrix shows the document loadings to a particular latent

factor. The singular values (square roots of eigenvalues) represent the importance of particular factor. The detailed explanation of Term Frequency Matrix Transformation and Singular Value Decomposition can be found in Li and Joshi's (2012) paper.

We first examined the singular values in the singular value matrix. Singular value is the square roots of eigenvalues, which theoretically represent the amount of variance explained by a particular factor as well as the importance of a factor. The top 5 most important factors and their singular values are presented in Table 1.

Factor Interpretation

The main purpose of the study is to uncover the major research themes of the global software development research; therefore we aimed to select the least number of factors that can cover all the existing content in these 83 papers. To serve this goal, we examined the document-by-factor matrix. In the matrix, each cell shows the loading of a particular paper abstract on a particular factor. The higher loading means the higher degree of relevance between a particular document and a certain latent factor. Negative loading means the document is irrelevant to a particular latent factor. Simply put, the number of positive loadings on a factor indicates the number of papers explained by this factor. We further counted the cumulative number of distinct papers explained by the factors. As shown in Table 1, Factor 1 covers the content of 45 distinct papers. Factor 2, together with Factor 1, cumulatively explain 68 papers. Finally, we found that the top 5 factors collectively explained all 83 papers. Therefore, these five factors represent the major research themes in the GSD area.

Table 1 Factors and Their Singular Value

Factor	Singular Value (square roots of eigenvalues)	Cumulative number of papers can be explained	High Loading Terms
Factor 1	1.474	45	Team, time, member, separ, virtual, collabor, cultur, time_zone, virtual_team

Factor 2	1.357	68	Knowledge, coordin, product, task, transfer
Factor 3	1.289	74	Govern, formal, mechan, sla, relat_govern, commit
Factor 4	1.253	79	Firm, outsource, client, vendor, contract, cost,
Factor 5	1.232	83	Practition, cultur_understand, maintain_trust, trust_client, relationship, client_cultur_understand, commun_strategi

However, these five factors so far were just five symbols; we wouldn't understand the meaning of them unless the factors were interpreted. We interpreted the meaning of these factors by examining the term-by-factor matrix. As discussed above, terms will load to a particular factor and collectively define the meaning of the factor. The top loading terms of the top five factors are displayed in the Table 1. These terms define the meaning of the top five factors or research themes.

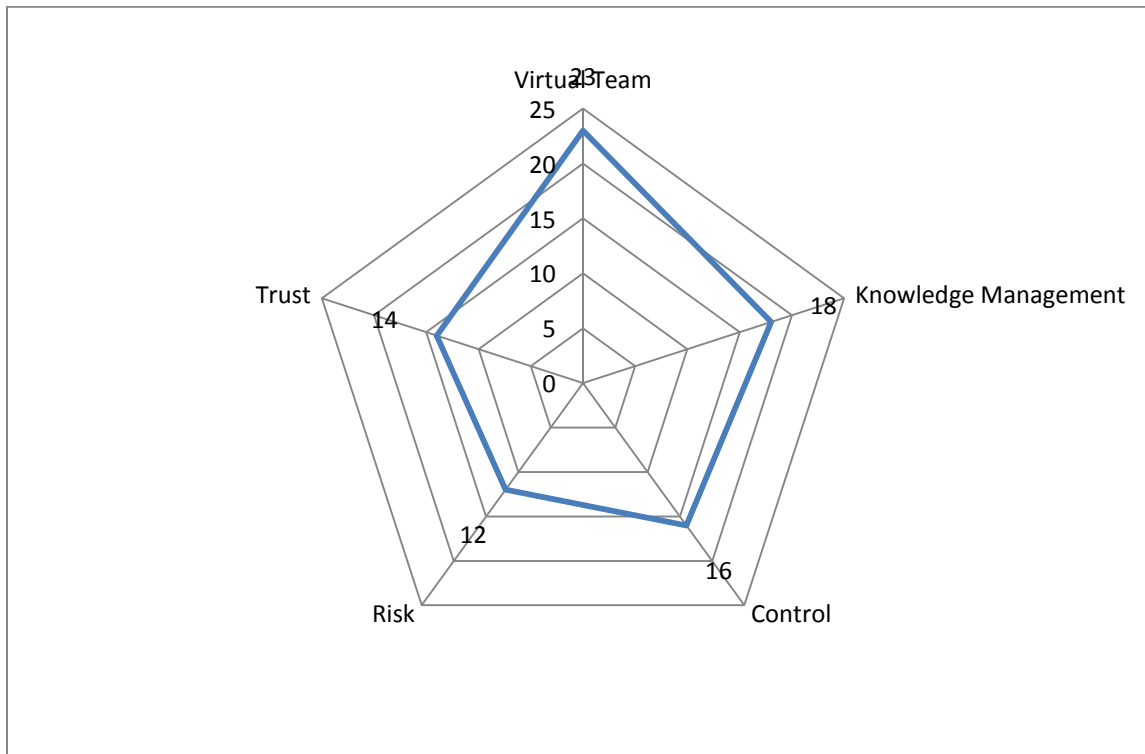
We associated each factor with its high-loading terms and documents to assist factor interpretation. We used these terms and documents to interpret and characterize (i.e., label) the particular factor. The process of labeling the factors consist of examining the terms and abstracts related to a factor, interpreting the underlying area, and determining an appropriate label. Finally, we identified 5 labels, which are also the research themes, in the GSD area. They are virtue team, knowledge management, control, risk, and trust (as shown in table 2).

Table 2 Interpretation of Factors

Factors	Labels	High-loading Terms
Factor 1	Virtue Team	Team, time, member, separ, virtual, collabor, cultur, time_zone, virtual_team
Factor 2	Knowledge Management	Knowledge, coordin, product, task, transfer
Factor 3	Control	Govern, formal, mechan, sla, relat_govern, commit
Factor 4	Risk	Firm, outsource, client, vendor, contract, cost,
Factor 5	Trust	Practition, cultur_understand, maintain_trust, trust_client, relationship, client_cultur_understand, commun_strategi

In order to find out how these 83 papers are distributed on the five factors, we examined the document-by-factor matrix and counted the number of distinct papers loaded to a particular factor. If one paper has cross loadings to multiple factors, we allocated this paper to the factor on which it has the highest loading. It turns out the virtual team is the biggest research area, which has 23 papers addressing this theme. The knowledge management is the second important research theme, which has 18 papers on it. The control is the third major research theme with 16 papers. The risk and trust themes have 12 and 14 papers on each of them, correspondingly.

Figure 1 The Web of GSD Research Themes by # of Papers



Results and Discussions

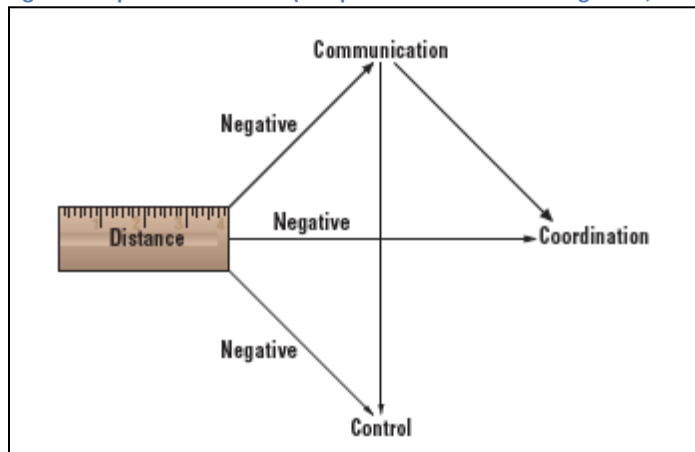
The Core Research Streams of GSD

The research results show that there are five major themes in the GSD research area: virtue team, knowledge management, control, trust, and risk. As discussed by Sidorove et al. (2008) LSA can be specified to give solutions at different levels of abstraction, which depends on the research

objective to decide what level of abstract is needed. Since the objective of this study is to provide a big picture of the entire GSD study in IS discipline across a long time of period (i.e., 1999-2011), we need the most parsimonious LSA solution to cover the most content. However there is no rule of thumb criterion for doing so (Sidorova, et al., 2008). Therefore, we decided to adopt Carmel and Agarwal's (2001) impact of distance research framework (Figure 2) in the GSD area to further categorize them into a higher level of abstract .

As many scholars have noticed and discussed the inherited challenge of GSD—the distance issue in their studies (Carmel, 1999; Carmel & Agarwal, 2001; S. Sarker & S. Sahay, 2004). The distance includes not only the geographical distance, but also temporal, and cultural distance. An organization can't function well without coordination and control; however, distance creates difficulties for coordination and control. Carmel and Agarwal (2001) had thorough discussion of coordination and control, and how they affect each other in the GSD settings. *Coordination* is the act of integrating each task with each organizational unit, so the unit contributes to the overall objective. *Communication* is the glue that integrates different units into the organization. *Control* is the process of adhering to goals, policies, standards, or quality levels. Control can be formal and informal. For today's knowledge workers, coordination and control have been blended together in many ways. Communication is the mediator that affects both coordination and control. Carmel and Agarwal (2001)'s "Impacts of Distance" figure (Figure 2) shows clear relationships among distance, communication, coordination and control.

Figure 2 Impacts of Distance (Adopted from Carmel and Agarwal, 2001)



From the figure 2, it is seen that distance *negatively* affects communication, coordination, and control *directly*; at the same time, distance *negatively* affects coordination and control *indirectly* through communication. From this figure, it is clear that effective communication can play an important role in a successful global software development project. Any challenges and issues relate to distance and communication can affect the GSD's success.

Based on above discussion of distance impact on GSD projects and the identified five factors, we can further classify these five factors into three research streams: *coordination, control and communication*. Virtue team and knowledge management are highly related to coordination research theme. Control and risk are related to control research theme. And trust is related to communication theme.

Coordination, Virtue Team and Knowledge Management

We define coordination here as the management of dependencies among task activities to achieve a goal (Malone & Crowston, 1994). The GSD projects need to be done by at least two teams located dispersal i.e., one is the vendor team and the other one is the client team, which are usually located in different countries. This type of team is called virtue team. The software development task among virtue teams is usually complex and has substantial dependencies that

need to be managed, thus need for coordination. The role of knowledge in software development is important. Software development is considered a knowledge intensive activity of organizing and integrating the specialized expertise, skills, and perspectives of various project stakeholders into an appropriate, coherent, and practical solution (Faraj & Sproult, 2000). The software development in the offshore domain is complex, and the stakeholders need to swiftly move through the learning curves with best practices institutionalized (Rottman & Lacity, 2004). It involves in the knowledge (including explicit-implicit and formal-informal) transfer between client and vendors. This process needs coordination between client and vendor teams intensively.

Control and Risk

Offshore outsourced projects are more likely to be failure than in-house and domestically outsourced because there are greater risks involved. The study shows that half of offshore outsourcing initiatives “fail” or do not meet stated performance objectives because of many risk factors such as the inability to navigate organizational and cultural barriers, middle-management resistance and failure to communicate (Nakatsu & Lacovou, 2009). To avoid the GSD project failure, in other words, in order to alleviate the risk factors in the GSD project, the control mechanism plays an important role here. In the control literature, vendor governance, especially, how the client exercises control over the vendor, has been considered a critical factor to a successful GSD project (Choudhury & Sabherwal, 2003; Clark, Zmud, & McCray, 1998).

Communication and Trust

Communication is fundamental to any form of organizing, especially for the globally distributed teams, for which organizational structure and form can be defined in terms of communication linkages among organizational units (Zack & Mckinney, 1995). These communication linkages are enabled by technology. Advanced ICT enables parties to communicate across distance, time, culture, departments, and organizations, thereby creating an “anyone/anytime/anyplace” form of

organizational experience (Desanctis & Monge, 1999). Effective communication highly relates to the trust among team members (Smith & Blanck, 2002). Javenpaa & Leidner (1999) indicated that lack of trust is likely to develop between globally distributed teams. Smith & Blanck (2002) confirmed this view and found that trust is the foundation for an effective team, but it is also most difficult to build at a distance. *Trust* is defined as the willingness of one person or group to relate to another in the belief that the other's action will be beneficial rather than detrimental, even though this cannot be guaranteed (Child, 2001). Trust is more likely to be built if personal contact, frequent interactions, and socializing between teams and individuals are facilitated (Child, 2001). Due to the common barriers of geographical distance, cultural, language, and time difference in the GSD teams, it is unusual that team members can have frequent personal contact, interaction and socialization. Therefore, the frequent formal and informal communication via ICT is important for distributed team members to build trust among them.

Table 3 Interpretation of Three Streams on GSD Research

Research Streams	Factors	Labels	High-loading Terms
Coordination	Factor 1	Virtue Team	Team, time, member, separ, virtual, collabor, cultur, time_zone, virtual_team
	Factor 2	Knowledge Management	Knowledge, coordin, product, task, transfer
Control	Factor 3	Control	Govern, formal, mechan, sla, relat_govern, commit
	Factor 4	Risk	Firm, outsource, client, vendor, contract, cost,
Communication	Factor 5	Trust	Practition, cultur_understand, maintain_trust, trust_client, relationship, client_cultur_understand, commun_strategi

Based on the above discussion, we can streamline the five-factor solution to the higher abstractive level of three-stream solution: coordination, control and communication (i.e., 3C research streams model). This 3C model provides us a better view and understanding of the current research trend in the GSD area in IS discipline: all these research studied solutions to alleviate the impact of the distance to the GSD project's success. They all revolve around three

research streams: coordination, control and communication. The total numbers of papers that studied in each research stream are 41, 28, and 14, correspondingly. These numbers indicate IS scholars paid extremely attention to the coordination issue, and paid least attention to the communication issue in the GSD projects.

Contributions and Limitations

Contributions

The study can contribute to the IS research field in the following ways: first, it focuses on IS-related GSD research studies, especially those with a behavioral focus (versus the technical journals and conference) since this study attempts to be more relevant to IS; secondly, it studies a long time period (i.e., from 1999 to 2011), thereby enabling the capture of more recent developments in the field; thirdly, it identifies the critical topics that have been studied previously, i.e., virtue team, knowledge management, control, trust and risk; fourthly, it identifies three major research streams in GSD area—coordination, control and communication; fifthly, it reveals the research trend in the GSD area – the most researched stream is coordination, and the least researched stream is communication; therefore, we would like to propose IS scholars to conduct more communication related GSD research studies in the future; finally, this study uses an advanced method, the Latent Semantic Analysis, to conduct a systematic and extensive literature review of publications in the global software development research area. In prior literature review of this kind, researchers' subjective judgment was used to identify the major research themes, this study makes a novel contribution by using the Latent Semantic Analysis, a mathematical natural language process technique, to synthesize the literature and outline the research landscape of this area.

Limitations

This study has some limitations as well. First, we used ABI Inform (Proquest) online, Business Source Complete (EBSCO), Google Scholar and several other IS journals e.g., MIS Quarterly and Information Systems Research, to compile our sample. Although these are the major databases and journals for the business and IS related publications, it is conceivable that some GSD related research papers were not captured in our sample. Secondly, although LSA is a pure mathematical method that can synthesize large body of literature in the objective manner with very little intervention from the researchers, it only provides certain statistics that requires researchers' judgment, e.g., labeling each factor. Cautious readers ought to, not only read the labels proposed in this paper, but also review the high loading terms and consider their own interpretation of each factor.

Conclusion

Considering the importance of GSD to modern business, and on a larger scale, to national economies, this research studied a relatively exciting and important area. The present study attempted to explore the development and current situation of GSD research. Through this empirical analysis, we hope to reflect on the "progress" of the body of research within the IS discipline, and therefore brings increased awareness as to the areas requiring further attention.

References:

- Carmel, E. (1999). *Global Software Teams*. Englewood Cliffs: NJ: Prentice Hall.
- Carmel, E., & Agarwal, R. (2001). Tactical approaches for alleviating distance in global software development. *IEEE Software*, 18, 22-29.
- Child, J. (2001). Trust--the fundamental bond in global collaboration. *Organizational Dynamics*, 29(4), 274-288.
- Choudhury, V., & Sabherwal, R. (2003). Portfolios of Control in Outsourced Software Development Projects. *Information Systems Research*, 14(3), 291-314.
- Clark, T., Zmud, R. W., & McCray, G. (1998). The Outsourcing of Information Services: Transforming the nature of business in the Information Industry. In L. P. Willcocks & M. C. Lacity (Eds.), *Strategic Sourcing of Information Systems*. Wiley, NY.
- Desanctis, G., & Monge, P. (1999). Introduction to the special issue: communication processes for virtual organizations. *Organizational Science*, 10(6), 693-703.
- Dube, L., & Pare, G. (2003). Rigor in Information Systems Positivist Case Research: Current Practices, Trends, and Recommendations. *MIS Quarterly*, 27(4), 597-626.
- Faraj, S., & Sproull, L. (2000). Coordinating Expertise in Software Development Teams. *Management Science*, 46(12), 1554-1568.
- Han, J., Kamber, M., & Pei, J. (2011). *Data Mining: concepts and techniques* Morgan Kaufmann.
- Haq, S., Khan, N. A., & Tariq, M. (2011). The Context of Global Software Development: Challenges, Best Practices and Benefits. *Information Management and Business Review*, 3(4), 193-197.
- Hossain, M. M., Prybutok, V., & Evangelopoulos, N. (2011). Causal Latent Semantic Analysis (cLSA): An Illustration. *International Business Research*, 4(2), 38.
- Jarvenpaa, S. L., & Leidner, D. E. (1999). communication and trust in global virtual teams. *organization Science*, 10(6), 791-815.
- Layman, L., Williams, L., Damian, D., & Bures, H. (2006). Essential communication practices for Extreme Programming in a global software development team. *Information and Software Technology*, 48, 781-794.
- Lee-Kelley, L., & Sankey, T. (2008). Global virtual teams for value creation and project success: a case study. *International Journal of Project Management*, 26, 51-62.
- li, Y., & Joshi, K. D. (2012). *The State of Social Computing Research: A Literature Review and Synthesis using the Latent Semantic Analysis Approach*. Paper presented at the AMCIS Seattle.
- Malone, T., & Crowston, K. (1994). The interdisciplinary study of coordination. *ACM Computing Survey*, 26(1), 87-119.
- Nakatsu, R. T., & Lacovou, C. L. (2009). A comparative study of important risk factors involved in offshore and domestic outsourcing of software development projects: a two-panel Delphi study. *Information and Management*, 46, 57-68.
- Robinson, M., & Kalakota, R. (2004). *Offshore Outsourcing: Business Models, ROI and Best Practices*. Alpharetta, GA: Mivar Press.
- Rottman, J., & Lacity, M. (2004). Twenty Practices for Offshore Sourcing. *MIS Quarterly Executive*, 3(3), 117-130.
- Sarker, & Sahay. (2004). Implications of Space and Time for Distributed Work: an interpretive study of US-Norwegian systems development teams. *European Journal of Information Systems*, 13, 3-20.
- Sarker, S., & Sahay, S. (2004). Implications of Space and Time for Distributed Work: an interpretive study of US-Norwegian systems development teams. *European Journal of Information Systems*, 13, 3-20.
- Sidorova, A., Evangelopoulos, N., Valacich, J. S., & Ramakrishnan, T. (2008). Uncovering the intellectual core of the information systems discipline. *MIS Quarterly* 32(3), 467-482.

Smith, & Blanck, E. L. (2002). From Experience: Leading Disperse Teams. *The Journal of Product Innovation Management*, 19(4), 294-304.

Zack, M., & Mckinney, J. (1995). Social context and interaction in ongoing computer-supported management groups. *Organization Science*, 6(4), 394-422.



Assessing the Impact of Poor Service Quality on Customer Satisfaction in the Federal Service Industry

Regina J Armstrong, University of Maryland University College, rarmstrong@umuc.edu

Anshu Arora, Savannah State University, aroraa@savannahstate.edu

and Mahesh S. Raisinghani, Texas Woman's University, mraisinghani@twu.edu

Abstract

Some firms struggle to be competitive because leadership does not know how to properly implement and use quality concepts and measures to improve their services. Additional reasons for their lack of success stem from quality misconceptions, reactive approaches to quality improvements, inadequate training and difficulty applying quality metrics. Firms have to consider the perceptions and expectations of their customers before they can assess how their attitudes and behaviors will affect their perceptions of quality (Foster, 2010). This study supports prior research and theory that suggest service quality is the driving influence for customer satisfaction. Six service dimensions within a federal service firm were evaluated in order to examine customer satisfaction and determine what areas in the acquisition and procurement sector need improvement. At the Army level, senior leadership has attempted to deploy internet- based surveys for customers and employees to measure quality. However, these measures were unsuccessful because the data was not reported back to the sampling agency for corrective action. The first goal of this research paper is to reveal that a correlation exists between service quality and customer satisfaction in the federal service industry. The second goal of this research paper is to recommend quality measures that management can apply in the federal service to improve poor service quality.

Introduction

Customer satisfaction can be the result of high quality services when management implements quality concepts and metrics properly (Hu, Juwaheer and Kandampully, 2009). Some firms struggle to be competitive because leadership does not know how to properly implement and use quality concepts to improve services. Additional reasons for their lack of success stem from misconceptions, reactive approaches toward quality improvement, inadequate training and difficulty measuring quality. According to Foster (2010), firms have to be able to take into consideration the perceptions and expectations of their customers

because their attitudes and behaviors will affect how they perceive service quality. If managers are not aware of how their customers perceive their services, it makes it difficult for them to know what areas need improvements.

Specifically within the Federal service industry, the acquisition workforce is experiencing a difficult time meeting the needs of their customers on time. As a result, customers are unsatisfied, productivity is low and managers are stuck in reactive mode. As stated by Foster (2010), “one of the difficulties in satisfying customer requirements is that in a dynamic environment, customer needs are constantly changing” (p. 132). As quality issues transpire, customer requirements continue to increase and eventually exceed the level of service quality. Therefore, a reactive customer driven quality approach puts the industry at risk of losing their customer base, employees and potentially future profit and revenues (Foster, 2010).

Intent of this Research

The purpose of the study is to discuss the service quality issues currently occurring within the Mission Installation Contracting Command Center (MICC). The MICC is a federal agency within the Department of Defense providing involuntary acquisition and procurement services to the Department of Army. Services include the procurement of supplies, equipment, construction and maintenance services for the Army Installations. Quality issues are a prevalent problem arising in the acquisition industry due to a retiring workforce, inadequate training, changes in leadership and lack of consistency. Due to the lack of poor quality management, customers and employees aren't satisfied. The first goal of this research paper is to reveal that a correlation exists between service quality and customer satisfaction. The second goal of this research paper is to recommend quality measures that management can apply in the federal service industry to improve quality.

Literature Review and Synthesis

Numerous studies have been conducted to evaluate the impact effective quality management has on service firms. Previous research implied that organizations practicing continuous quality management improvement are more customer- focused than organizations without these concepts set in place (Byrde and Robinson 2007). In a prior study conducted by Byrde and Robinson (2007), their research implied that quality management concepts influenced customers, time, cost, quality and stakeholders. Their research further indicated that organizations with total quality management processes in place experience long-term improvements in performance and productivity when customer satisfaction is the ultimate goal. However, Byrde and Robinson's research did not discuss or identify a cause and effect relationship between total quality management (TQM) and customer/employee satisfaction in specific business industries such as the service industry. Abratt, Dion and Molinari (2008), discussed how customer satisfaction and quality are important in a service firm's ability to retain a strong customer base. The authors evaluated the relationship between customers satisfaction, quality and repurchase to understand how managers can identify their shortfalls and improve service quality. The findings indicated that value and satisfaction were the key variables that influence whether or not a service firm is able to retain their customer base. The study also implied that managers must determine the needs and requirements of their customers instead of relying on false marketing tactics and strategies that raise customer expectations above the quality of service their capable of providing (Abratt, Dion and Molinari, 2008). However, this study was restricted to the freight service industry and customer's intentions to repurchase services from the same organizations could not be validated, because customers' behaviors are constantly changing. Research has also been done to evaluate employee's perception of service quality as an internal customer. Cai and Jun (2010), investigated six service dimensions to identify which factor had the most

significant impact on employee satisfaction and service quality in the procurement industry, by applying the SERVQUAL quality measure to analyze each dimension. The authors suggested that it's necessary for managers to develop and implement quality concepts that meet the needs of their internal and external customers if they want to continuously improve service quality. Past discussions have presented debates as to which quality metrics yield the most accurate measurement of service quality; SERVQUAL or SERVPERF (Cai and Jun, 2010). However, this study does not examine how service quality influences customer satisfaction and only focuses on how employee satisfaction relates to quality. Carriallat, Jaramillo and Mulki (2009), investigated how measurement tools chosen to evaluate quality can affect the validity of customer satisfaction, loyalty and purchase intention. The authors suggests that in order to strengthen the validity of results obtained from the SERVQUAL or SERVPERF method adjustments and modifications must be made to fit the context of the study conducted (Carriallat, Jaramillo and Mulki, 2009). However, this study does not identify which tool is more effective at measuring service quality. In contrasts to Carriallat, Jaramillo and Mulki study, other research studies conducted on service quality applies additional tools such as the GAP analysis to evaluate the validate the differences identified between customer expectations and perceptions. Although prior studies discuss service quality, satisfaction, and how they relate to understanding customer behavior, a study conducted by Hu, Juwaheer and Kandampully (2009) investigated how service quality and perceptions of value affect the customer and the firm's reputation. The authors propose a model that reveals the benefits of delivering high quality services. This study suggests that high service quality creates value and as a result customers are satisfied and easier to retain (Hu, Juwaheer and Kandampully, 2009). Hu, Juwaheer and Kandampully investigation revealed that customer satisfaction had a positive effect on reputation and reputation had a positive impact on customer retention. The authors also note that managers will have to make tradeoffs between quality and price in

order to maintain a positive image in the eyes of the customer. Although this study discussed the impact of high service quality on customer satisfaction, it was limited to the hospitality industry and did not consider the findings from other service industries. In addition, there was no discussion on quality, value and customer satisfaction influence on a firm's profitability.

Implications for Research

Over the course of three years, the MICC Center has lost older employees to retirement, leadership has changed and younger employees are advancing in their careers rapidly. As a result, these major changes have compromised the quality of services provided to the customers. Due to a younger workforce replacing a retiring workforce, employees lack the skills and expertise to adequately advise the customers with new requirements. Employees are lacking in these areas as a result of a flawed training program, therefore entry-level employees coming into the workforce aren't provided with the proper tools to meet the needs of the customer. According to Foster (2010), lack of communication with employees that interact with customers can lower service quality (Foster, 2010). Leadership has failed to take the initiative to encourage communication and support for on the job training so service quality suffers, because the customers are not receiving what they need on time. At the Army level, senior leadership has attempted to deploy internet-based surveys for customers and employees to respond to. However, these measures are unsuccessful because the data is not analyzed and reported back to the sampling agencies for corrective action. Although there are many methods available to analyze service quality, Pan and Kuo (2010) suggest evaluating nine service dimensions; tangibles, reliability, responsiveness, communication, credibility, security, competence, courtesy and understanding the customer. In regards to federal contracting agencies, leaders approach quality issues with a reactive approach and do not consider conducting an assessment of the service dimensions mentioned

above. Most of the managers leading these federal agencies lack knowledge and expertise managing quality, so they fail to properly use quality measures to assess how well they're meeting the customers' needs. Contributions to existing research conducted by authors such as Hu, Juwaheer and Kandampully (2009) will expand on service quality by examining the perceptions and expectations of external customers within a federal service agency. In contrasts to the study conducted by Jun and Cai (2010), this study will also conduct an analysis to assess the customers' perceptions and expectations of the MICC's level of service quality using a SERVQUAL survey to collect data and a GAP analysis to determine which service dimensions require quality improvements.

In this study, data was collected from a focus group of 17 customers working in the project office to determine customers' expectations and perceptions of the level of service quality received from the MICC center. All participants were required to define what they thought were critical service quality dimensions. Prior to issuing the surveys, a total of 6 service quality dimensions indentified below were selected for evaluation in this study.

MICC Center Service Quality Dimensions	
Reliability	Ability to develop realistic project milestones and meet deadlines
Responsiveness	Ability to return phone calls and emails to resolve issues promptly
Competence	Specialized and technical expertise with federal regulations, guidance and policies
Communication	Ability to keep customer's informed of policy changes and issues impacting requirements
Understanding the Customers Requirement	Dedication conducting acquisition planning with the customer and providing recommendations to expedite the procurement process
Streamlined Review Process	Length of time to obtain senior leadership review and approvals before solicitations and contract awards are released.

A three page survey assessing customer perceptions and expectations was issued to the focus group containing a seven point Likert scale ranging from 1=strongly disagree to 7=strongly agree. Participants were requested to rate the overall quality of the MICC's services on a 7

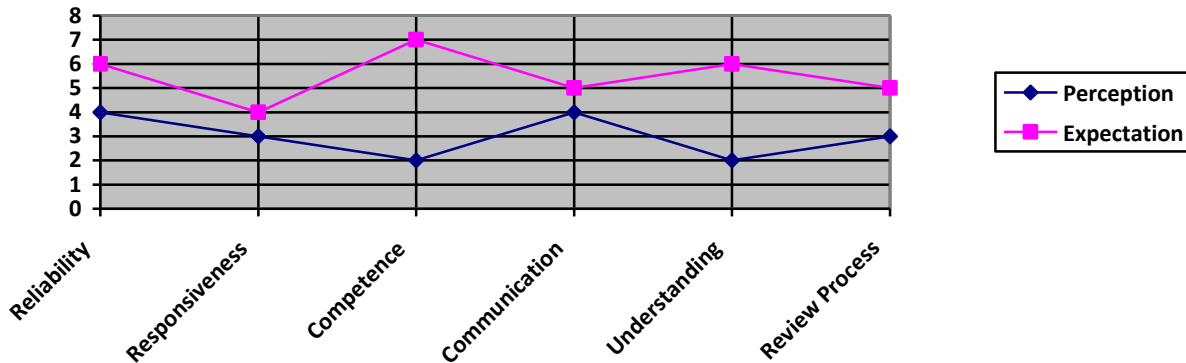
point scale ranging from 1=very poor to 7 =very good and their satisfaction with processes and procedures on a 7 point scale ranging from 1=very dissatisfied to 7= very satisfied. Initially, a sample of 25 participants was randomly selected from the global email directory. However, only 17 customers agreed to participate. As a result, there was a 68% response rate. In order to collect data, the SERVQUAL survey used in previous studies performed by Cai and Jun (2010) and Carriallat, Jaramillo and Mulki (2009) was also used in this study to determine how customers perceive the overall service quality provided from the MICC. In addition, a Gap analysis was performed on the perceptions and expectations of MICC customers to pin point which service dimensions required improvement. Based on the responses, the averages and differences were computed for each dimension. The results indicated that the greatest negative relationship existed between customers' perception and expectation of competence and understanding the customers' requirement. The customers' perception and expectation of reliability also reflected a negative relationship but the difference was not as significant as competence and understanding the customers' requirement. The difference in responsiveness, communication and the review process indicated that these dimensions will have little to no impact on the improvements that need to be made to the organization's service quality process since the gap in expectations and perceptions are larger. Although customers have high expectations for responsiveness and the review process, their perceptions were low in these area.

Analysis of Customers Average Perception and Expectation of MICC Service Quality

Service Dimensions	Average Perception	Average Expectation	Difference
Reliability	4	6	-2
Responsiveness	3	4	1
Competence	2	7	-5
Communication	4	5	0
Understanding Customer	2	6	-4

Requirement			
Review Process	3	5	-2

MICC Customers' Average Perception and Average Expectation



Limitations of Current Study

Due to time constraints, a limited amount of data was collected to contribute to the existing body of research on service quality. Typically, a desired sample size should consist of around 50 to 100 samples (Foster, 2010) however, only 17 customers agreed to participate, therefore the small sample size represents a limitation for the current study. Similar to June and Cai (2010) study conducted on service quality in the public sector, the data collected for this research was restricted to one service firm. In addition, private and non-profit service firms were excluded due to the short amount of time allotted to collect research. In an effort to collect the most recent data, only the perceptions of customers currently receiving procurement services from the MICC were evaluated. However, this also represented a limitation to the current study since some of the customers previously receiving service were transferred to the Air force and were not requested to participate. Although the study indicates that service quality influences customer satisfaction, no discussion was provided as

to how employee satisfaction influences quality and relates to customer satisfaction in the public sector.

Future/Related Research Topics

Although previous research was conducted to evaluate employee's perception and expectation of service quality, additional research should be considered to discuss how employee satisfaction influences customer satisfaction. Since many organizations trying to implement quality management concepts aren't always successful due to leadership style, ambiguous organizational goals and the lack of sustaining customer driven quality concepts (Mohammad and Rad, 2006), a more in depth evaluation of the impacts of poor leadership as discussed by Abratt, Dion and Molinari (2008) should be further investigated to determine the relationship between poor leadership and employee/customer satisfaction. In addition, a further investigation of Hu, Juwaheer and Kandampully (2009) should also be evaluated to encompass how service quality affects customers' behavior in the public and private sector.

Implications for Management

Managers leading service firms in the acquisition and procurement industry should recognize the importance of service quality and its impact on customer satisfaction by analyzing the service dimensions that drive customer satisfaction. Leadership should know that service customers tell twice as many people about bad service experiences (Foster, 2010). In order for firms to retain their customers, managers should acknowledge that "complaints should be viewed as opportunities to improve" (Foster, 2010, p.135). If leaders want to maintain a competitive edge in a fast changing market total quality management is a strategy that should be implemented into their organizational culture (Mohammad and Rad, 2006). In order to identify strengths and weakness in service quality, leadership should conduct internal surveys or audits with customers and employees. Secondly, managers need to categorize the organizations strengths and weakness in terms of resources and capabilities

(Foster, 2010). In addition, an investigation should be held to determine how well the firm is performing in the market and finally, leaders need to evaluate the organization's strategy to determine if leadership is customer focused (Foster, 2010).

Lessons Learned

It's important to note that within the service industry, quality issues can manifest in many different areas. According to Hu, Kandampully and Juwaheer (2009), management focus should be satisfying the customer in order to gain their loyalty and increase their perception of service quality. Therefore, it's imperative that firms are able to provide high quality services by meeting their customer needs in a constantly changing environment. Leadership must proactively redefine their quality priorities by focusing on quality improvements (Ebert, 2010). Unfortunately, organizations following a reactive approach will continue to experience an increase in quality issues that eventually exceed the quality of service. So in order to prevent loss of customers, employees and sales, firms have to invest in quality early. However, as stated by Ebert (2010), "if you simply pour more money into find-and-fix, you reach a point of diminishing returns. But if you reconceptualize your quality function to proactively engage with customers with a strategic cross enterprise focus and a rejuvenated quality culture, you can reap far-reaching benefits" (Ebert, 2010, p.260).

Another point to note is that quality measures allow firms to assess the level of quality in their organizations. In order to identify potential shortfalls, firms must collect and analyze data from their customer's if they want to understand their behavior, perceptions and needs. Soliciting feedback through the use of focus groups or SERVQUAL surveys can help gain insight into areas that require quality improvements. In addition, as suggested by Cai and June (2010) and Carriallat, Jaramillo and Mulki (2009), GAP analysis serve as useful quality measure for identifying differences between managerial and customer perceptions of service quality.

According to Foster (2010), “gaps are important in that once a gap is identified it is a candidate for corrective action and process improvement” (p.137). When applying GAP analysis, firms should be aware that large gaps indicate exceptional service quality and small gaps indicate poor service quality.

Conclusion

Summary of findings

Due to poor training programs, lack of initiative and knowledge about quality concepts and measures; the acquisition workforce continues to have challenges with improving service quality and meeting the needs of their customers. This study conducted on the MICC’s poor service quality revealed that the level of competence and understanding of the customers requirements is having a negative impact on customer satisfaction. As a result of a retiring workforce and a less experienced staff, service quality is comprised in the areas of competence and the ability to understand the customer’s requirement. In addition, employees are overworked due to a massive increase in turnover, therefore the organization cannot devote the amount of time necessary to become familiar with new projects and adequately meet project deadlines. Customers are not getting the ample amount of time they need from employees and leadership to engage in acquisition planning early. Based on the results, customers are not satisfied with the MICC’s level of competence and their ability to understand requirements.

Limitations of this Study

The validity of this study is limited to the small sample size that was collected for evaluation. The MICC has undergone reorganization and over 40 employees along with the customers they supported were transferred to the Air Force and were not accessible to contact and request input. In addition, a typical sample size should range from 50 to 100 (Foster, 2010), but only 17 customers out of 25 agreed to participate. Therefore, the focus group could only contain 17 customers randomly chosen from three project offices. Limitations exist because the data

collected may have revealed different results if the sample size was larger. For example, if a larger sample was collected, significant differences in other service dimensions may have been identified besides the two that were revealed in this study. Also, if the survey was not conducted in a group setting, some customers may have provided different responses. The focus group may have limited the data collected, because participants may have felt influenced to respond negatively or positively on questions they weren't unsure about.

Implications for the literature

This study contributes to the current body of research conducted on service quality by investigating how poor service quality effects customer satisfaction in the public sector. The investigation supports prior research and theory that suggest service quality is the driving influence for customer satisfaction. Six service dimensions were evaluated similar to the study conducted by Cai and Jun (2010) on employee satisfaction to determine which areas needed significant quality improvements at the MICC. The study revealed that based on the customer's perceptions and expectations, the service dimensions requiring significant improvement were the level of competence and employees knowledge about the customers' requirement. In comparison to previous studies conducted by Abratt, Dion, Molinari (2008), Cai and Jun (2010) and Carriallat, Jaramillo and Mulki (2009), the quality measure used to determine the results were the SERVQUAL survey to collect the data and the Gap Analysis to assess how the customer viewed the overall quality of service received from the MICC Center.

Actions to be taken

Recommend the MICC attempt to improve all areas of service quality by implementing quality standards that are measurable and attainable (Hu, Juwaheer and Kandampully, 2009). Leadership needs to break out of reactive mode and be proactive about improving on the job training and taking the initiative to actively recruit qualified specialist that can add value to the organization's procurement processes. Senior leadership needs to conduct a climate survey to indentify the shortfalls within management's leadership styles and techniques. Past

mistakes made should be documented and reviewed as lessons learned in an effort to prevent the same mistakes from reoccurring again in the future. Implementing customer driven quality concepts such as focus groups and surveys need to be set in place immediately to gather and collect feedback from internal/external customers. According to Cai and Jun (2010), assessing internal and external customers perceptions and expectations of service quality can result in improved service quality. Benchmarking is also another technique that should be considered to evaluate how other successful service firms in private and public industry apply quality concepts and theory (Foster, 2010). Benchmarking could enable managers to learn the processes and techniques used by other service firms to assist them with ways to improve leadership techniques, recruitment strategies, time management and training programs that will increase customer satisfaction. As stated by Foster (2010), “benchmarking can be used to observe the practices of others and achieve even higher levels of performance” (Foster, 2010, p.478).

Method of Application

In order for the MICC to improve their service quality, they will have to employ total quality management strategies that are quality oriented and customer focused (Byrde and Robinson, 2007). These strategies will have to identify and address the shortfalls contributing to customer dissatisfaction with employees’ level of competence and lack of understanding requirements. One way management can improve the level of competence would be by conducting a quality assessment of the training program to gain an idea of employees’ perceptions and expectations of the training currently in place. The areas identified as fail points should be revamped to improve areas that are not meeting the needs of the employees. Revising the organizational strategy by accounting for quality related costs, such as turnover and training could help retain customers and employees (Hu, Juwaheer and

Kandampully, 2009). When potential risks are assessed early on, managers are in a better position to mitigate risks before the firm is trapped in reactive mode.

Managers should take time to conduct surveys to measure customer expectations and perceptions in order to know what will satisfy their customers. The SERVQUAL survey used to assess quality of services can be provided to employees and customers to pin point discrepancies in the quality of services. The implementation of total quality management concepts that focus on sustainment, team work, training, continuous education and communication can help increase customer/employee retention (Byrde and Robinson, 2007). A GAPS analysis is one approach useful in evaluating service quality (Foster, 2010). Depending on the gap between management and customer perception this approach can reveal whether or not a firm's service quality is high or low and what area needs significant improvements. In order to last in the service industry, leadership has to work towards perfecting the processes that drive quality and influence customer satisfaction. Service dimensions influencing reliability, responsiveness, competence, understanding, credibility and tangibles must be evaluated and assessed before changes can be implemented (Mohammad and Rad, 2006). MICC leadership will need to focus on revamping the training program to improve on the job training by assigning mentors and setting standardize policies in place that will help improve the training process. The organization will also need to redefine its recruiting tactics by offering incentives and bonuses that will make them more competitive and attractive to qualified candidates seeking career opportunities in acquisition. In order to improve quality, leadership will have to be proactive in their approach by conducting an internal analysis, implementing a quality driven strategic plan and adapt to change quickly if they want to sustain a higher level of quality that will satisfy the needs of their customers.

References

- Abratt, R., & Dion, P., & Molinari, K. L. (2008). Satisfaction, quality and value and effects on repurchase and positive word-of mouth behavioral intentions in a B2B services context. *Journal of Services Marketing*, 22(5), 363-373. doi: 10.1108/08876040810889139
- Byrde, J.D., & Robinson, L. (2007). The relationship between total quality management and the focus of project management practices. *The TQM Magazine*, 19(1), 50-61. doi: 10.1108/09544780710820835
- Cai, S., & Jun, M. (2010). Examining the relationships between internal service quality and its dimensions, and internal customer satisfaction. *Total Quality Management*, 21(2), 205-223. doi: 10.1080/14783360903550095
- Carrillat, A. F., & Jaramillo, F., & Mulki, P. J. (2009). Examining the impact of service quality: a meta-analysis of empirical evidence. *Journal of Marketing Theory and Practice*, 17(2), 95-110. doi: 10.2753/MTP1069-6679170201
- Foster, S. T. (2010). *Managing quality: Integrating the Supply Chain*. Upper Saddle River, NJ: Pearson Prentice Hall
- Hu, H., & Juwaheer.D.T., Kandampully.J. (2009). Relationships and impacts of service quality, perceived value, customer satisfaction, and image: an empirical study. *The Service Industries Journal*, 29(2), 111-125. doi: 10.1080/02462060802292932
- Kuo, T., & Pan, J. (2010). Developing a new key performance index for measuring service quality. *Industrial Management and Data Systems*, 110(6), 823-840. doi:10.1108/02635571011055072
- Mohammad, A., & Rad, M. (2006). The impact of organizational culture on the successful implementation of total quality management. *The TQM Magazine*, 18(6), 606-625. doi: 10.1108/09544780610707101

ADOPTION OF ELECTRONIC TAX FILING: THE IMPACT OF TRUST

Helen M. Moshkovich, Alexander I. Mechitov
Stephens College of Business, University of Montevallo, Montevallo, AL 35115, 205-665-6546,
MoshHM@montevallo.edu, Mechitov@montevallo.edu

ABSTRACT

In 1998 US Congress passed the Internal Revenue Service Restructuring and Reform Act. One of the goals was to reach 80% online tax return filing by 2007. In 2008 only 60% of tax returns were filed electronically. Only in 2012 this rate reached the 80% goal mostly due to the requirement for certified preparers to use e-filing. The goal now is to make those taxpayers who prepare and file taxes themselves to use more e-filing.

Tax return is one of the most widespread forms of interaction with the government. In using electronic systems to file tax returns, taxpayers engage in e-government. There is a free e-file system endorsed by IRS, some companies also provide free e-file opportunities for low income taxpayers.

As an electronic technology, e-filing was studied within the framework of technology adoption models including TAM, UTAUT, and different modifications of the two. Leading studies on e-government stressed the importance of trust in the adoption of government electronic initiative. At the same time, majority of studies on electronic tax filing concentrated on the “trust in government” and “trust in Internet” as main representative concepts of this trust.

In this study we used 190 students who are eligible for a free online tax filing to study classical interpretation of trust beliefs introduced by McKnight et al. (2002) for e-commerce on the intention to use the electronic tax filing system:

- 1) Benevolence – belief that the system will act in the user’s best interest and give the user some advantage
- 2) Competence – belief that the system has the ability to help the user in the task
- 3) Integrity – belief that the system will provide unbiased results to the user.

Preliminary results support the importance of these antecedents to trust beliefs with benevolence and integrity being the more important ones.

The results of the study may help better understand what to do to improve the trust in e-filing for individual taxpayers.

Key words: e-file, e-government, trust, technology adoption

Sustainability and Corporate Responsibility: is there enough progress?

Erika Holmes
Christopher Ziemnowicz
The University of North Carolina at Pembroke
School of Business
ziemnow@uncp.edu

Abstract

There is an increasing awareness among top executives of large firms concerning the role of corporate environmental strategy and their sustainability efforts to secure continuing organizational performance. This paper seeks to answer the question: Are companies taking action toward sustainability? The information gathered for this article is from the World Business Council for Sustainability Development's Vision 2050 project, the Ceres Roadmap for Sustainability, as well as secondary data from other independent sources. This review Explores some of the trends in corporate sustainability programs and is an exploratory effort to measure the level of engagement and progress being taken by decision-makers including sustainability policies within their firms. The preliminary results indicate that many companies are making progress. Nevertheless, the actual trends, as well as expert opinions, indicate much more work is needed to achieve real progress.

Introduction

An increasingly important stream of management responsibility is in sustainability and the associated aspects social responsibility. Taking meaningful and concrete steps require all companies to examine the challenges of implementing sustainability in a variety of contexts. Strategies must be developed that include perspectives and aspects of climate change, energy use, natural resource use, ecosystems/land use, and many other related factors. For some corporations, this is completely new, while others have been incorporating these into their strategies for some time. This paper seeks provide some insight into whether corporate leaders are making adequate progress towards sustainability. This is an important aspect given the global efforts to overcome some of the apparent rollback of sustainability policies given the problems of the current economic crisis. Corporate executives need to be among the leaders and act as change agents to develop and implement the necessary strategies and corporate transformation.

The purpose of this study is to review corporate sustainability efforts and identify areas in need of additional focus. The timeframe to help determine whether progress is sufficient is offered by such frameworks as Vision 2050 and the Ceres Roadmap to 2020, along what is presently known about corporate practices and their implementation, as well as expert opinions. The approach used with this paper was to collect data concerning these issues and identify trends related to sustainability practices and beliefs. The paper relies secondary data and key findings of notable organizations and experts to establish trends and provide support for the final analysis.

There is a wealth of literature and websites devoted to discussing sustainability, corporate responsibility, and “going green.” The following are a few of the organizations providing platforms for dialog, framework, solutions, trends, challenges, and research data:

- The United Nations Environment Programme (UNEP)
- World Business Council for Sustainable Development (WBCSD)—“Vision 2050: A New Agenda For Business
- Ceres—“The 21st Century Corporation: The Ceres Roadmap for Sustainability”
- GlobeScan and SustainAbility research organizations—“Down to Business: Leading at Rio+20 and Beyond”
- Corporate Responsibility Magazine—“The State of corporate Responsibility: Setting the Baseline.”
- Ernst & Young survey of company executives and thought leaders regarding environmental strategy and performance.

These sources also provide some insight into the current sustainability and social responsibility beliefs, and practices at many institutions. They also provide information and some measures of what has been done, as well as goals that still remain to be accomplished, to achieve the Vision 2050 scenario. This is the goal that by 2050, *approximately nine billion people will be living well upon the earth, with plenty of food and water, education, and healthcare, and resources will not go beyond what our planet can sustain.*

Article Reviews

The articles reviewed below are written from both empirical and theoretical perspectives. The data is verifiable and methodologies are included for each article. Information is obtained from notable resources such as World Business Council Sustainability Development (WBCSD) members, and Ceres, a well-known sustainability organization. They are theoretical in that they address sustainability dialog and frameworks based partly on theories derived from research, as well as ideas that have been gathered from experience. The reviewed articles also included introductions to the subject and sustainability related information. The discussion and conclusions reached from these independent studies also contained graphical depictions for increased clarity. The Vision 2050 scenario also offers new information in various newly developed pathways to sustainability. The WBCSD members believe their new pathway and its elements present many opportunities: “to do more with less; to create value; and to advance the human condition.” Although most of its ideas are not new, the Ceres Roadmap to Sustainability offers twenty key sustainability expectations. These can be used as a progressive guide for measuring sustainability efforts.

The Vision 2050 Project is a collaborative effort among World Business Council Sustainability Development (WBCSD) members from 29 countries to establish scientific global predictions and pathways to achieve sustainability by the year 2050 (WBCSD 2010). It offers ideas concerning “fundamental changes in governance, structures, economic frameworks, and business and human behavior (WBCSD 2010). It provides insight into how to accomplish sustainability and business roles in the process among other information. The report is not a blueprint, but it does presents nine critical pathways for success in reaching the future goal (WBCSD 2010). The main purpose of this report is to provide a tool for dialog concerning

sustainability, to address numerous questions about the future, as well as to lessen the gap between business practices and the new dilemmas that the quest for sustainability will introduce (WBCSD 2010).

The effort makes use of science data to predict that Earth will have approximately nine billion people in less than forty years. The effort is to prepare for a scenario that the entire global population will be living with good living standards that include sufficient food and water, education, and healthcare, as well as the use of resources will not go beyond what our planet can sustain (WBCSD 2010). Vision 2050 offers a “best case scenario” of the global landscape in the next 40 years in two timeframes that are described as the Turbulent Teens (from 2010 to 2020) and Transformation Period (from 2020 to 2050) (WBCSD 2010). The Turbulent Teens is described the era for developing dynamic ideas and establishing the global vision and collaborative relationships (WBCSD 2010). The first decade of the Transformation Time will consist of gaining more “consistent knowledge, behavior, and solutions.” It will also be a time of change: “climate, economic power, population, and fundamental market change the redefine values, profits, and success” (WBCSD 2010).

Ceres is a promoter for sustainability leadership. Ceres networks with investors, companies, and public interest groups to hasten and develop the adoption of sustainable business practices and resolutions in order to help shape a vigorous global economy (www.ceres.org 2012). The report “The 21st Century Corporation: The Ceres Roadmap for Sustainability,” focuses on “setting new standards and expectations for business leadership” (Ceres 2010). It serves a guide for companies to address comprehensive sustainability, extending from top-level managers and corporate boards of directors, down to the supply chain (Ceres 2010). Its 20 key expectations relate to governance, stakeholder engagement, disclosure, and performance. Their definition of governance in this area within companies relates to sustainability integration concerning management structures, goal-setting, and strategic decision-making. Stakeholder engagement addresses how companies can use it proactively to assess the “relative importance of specific goals and the effectiveness of strategies” (Ceres 2010). Disclosure is addressed through emphasizing the need to divulge critical information to stakeholders and demonstrate commitment to sustainability (Ceres 2010). The report offers several key areas as well as expectations for measuring a firm’s sustainability progress.

The survey conducted by Ernst & Young (2011) in cooperation with GreenBiz Group asked executives and leaders of large and mid-sized firms regarding their corporate environmental strategies and performance. It indicated that firms are developing corporate sustainability programs despite the perceived decreasing chances of regulations in the United States to address climate change issues. The survey found that corporations are interested in reporting their greenhouse gas emissions and their reduction efforts, as well as working on improving their water usage and other elements for greater efficiency and their stewardship. Also notable are the stakeholder interests in the sustainable sourcing. A major question was the continued availability of raw materials that are intrinsic to firm’s ability to operate. This report indicated a growing number, interest, and weight of the sustainability inquiries and questionnaires received by the companies from their customers, investor groups and analysts, as well as various media and other outside organizations.

Analysis

The method for analysis for this overview concerning the progress toward sustainability and evaluating this corporate responsibility was to review secondary corporate and expert sustainability data. The analysis of these independent reports could then point out trends and provides some insight as to whether corporations are on a progressive schedule to sustainability. Data was obtained from “The 21st Century Corporation: The Ceres Roadmap for Sustainability,” “Down to Business: Leading at Rio+20 and Beyond,” the Corporate Responsibility Magazine’s “The State of corporate Responsibility: Setting the Baseline,” and the Ernst & Young survey of executives at large and midsized corporations. It was not feasible to include all of the data results from each survey and report; therefore, selected data was used within the analysis based on relevance. The full survey and individual results are available within each of the original reports.

Results

Time Frames

The two timeframes are taken from Vision 2050: the Turbulent Teens, from 2010 to 2020 and Transformation Time, from 2020 to 2050. The Turbulent Teens is best characterized as a period of “crisis, clarity, action,” resulting in the “rebuilding the economy, with new rules and businesses working to make sustainability an easier choice” (WBCSD 2010). Therefore, it is a time for dynamic ideas and establishing the global vision as well as forming collaborative relationships (WBCSD 2010). The first decade of the Transformation Time will be characterized by the phrase: “success builds confidence and momentum” (WBCSD 2010). It will be a time of innovation; renewal; and systems change, with healthier, wealthier people and a vibrant path for businesses (WBCSD 2010). The Transformation Time will consist of gaining more “consistent knowledge, behavior, and solutions,” and it will also be a time of change: “climate, economic power, population, and fundamental market changes the redefine values, profits, and success” (WBCSD 2010).

The Ceres Roadmap to Sustainability offers 2020 as a timeframe for tracking sustainability progress using twenty expectations. Assessments include specifics relating to sustainability governance, stakeholder engagement, disclosure, performance, and other practices. An example of a measured operations expectation would be: “Obtaining at least 30% of energy from renewable sources” (Ceres 2020). On the other hand, the Ernst & Young survey was concerned with a much shorter time horizon in the opinions of the corporate executives. It revealed an immediate concern about corporate sustainability policy issues because over three quarters of the decision-makers surveyed already anticipate natural resource shortages that will adversely affect their core business objectives over the next three to five years.

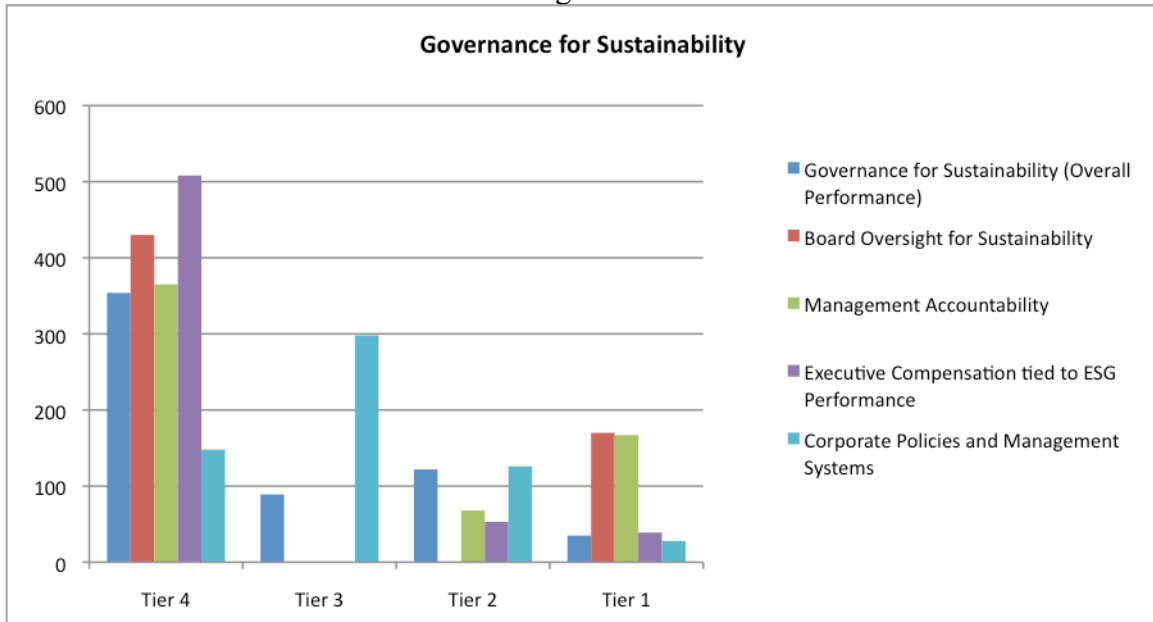
The Data

The 21st Century Corporation: The Ceres Roadmap for Sustainability

This survey evaluated 600 large, U.S. companies from 19 industrial sectors to determine whether they are meeting 21st century sustainability efforts. The report was conducted and

evaluated by analysts at Sustainalytics, an independent environmental, social, and governance (ESG) research provider. It stratified the organizations surveyed into four “tiers” that ranged from the lowest to most advanced depending on their level of activity in sustainability. These were informatively named: starting out, getting on track, making progress, and setting the pace.

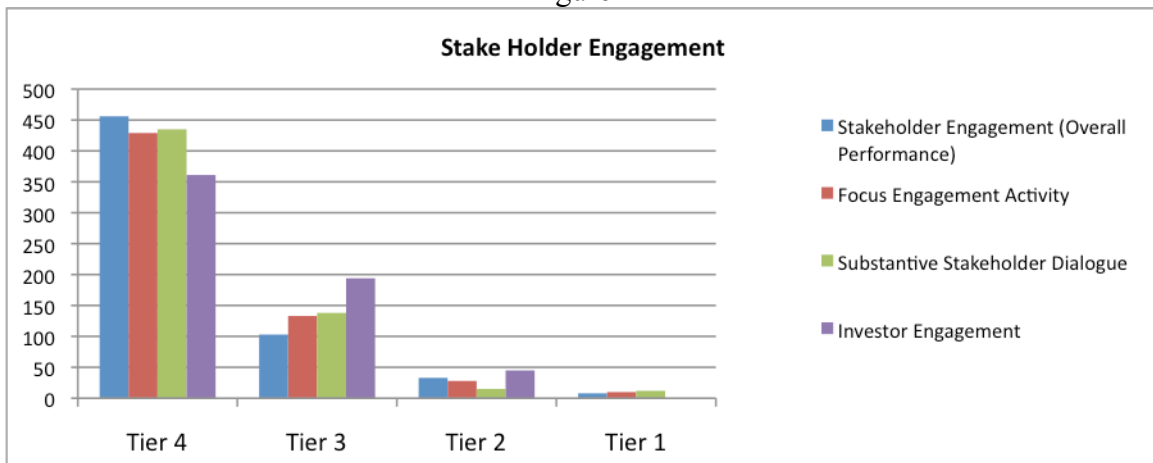
Figure 1



Tier 4 = Starting out **Tier 3 = Getting on track** **Tier 2 = Making Progress** **Tier 1 = Setting the pace**

Figure 1 illustrates that most organizations are just starting out in this process at Tier 1. They have executive compensation tied to ESG performance, board oversight for sustainability, management accountability, and overall governance for sustainability. However, there are some that have reached the highest tier and are setting the pace. These focus on board oversight and management accountability for their sustainability governance.

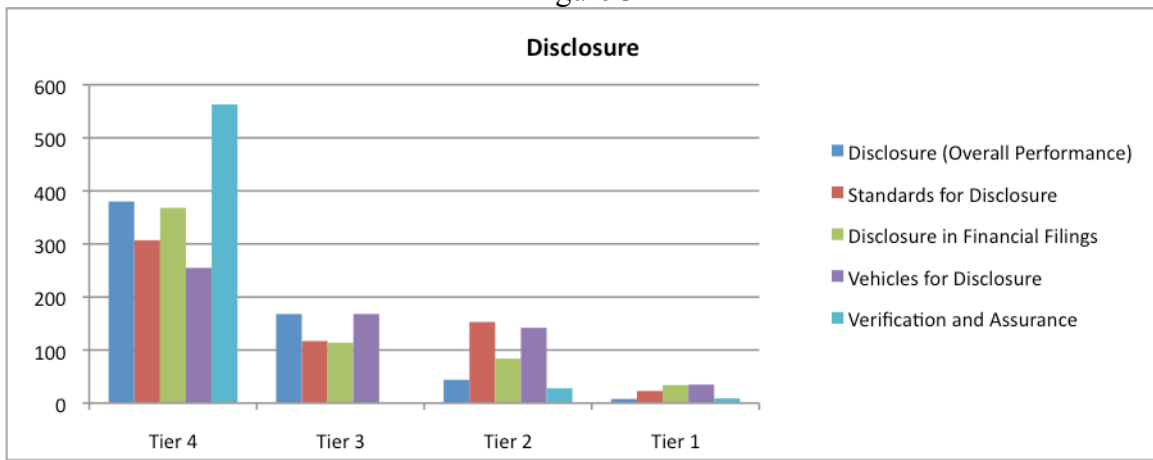
Figure 2



Tier 4 = Starting out **Tier 3 = Getting on track** **Tier 2 = Making Progress** **Tier 1 = Setting the pace**

Stakeholder engagement is performed by various activities and dialogue with interest groups, and most particularly with the company’s investors.

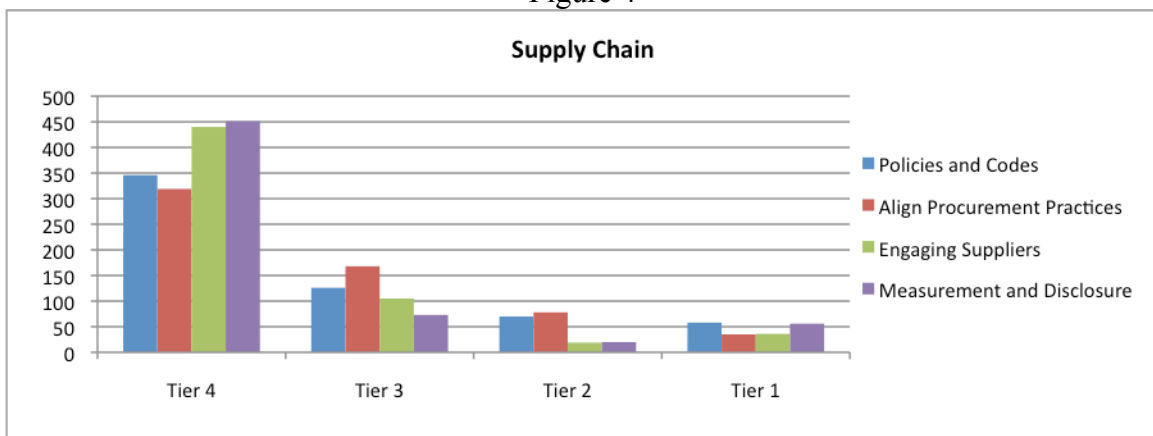
Figure 3



Tier 4 = Starting out **Tier 3 = Getting on track** **Tier 2 = Making Progress** **Tier 1 = Setting the pace**

Figure 3 shows that verification and assurance are the main forms of disclosure in Tier 4 organizations, those starting out. Although overall performance in disclosure is high in Tier 4 and 3 organizations, standards for disclosure, financial filings, and vehicles for disclosure are higher in Tier 2 and 1 than the role of verification and assurance. Those organizations may have more experience in various measures and effective vehicles for sustainability disclosure.

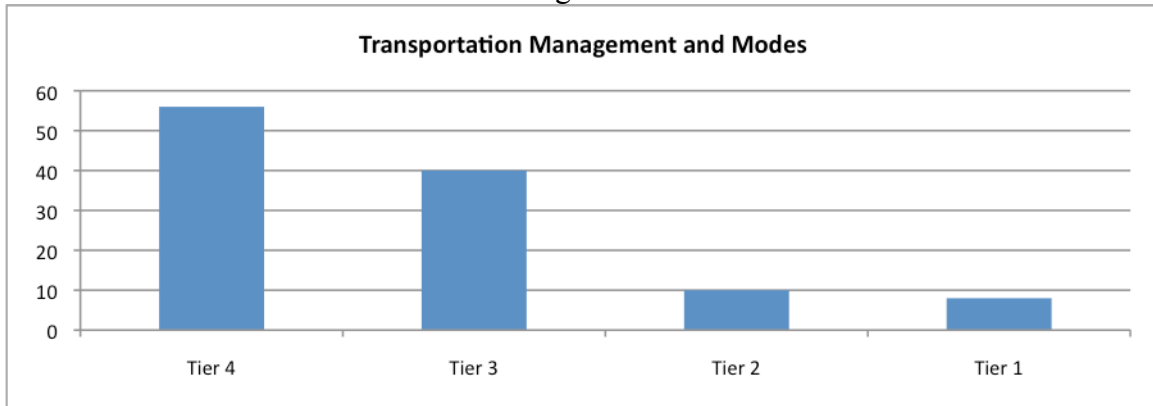
Figure 4



Tier 4 = Starting out **Tier 3 = Getting on track** **Tier 2 = Making Progress** **Tier 1 = Setting the pace**

Figure 4 shows that the supply chain is an important factor in sustainability efforts. Tier 1 organizations are mainly focused on measurement and disclosure along with engaging their suppliers, while developing their policies and codes. They have relatively less emphasis on aligning their procurement policies. On the other hand, Tier 3 and 2 firms are most concerned to align their procurement policies for greater sustainability. Developing policies and codes as part of their supply chain is most important for companies that have reached Tier 1.

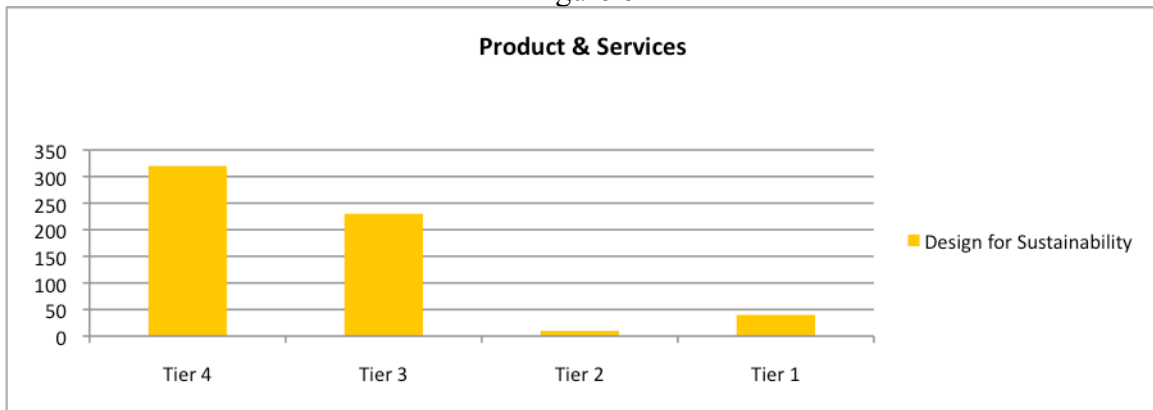
Figure 5



Tier 4 = Starting out **Tier 3** = Getting on track **Tier 2** = Making Progress **Tier 1** = Setting the pace

Figure 5 shows that firms are examining transportation management and modes. This is often a significant component and has a direct effect on not only enhancing sustainability efforts by reducing energy use, but also for achieving significant savings that enhance their financial performance. Figure 6 indicates that firms are examining their products and services to build in design for sustainability.

Figure 6



Tier 4 = Starting out **Tier 3** = Getting on track **Tier 2** = Making Progress **Tier 1** = Setting the pace

All of the six major areas of assessment and sub areas had the majority of companies within the Tier 4 group. Two additional assessment areas, “Training and support” and “Performance operations” followed the same trend, denoting that most companies are presently “starting out” with sustainability and social responsibility efforts. Tier 3 had the second largest group, followed by tiers 2 and 1, respectively.

Down to Business: Leading at Rio+20 and Beyond

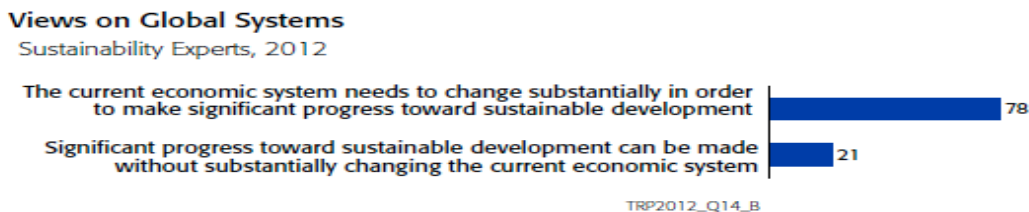
The data was obtained through a collaborative effort of GlobeScan and SustainAbility research groups. They conducted a series of surveys involving 1,600 sustainability experts representing 117 countries. The purpose was to rate the sustainability performance of various organizations that included national governments, private sector, media, non-governmental organizations, and many others that were grouped into 13 distinct categories.

Figure 7



According to sustainability experts, non-governmental organizations, and social entrepreneurs are the top performers on sustainability issues. The private sector, multilateral institutions, international financial institutions, and national governments had the lowest performance ratings.

Figure 8



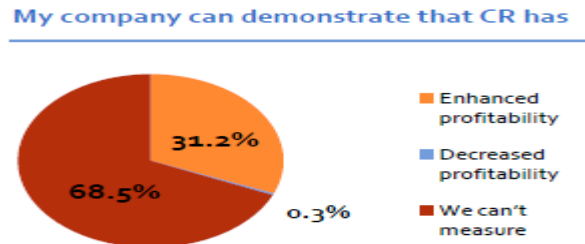
The vast majority (78%) of sustainability experts believe that our current economic system needs to undergo substantial changes in order to make the appropriate sustainability progress.

Corporate Responsibility Magazine's: Setting the Baseline

Data was obtained through collaborative efforts among The Corporate Responsibility Officers Association (CROA), NYSE Euronext, and SharedXpertise Media. The results provide insights into corporate responsibility practices at 650 companies from a variety of industries around the world, including the United States, Western and Eastern Europe, Canada, Latin

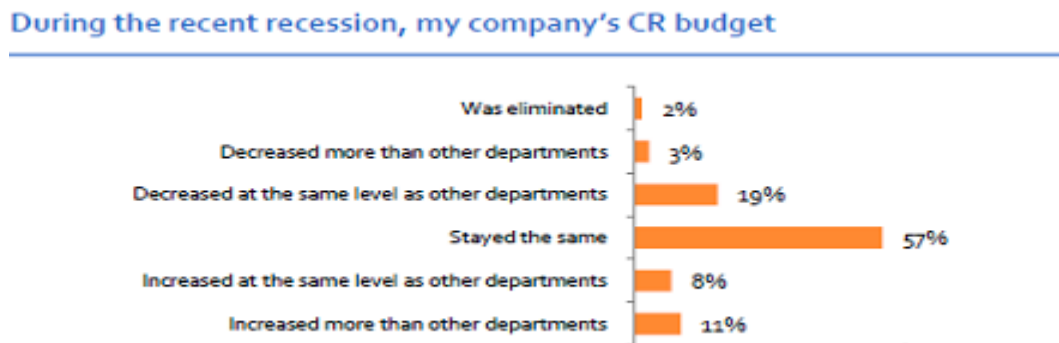
America, Asia Pacific/Australia, and Africa. The largest group of responses obtained in this report was from the United States, followed by Western Europe. Africa was least represented.

Figure 9



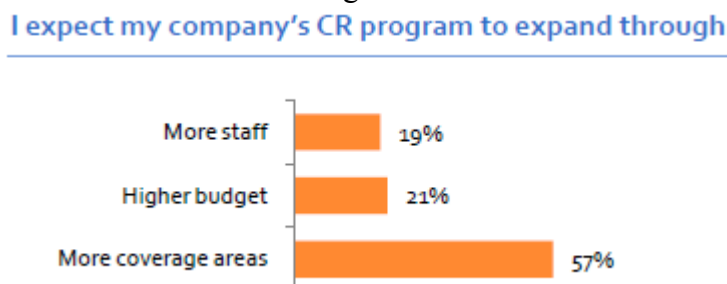
Over 30% of companies report that corporate responsibility practices have increased their profits; however, nearly 70% cannot measure their efforts and 0.3% say CR practices have decreased profitability.

Figure 10



During the global recession, the majority of CR budgets remained untouched. Higher percentages were decreased than increased. Over twice as many budgets decreased at the same level as other departments (19%) were increased (8%). Nearly three times as many CR budgets increased more than other departments than decreased, and 2% were eliminated altogether.

Figure 11



A significant proportion (57%) of the CEOs expect to expand their CR programs over the next three years. Data from the report reveals that 48% of CR programs do not have a “dedicated budget.”

This is confirmed by the Ernst & Young (2011) survey. Trends suggest that sustainability efforts are now well integrated into the corporate fabric of a growing number of large and mid-sized companies. Exploring corporate sustainability programs, action still needs to be taken. For example, 76% of the Ernst & Young respondents anticipate natural resource shortages will affect their core business objectives over the next 3-5 years.

Discussion

The 21st Century Corporation: The Ceres Roadmap for Sustainability

The results of the Ceres Roadmap data established a trend in that the majority of the corporations assessed were in the first tier, “Starting Out.” There was also a trend present in that there were very few corporations in the fourth tier, “Setting the Pace.” Board oversight for sustainability had the highest of the tier 4 ratings, while executive compensation tied to ESG performance was the worst performing area in tier 1, at 508. These trends support the notion that there is substantial progress to be made in each sustainability area assessed. Similar trends exist within the original report that includes the entire data set.

Down to Business: Leading at Rio+20 and Beyond

The results in this data revealed that sustainability experts believe that there has been some progress in the private sector, but not nearly enough. Leading companies have taken steps towards environmental efficiency, some more intense measures, but progress has still been very limited since the Earth Summit in 1992. Overall, performance is still considered “poor” for the majority in the private sector. Surveyed experts believe that national governments, the private sector, and other change agents have not lived up to expectations concerning leadership during the sustainability crisis (Lee & Coulter, 2012).

Expert views on global economic systems follow the same trend. They believe that our current system will need to undergo substantial changes in order to make progress towards sustainability (Lee & Coulter, 2012). Several companies have been addressing the systems problem and have found ways to calculate GHG emissions and water consumption across value chains. Others have developed growth targets while decreasing environmental impacts. However, everyone must plan for resource constraints in order to achieve global sustainability and perform responsibly (Lee & Coulter, 2012). Again, progress is being made, but his data provides further support to the notion that sustainability progress may not be intense enough to meet the Ceres 2020 and Vision 2050 timeframes, with only 21% of experts stating that progress towards sustainability development can be made without substantial economic system changes.

Corporate Responsibility Magazine’s: Setting the Baseline

Companies have reported being able to demonstrate that CR has enhanced profitability, although they offered no hard supporting data or means of measurement (Crespin, 2010). This is still encouraging news and is aligned with the Vision 2050 in that it denotes sustainability is an

opportunity for long-term profitability. The negative implication is that goals require a clearly defined measurement system, which may require additional research with nearly 70% of companies without a system (Crespin, 2010).

The recent recession did not adversely affect CR budgets more than other departments. Only a small percentage of budgets were eliminated, the majority remaining unchanged through 2009 (Crespin, 2010). Expectations are high for CR programs and data reveals that the majority of companies expect to increase its scope; however, only a fraction plan to add additional staff and increase the present budget. This denotes an inconsistency in sustainability efforts and will not prove effective in meeting the established timeframes.

Ernst & Young Survey

One of the major problems identified by the Ernst & Young (2011) survey was that organizational efforts in developing sustainability strategies might be limited by their own internal systems. For example, systems are not in place to effectively measure, track and optimize their sustainability impacts. Moreover, decision-makers may not understand and manage the risks associated with of lack of action in the area of sustainability. More sophisticated methods of sustainability reporting and assurance are needed. Existing tools remain rudimentary compared with those used for reporting financial performance. Among the emerging players in sustainability are CFOs, as well as employees. They have become second to customers as drivers of sustainability initiatives. Additional findings from this survey show six key trends:

- 1: Sustainability reporting is growing, but the tools are still developing.
- 2: The CFO's role in sustainability is on the rise.
- 3: Employees emerge as a key stakeholder group for sustainability programs and reporting.
- 4: Despite regulatory uncertainty, greenhouse gas reporting remains strong, with growing interest in water.
- 5: Awareness is on the rise regarding the scarcity of business resources.
- 6: Rankings and ratings matter to company executives.

Conclusion

This review reveals that although there is a progressive move toward sustainability, several areas are in need of focus when taking into consideration the timeframes and descriptions offered by the Ceres Roadmap and Vision 2050. Trends reveal that most companies are just beginning their efforts, and it will be difficult to make adequate progress in all of the Ceres areas of assessment within the next eight years. The Vision 2050 report offers a more feasible goal because of the longer timeframe, but only with more innovative, aggressive implementations and corporations engaging in the offered frameworks and dialogs effectively. Vision 2050 describes the time of innovation, collaborative relationships, change, action, fundamental market changes, redefined values, and success, all of which seem to be more optimistic than what the actual data trends reveal.

Companies are reporting increases in sustainability-related inquiries from numerous groups that have different set of interests regarding the topics that concern them, as well as different levels of depth and detail they want to know about company activities and impacts.

Investors and shareholders are increasingly asking for a sustainability publication or report. Most reports focused primarily on operations, they now also provide information about the company's products from a life-cycle perspective, from raw materials and resources to the final disposition of goods at the end of their useful lives. Disclosure and transparency of sustainability actions are becoming the norm.

Finally, this study also supports a sustainability philosophy: *We must turn away from the past; live and operate responsibly in the present; and build a better future socially, environmentally, and economically. We must adopt new mindsets, value systems, and consumption and production behaviors/practices in order to find balance between meeting society's needs and those of our life-sustaining earth.*

Compromise and neglect are no longer options given the detrimental implications doing nothing or little to address sustainability issues. Our future depends on leaders and change agents being committed to implementing the sustainability transformation process as they validate the crucial need to consume and produce responsibly, within the resource limitations that our single earth can safely provide (Vision 2050 WBCSD 2010). Moreover, as sustainability continues to rise in importance inside of companies around the world, the demands for real action and accountability are also increasing.

References

- WBCSD Vision 2050 (2010). The New Agenda for Business:
<http://www.wbcsd.org/vision2050.aspx>
- Ceres (2010). The 21st Century Corporation: The CERES Roadmap for Sustainability:
<http://www.ceres.org/company-network/ceres-roadmap/ceres-roadmap>
<http://www.ceres.org/roadmap-assessment/overview/methodology>.
- Lee, Mark & Coulter, Chris. GlobeScan & SustainAbility (2012). "Down to Business: Leading At Rio+20 and Beyond."
- Crespin, Richard, J/Corporate Responsibility Officers Association (2010). "CR Best Practices: Setting the Baseline"
- Ernst & Young (2011). Six growing trends in corporate sustainability
http://www.ey.com/US/en/Services/Specialty-Services/Climate-Change-and-Sustainability-Services/Six-growing-trends-in-corporate-sustainability_overview

The Dichotomy of Technology as Both the Villain and the Hero to Human Resource and Other Professionals

Corresponding Author:

Dr. Janice Witt Smith, SPHR

Professor of Human Resource Management

Department of Management and Marketing

smithjw@wssu.edu

Dr. Sharon White, Chair

Associate Professor of MIS

Department of Accounting and MIS

whitesd@wssu.edu

School of Business and Economics

Winston-Salem State University

Winston-Salem, NC 27111

Submitted to: February 2013 SE DSI Conference, Charleston, SC

Key words: Technology, legal, ethical, moral, social, human resource issues; implementation challenges; and opportunities

ABSTRACT

Technological innovation has significantly changed the way business is being conducted in a global economy. The rapid pace of technology innovation and the corresponding shifts in the way organizations get work done through people have not been in alignment. There are legal, ethical and moral dilemmas in dealing with the increased access to personal information about individuals. This paper gives a general overview of what is occurring, provides several anecdotes to demonstrate real-world challenges, and invites a conversation about whether technology is no longer enhancing the work we do but rather controlling the work that we do.

Over the past twenty-five years, technology advances have outpaced the ability of many organizations to manage, regulate, and effectively leverage and monitor innovation and use of technology within their corporate environments. As a result, there have been a number of legal, ethical, moral, human resource, and efficiency challenges that have emerged. Technology has emerged from conversations about these challenges characterized as both “knight in shining armor” and “villain.” We review both perspectives and identify real-world examples and research studies which further elucidate these views. What is clear is that technology in its various forms is deeply embedded in the way we do work and how we experience the workplace. Finally, we offer suggestions from both technology and people perspectives to enhance the knight and lessen the villainous challenges associated with technology. HR foci include training and development, employee morale and engagement, privacy issues, use of technology to support work/family balance, and motivating employees. IT foci include the technology development and implementation and risk management issues.

While the type of technologies used in U.S. and foreign businesses may vary by organization, budgetary constraints, and type of business, the use of technology is pervasive and is the new “norm” to remain competitive in organizations. Even small businesses tend to have e-mail, some type of web browser and access to social networks, and some level of personal financial applications.

As one examines the shape of the world economy, there is a deep realization that many individuals are faced with personal money woes and with it an increased potential for less ethical behavior at work and outside of work. This is coupled with downsizing and increased job insecurity, through which employees perceive injustice in the workplace. Often layoffs are made without attention to seniority or job performance; since there is no obvious rhyme or reason to

the job loss and no appeal within the organization, many (former) employees see limited recourse and some seek payback against their employers. Because of the proliferation of technology in the workplace and its accessibility to workers, companies must be even more vigilant against this backdrop in dealing with and protecting their technology and stored data from displeased internal and external customers.

View of Technology as the Knight in Shining Armor

Technological advances in the field of medicine have been nothing short of astonishing. These advances are seen probably more readily than in any other area. Diagnostic tools that required weeks and months of external processing can now be done in the comfort and convenience of a doctor's office. The x-ray, which was the standard tool, has been enhanced by CT scan, then the MRI, now the open MRI and so forth. Doctors are able to have more information about the inner workings of the body than they have been able to have outside of an autopsy. Advances that have led to heroic measures to save the lives of individuals previously considered terminal or too "damaged" to survive are now commonplace. Early-term babies born at 20-24 weeks are surviving and neonatal care advances have allowed many of them to have relatively normal lives. In addition, advances in transplants, implants, laser technology, robot-assisted surgery, drug development and prosthetic devices have all given new hope to individuals whose lives previously may have been discouraging or even fatalistic.

Inside the board room, supply room, and store room, other advances have also occurred. Executives can limit travel by having the ability to teleconference with both audio and video, simultaneously at domestic and international locations with multiple multimedia technologies both available and operational. Data can be accessed from multiple sources, and additional individuals can be "conferenced" into the meeting within seconds, with little or no additional

notice and at little additional cost. Files can be shared and worked on simultaneously, with the most up-to-date file visible to the authors and users. When the technology is successfully integrated, databases and inventories can be updated immediately; and supply chains can be tracked from time of manufacture to time of purchase and then to time of delivery.

In both the educational and corporate training arenas, classrooms have been enhanced with whiteboards, Blackboard, CT, and other types of educational instructional-enhancement platforms and distance-learning technology. Students can access instruction at their convenience and choose modalities which work best for them – time, interests, lower costs, accessibility, and the like. Faculty can assess immediately whether or not students understand content by having JIT in-class and on-line testing of content and quick remediation of topics. Students can choose to retest on unfamiliar topics, and publishers provide on-line supplemental material to facilitate student learning and improve learning outcomes.

Technology as the Possible Villain

Technology innovation has proceeded at almost breakneck speed, with new technology or revisions coming out on a regular basis. Companies who have made huge investments in technology soon find their technology is quickly out of date. Among the recommendations made in the IT community to increase technology acceptance within the organization was to include users formally as part of the development team (Lin & Shao, 2000). Three ways to accomplish this task included user-oriented methodologies such as participatory design, user-centric design, and joint application development (JAD) (Pekola, Kaarilahti, & Pohjola, 2006). Research has consistently shown that the failure of an IT system is not due to technological issues, but those that are related to organizational and psychological issues – the people side of the equation, if you will [Au, Ngai, & Cheng, 2008; Doherty, 2003; Lorenzo, 2003).

According to Quazi and Talukder (2011:34), “Since organizations are run and nurtured by employees, employees’ willingness to accept and apply technological innovation in their workplace is a crucial factor in making the innovation effective. Therefore, the potential users of an innovation are the focal point in making technological innovations a success.” The costs of training and retraining employees can become prohibitive, and the amount of employee hours lost in the frustration of technology that has become obsolete, no longer integrates with the systems it used to support, has a glitch that requires a patch or rework, or requires additional training to overcome a previously unsuspected problem is a serious problem for organizations. Research has shown that training on technology provides a number of benefits, which include decrease in anxiety, promotes greater understanding, results in greater use of the technology, improves one’s perception about the innovation, facilitates a more favorable attitude, encourages use of technology, and encourages technology adoption (Igarria, Inatelli, Cragg, & Cavaye, 1997; Igarria, Parasuraman, & Baroudi, J., 1996; Jaspersen, Carter, & Zmud, 2005).

Three real-world examples further elucidate the opportunities and challenges that improved technology can provide which significantly impact the organization’s human capital (both internal and external customers). The first deals with a technology update from a PC-based, server-linked platform to a web-based system. The second example focuses on an educational setting in which a course management system is updated, then that decision is reversed. The final real-world example uses a phenomenological approach where the research is participant-observer in experiencing and observing technological snafus by a major retailer.

Technology Implementation Issues

Given the pervasiveness and importance of the use of information technology within organizations, it is even more critical that the systems developed and implementation processes

employed meet the needs of the organization and are accepted by the target audience. Research and anecdotal evidence have shown that this acceptance is sometimes lacking, and there are a myriad of reasons why the IT systems fail (Ewusi-Mensah, 1997; McClure, 2007), are abandoned in the midst of their design or construction (Oz & Sosik, 2000) or do not fulfill user expectations when they are implemented (Davis, 1989). The Technology Acceptance Model (TAM) by Davis provides a framework for understanding why end users will accept or reject information systems departments that are created solely by the IT department. Davis found that the two most critical reasons were end users perceived usefulness of the system and the ease of using that system (Davis, 1989).

Example 1. A major financial services company recently updated its claim operations technology from a PC software-based technology to a web-based technology. This is a significant change from the previous technology; requires the learning of a totally different vocabulary; incorporates significant self-paced and group training in a “live” environment – where their “real” work continues; and significantly impacts the way the claims are processed and resolved. The old system and the revised system ran simultaneously for several months while employees were being trained. Its employees are required to learn the new technology while managing a heavy workload in an increasingly competitive and litigious environment.

Like many organizations, in an effort to remain competitive, this excellent company may have underestimated the impact of the technology change and overestimated the potential benefit of the technology on its bottom line and process improvement. Its leadership has ceded timeliness, performance standards, and internal and external customer satisfaction while its employees adapt to the new system. This change was mandated by upper level management who had invested nine years in the technology development, with little or no input from those who

would be using the technology. How this new technology will affect overall profitability and impact policyholders' costs will bear close watching.

Example 2. Similarly, a 6,000 student, master's level university, one of the 17 schools of the University of North Carolina System, decided to move its educational platform from Blackboard 8 to Blackboard 9, which has expanded functionality. During the process of the move, it discovered that the change was more significant than it anticipated; the current infrastructure could not support the change; there was a change in **the** Chief Information Officer, where a consultant group was hired, then a new CIO was hired; the cost in faculty time to learn and apply the change would be prohibitive; and the student impact of the change was negligible. However, a number of faculty had chosen textbooks that were only available with electronic support in the new Blackboard 9 environment. Those faculty were then forced to learn the new platform for some classes and to use the old Platform for other classes. As a result, the students had to learn the new platform as well, while navigating between Blackboard 8 and Blackboard 9 depending on which faculty they may have had.

When students had difficulty with either Blackboard 8 or Blackboard 9, the faculty members were called upon to become the technology experts rather than the course content experts. There was helpdesk assistance available, but students' first call for help and to provide technology-based excuses for late or missing work is through the faculty member. The message for the helpdesk indicated that help was available from 8:00 a.m. – 5:00 p.m. A 1-800-number was embedded in the student accounts for assistance but only at Tier 1 level. For problems the helpdesk could not resolve, an IT ticket was generated. Those technicians were only available Monday-Friday, 8:00 a.m. – 5:00 p.m. There was no separate number for assistance for faculty. The helpdesk was not able to assist students with problems they had with their own computers

and software, but only assist them with Blackboard-based issues. Again, the infrastructure support was not in place for the technology implementation.

In addition to this change, the Banner system for student records, registrar and financial information, and internal budgeting was integrated with the Blackboard platform. Students had to use their Banner passwords to access the Blackboard platform. Students who were not officially enrolled through Banner could not access Blackboard platforms. Whenever the Banner system was down, access to the Blackboard platforms was also unavailable. This was an unintended consequence of the merged system, which allowed improvement in processes on the non-academic side of the house, but has created significant difficulty for students in web-based courses.

Additional Human Capital Investment

Example 3. The third illustration relates to the need for companies to focus on additional training on hardware, software, and new applications, as well as a heightened knowledge and understanding of security and privacy laws. IT “folks” need to meaningfully converse with non-IT folks (both in-house and outside of the company) to determine their needs, how they use technology, what systemic changes are underway, and what is needed futuristically. A major retailer uses PDAs to check on their inventory to assist customers in determining whether or not a product is available in the store. This system is supposed to give the correct number available at that point in time, except for what shoppers may have in their carts. In addition, they are able to access the cash register to determine if another store might have that item and reserve it for the customer for pickup at a sister store.

Based on the researcher’s visit to four of these stores in the Raleigh, NC, area on November 19, 2011, searching for the Leapfrog LeapPad in green, we found the following.

Their associates found that their inventory figures are often 24-36 hours behind what their PDAs show. Therefore, they can only state that if their figures show 2 or less in store, “they probably do not have any.” If they show 3-5 in store, “they probably have 1”. If they show more than 5, there is a good chance that you can get the item in store. After this researcher went to four different Targets, then 5 different Best Buys, 6 Wal-Mart’s, and 3 K-Marts, and four on-line sites, it is clear that the inventory processes that they use to determine whether or not a product is in store are flawed.

What appeared to be well-developed centralized databases was fraught with error – some human error and other artifacts of the technology used and retrieval system accessed. In addition, we learned that if an item is in layaway, the inventory may show the item as in the store, when in fact, it is not available for purchase. If the item has been misplaced on the shelf, is in some other shopper’s cart, or has been pilfered, the technology shows the item as available. The technology is useful at a rudimentary level, but the sales associates must understand the limitations of it. In addition, the policies and procedures needed for the technology to be useful for decision making were not in place. After eight hours of trying, the researcher finally purchased the LeapFrog LeapPad in green at a scalper’s rate.

There is a growing the need for more technologically savvy human resource (HR) employees in collecting, retrieving, interpreting, and reporting information as well as possible increased HR staff training costs and additional reporting requirements. The use of Human Resource Information Systems (HRISs) becomes increasingly important to capture employee data and to track applicants, current employees, exiting employees, and employees who have exited but still maintain eligibility for several benefits extended or created under the American Recovery and Reinvestment Act of 2009, as well as other federal and state laws. As the laws

intersect, become increasingly complicated, and have multiple requirements within them as it relates to HR reporting, there is an increased need for internal education and coordination among HR, benefits, payroll and accounting, to ensure that there is a coordinated approach to compliance. Under several federal laws, the organization has additional reporting requirements and a greater need to track employee information for expanded unemployment benefits, most of which are done electronically. Secure storage of information, employee privacy, and secure access to the information all become increasingly important to the organization.

Risk Management Issues. At the same time that organizations are becoming more sophisticated in their choice of computer hardware and software, there has not been the corresponding necessary change in the view of user access to this technology. Morgan and Mueller (2010) examined issues with security of information systems and found that despite documented cases of un-approved access to computer systems in organizations, there is still a bias toward allowing access through passwords alone. Risky human behaviors that may compromise the systems include passwords that are easy to guess; use of post-it notes and other methods to tape the password to the computer screen; the use of the same password to access a number of different portals, including web-facing systems; sharing of “secret” passwords with others inside and outside the organization; using familiar names, dates, labels, and nicknames as the password and adding a number at the end for the “nth” time that that password has been used. There is a tension between what IT needs to do to make the system “safe” and what the user is willing to bear in terms of access to the system to conduct necessary company business.

The information technology (IT) policies encompass both the normal and extraordinary use of applications and equipment. When “tracking” devices and applications are implemented, there must also be an awareness of how the increased surveillance impacts employee morale and

affects customer privacy. Additionally, labor unions and other employee advocacy groups continue to express concern about the loss of employee privacy and the heavy monitoring of employee work through technology. Companies must walk the tightrope between security of their data and equipment and what employees need to feel valued and trusted and to be actively and positively engaged in the workforce (Clark, Smith & White, 2010).

Several other risk management issues with which HR and IT must deal collaboratively include, but are not limited to the following: (a) access to data at the appropriate levels – that is, allowing employees access to the data they need to get their work done, but not to allow them access to more data than what is appropriate for their knowledge, skills, abilities, and job assignment; (b) damage and sabotage to equipment and applications – this is frequently more of an HR issue when employees have been terminated or fear that they will be laid off or terminated. Extreme diligence must be exercised to ensure that access to company equipment, software and databases is terminated at the same time that the employee's employment has been terminated. However, this must be done with empathy, respect, and care for the individual; (c) potential for illegal, immoral or unethical access to sensitive and private information; (d) sharing confidential information with individuals who do not have the right or need to know that information; (e) selling of confidential information to third parties; and (f) unauthorized access to and/or transporting of data away from the proscribed site.

These potential abuses or misuses of company hardware and software have been made possible because of the gains in the speeds at which information can be captured and transmitted; expansions in the types of information that can be stored and processed; enhanced visual displays which depict the information before, during and after processing; reduction in the size and amount of hardware required to process and store data; and increased access to the data. In

addition, a myriad of software programs have been developed as well as a variety of platforms and operating systems from which to launch these programs. New companies have taken advantage of the competitive environment to sell cutting edge technology infrastructure and software, to market technological expertise, and to make their operating system the “norm” for businesses. Furthermore, there is more electronically stored information (ESI), which is both fragile and easily transported.

Advances in data storage techniques and rapidly declining storage costs have resulted in multiplying databases on individuals, whether they are employees, customers and potential customers. As a result, there is a wealth of information on individuals collected from a variety of sources – frequent shopper cards at CVS or Food Lion, credit cards, banking records, telephone calls and the like. That, coupled with data analysis advances (that is, data mining techniques and technology) enable savvy users to identify personal information about individuals which they might not be aware that they have shared. Finally, it is easier to copy data from one source to another because of networking advances and the internet. This results in the ability to create electronic dossiers being available on individuals, which is called “profiling.” Companies like DoubleClick (www.doubleclick.net) can create detailed dossiers on individuals’ spending and internet computing habits, while companies like ChoicePoint can gather data from employment and credit histories, police, criminal and motor vehicle records, insurance claims, and addresses. This information is then for sale to businesses and governmental agencies. Even more powerful profiling capabilities are available through a new data analysis technology called non-obvious relationship awareness (NORA). Data is gathered from a myriad of seemingly unrelated sources to find hidden or obscure relationships and is used by both the public and private sectors. This is, again, slippery slope as it relates to privacy. (Laudon & Laudon, 2010)

Technology and Human Resource Management

The field of Human Resource Management has embraced technology to automate routine processes and to create a database which will allow managers and executives to capitalize on the strategic competencies of its strategic, non-renewable resource, its human capital. With the increased reporting requirements of recently passed federal laws, there is a greater need for quick and accurate access to meaningful data. Twenty-six percent of the 150 HR leader-respondents in a September 2009 survey of the International Association for Human Resource Information Management (IHRIM 2009) indicated that they plan to “optimize currently implemented systems to get more return from their investments,” while another 24% plan to implement previously purchased models; and 19% plan to consolidate multiple systems under one vendor.

Fifty-one percent (51%) of the respondents stated that their human resource information technology (HRIT) budgets for 2010 would remain the same, while 30% expected to increase their budgets; and 19% expected a decrease. About 40% of the respondents said they plan to move forward in 2010 with new HR system project implementation, while 28.7 percent said they do not intend to do so. Around 31.6% were either undecided or unsure. Their 2010 budgets were expected to increase for HR software investments in performance management (31.1%), business intelligence (22.4%), e-recruiting and applicant tracking (21.3%), and core HR management systems and on-boarding programs (20% each).

Finally, 52.9% delayed optional HRIT projects, 22% reduced headcount in HRIT departments, and almost 50% implemented hiring freezes. Most of these companies indicated that they would not increase their budget for training and staff development, although 11% plan to spend more on HRIT hiring, 18% to increase investment in HRIT staff training, and almost

20% plan to spend more on consultants and contractors. About 45% indicated that the current economic conditions did not force HRIT purchase decisions in their companies.

Because of the wealth of information that has been collected, the organization, often as a collaboration between HR and IT departments, must deal with a variety of cyber sabotage, which includes but is not limited to: data breaches, interruption of business; theft and embezzlement, blackmail and extortion, destruction of computer hardware; a type of “kidnapping” of data and holding it hostage; infringement of intellectual property laws; inappropriate and sometimes illegal data mining; disclosure of confidential information and/or sharing of information with the intent or impact of harming the reputation of another; trade defamation; and/or identity theft.

As if these challenges are not enough when the employee is on site and working from company-owned and secured technology equipment, companies are also dealing with employees who are working off-site. In 2009, according to the U.S. Census Bureau’s annual American Community Survey, in 2009 there were 2.9 million employees who worked mostly from home, utilizing technology to interface with clients, coworkers, and organizational leaders (telecommuting). Some of the benefits of telecommuting are flexibility; lower transportation cost for the employees; more time to spend with family; greater work/life balance; boost in employees’ productivity; and reduced organizational footprint and overhead costs (office space, energy costs, furniture and equipment). For companies to save money on telecommuting, there have to be a critical mass of employees who are participating on a consistent basis, for 3 or more days per week. Otherwise, the companies still have all of the overhead costs. Some jobs cannot be done without face-to-face contact with the customer.

Organizations, often through their HR and/or IT departments, also must figure in the initial costs to ensure that the employee has the appropriate equipment, software, office set-up at

home, liability insurance, secure networks to protect the company's data, secure, dedicated space within the home; availability at key times when the company needs them available; and a good assessment process to ensure that individuals who are allowed to telecommute have the right personality and work ethic to successfully do so.

The time that the individual is working also impacts other people in the organization. Some individuals may work on their circadian rhythm, which does not provide their coworkers or customers responses in a timely manner – where their responses are not synchronized with the clients' or coworkers' needs or deadlines. As a result, some companies require that telecommuters work during core business hours, while maintaining flexibility around the other hours they work. While this does not provide them with all of the flexibility they may want, it does provide the business with the stability that it needs.

Finally, the telecommuter has multiple methods of technology with which to stay connected, but it does not provide those quick in-the-middle-of-the-hallway-while-on-your-way-somewhere-else conversations, networking, and friendly chat kind of opportunities. As a result, many telecommuters feel left out of the life of the organization and have to make a conscious effort to reconnect with the people absent the technology to remain a part of the company (HR Magazine, June 2011, Telework, Balance the costs and Benefits, pp. 33-7).

Integrating HR Systems

Organizations are often sold stand-alone technology systems, particular in the Human Resource Department, which as a cost center has to justify every expenditure. Examples of parallel systems might be a core Human Resource Information System (HRIS) which captures applicant and employee data to recruiting, compensation, and performance management platforms. All of these platforms have key information, but none of them are interconnected. In

fact, a different area of HR or operations might be responsible for and have access to each system. Several systems have to be accessed to provide a true picture of where the organization is, from a human capital perspective as it relates to key HR metrics (Zielinski, 2011). While companies know intuitively that they would derive value from having a single, integrated system, the parallel systems do their one thing well; the cost of integration is often prohibitive; and management often does not know the right questions to ask. While HR is more often at the table than previously, it is possible that the strategic thinking about the human capital value needed to assist the company is often missing from both the leadership and HR levels. If the right questions are not being asked, the integration of the databases becomes a nonissue.

Conclusions

IT Best Practices

While IT frequently looks at employee use of technology as possible venues for abuse and misuse, recent surveys have indicated that IT professionals themselves may be participants in this behavior. At the NC SHRM State conference (September 2011, Raleigh, North Carolina), a legal professional who conducted a Cyber security workshop quoted the following statistics which we feel which offers additional IT possibilities for HR regarding job descriptions, recruitment, and screening of individuals: “In a recent study, 88% of IT workers surveyed indicated that they would take sensitive data or passwords if they were fired. In addition, 50-75% of all e-sabotage events are considered “inside jobs” by disgruntled workers. Furthermore, huge and well-protected companies and organizations – Yahoo, eBay, and Amazon – have all been hacked. The Pentagon infiltration rate is 250,000 attacks per year. The median cost of cyber crime is \$3.8 billion per year. Ninety percent (90%) of cyber attacks are either malicious web attacks, malicious code or malicious insiders. There are approximately 14 days needed to

address a cyber attack occurs from the outside and 30 or more days needed to address a cyber attack from inside the organization.”

Among the best practices that Information Technology “gurus” could incorporate in IT implementation efforts include, but are not limited to, the following:

- End users should be involved in the development of the system;
- The system should be easy to use and navigate;
- Employee privacy issues should be considered;
- There should be balance between safeguarding organizational hardware and software and the number of levels of encryption, password protection, limits on access, and the like; and
- The data collected must be intentional, purposeful, useful, and meaningful for making organizational decisions.

In addition, companies should ensure that technical support is provided for at-home workers. IT departments can control the environments of employees on company property; however, they cannot control the environments of at-home workers whose children may have access to their parents’ work area and computers. The number of calls to the company’s helpdesk may be extensive and time consuming. Increased IT training and support needs to be available for the at-home worker, as well as training on applicable state and federal laws (applicable liability and labor laws, workers’ compensation, FLSA, and the like) when using company property, and working for the company at an off-site location.

Furthermore, IT should conduct regular orientations as part of new employee orientations and existing employee updates to ensure that there is clear communication between groups; expectations concerning the use of company equipment are clearly delineated; current and

proposed systems and software and their purposes; access to equipment; accountability around equipment; and ways in which the IT Department will facilitate employees' use of technology in accomplishing employees' organizational performance goals. In addition, the IT helpdesk must interact with organizational employees in a collegial, helpful, and user-friendly manner. As the federal and state governments become more involved in legislation around data collection, security, and dissemination, there will be a continuing and increased need for information technology professionals to hone their skills, develop stricter controls, limit unnecessary access, while still providing for the data needs of organizations. Both groups must understand that they need each other in order for the organization to comply with reporting requirements and leverage technology to benefit the organization.

Given the continued incidences of hackers into what had seemed to be impregnable firewalls (e.g., Department of Defense, major financial services organizations, hospitals and universities), considerable risks exist that the collected data may be compromised. The organizations must conduct detailed and intensive technological security audits, shore up potential areas of illegal entry, provide sufficient data massage and scrambling to reduce the likelihood of breaches, continue to educate users on appropriate creation and use of passwords, and provide sufficient access to individuals with a need to know (Clark, Smith and White, 2010).

HR Best Practices

Among HR best practices to assist with dealing with technology, including social media, would include having a well-developed, widely communicated, and consistently administered social media, e-mail, internet, password, and return of property policies. Each policy is separate and distinct, while they are also inter-related. These policies should be regularly audited and privacy provisions under local, state, and federal laws examined for their applicability to your company and these policies. Organizations should examine the way the internet and e-mail are

being used, as well as the effectiveness of the current policies. HR, operations, IT, and executives should communicate regularly and honestly among the groups, without either group having full control over the technology. Any defiant or suspicious behavior needs to be addressed at the onset and investigated promptly and thoroughly. Before third parties are allowed access to company systems, they must be properly vetted and that access should be limited and on an as needed only basis.

HR screening, recruitment, training, and selection practices need to be in sync with what companies actually need, particularly as it relates to technological savvy. Additional background screening may become critical to de-select individuals involved in cyber sabotage or counter-productive behavior in other organizations. HR's use of on-line screening tools and techniques and their own collection of information also needs to be tightly controlled and reviewed. Typically, if an organization cannot ask a question in an interview, the organizational should not look for that information through on-line sources. This fascinating subject is the topic of a separate paper.

References

- Au, N., Ngai, E., & Cheng, T. 2008. Extending the understanding of end user information systems satisfaction formation: An equitable needs fulfillment model approach, *MIS Quarterly*, 32(1), 43-66.
- Barr, S. August 27, 2008. Census Bureau says fewer lack coverage; decrease reflects shift to public insurance. *Daily Labor Report 166*: D-15.
- Clark, G., Smith, J.W., and White, S.D. 2010. The American Recovery and Reinvestment Act of 2009 - Human Resources, Accounting, and Information Systems Issues. *Issues in Information Systems*, 11(2): 114-121.
- Davis, F. 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3): 319-340.
- Doherty, N. 2003. The impact of inadequacies in the treatment of organizational issues on information systems development projects. *Information & Management*, 41(1): 49-62.
- Ewusi-Mensah, K. 1997. Critical issues in abandoned information systems development projects. *Communications of the ACM*, 40(9): 74-80.
- Igbaria, M., Inatelli, N., Cragg, P., & Cavaye, A. 1997. Personal computing acceptance factors in small firms: A structural equation model. *MIS Quarterly*, 21(3): 279-305.
- Igbaria, M., Parasuraman, S., & Baroudi, J. 1996. A motivational model of microcomputer usage, *Journal of Management Information Systems*, 13(1):127-143.
- Jasperson, J., Carter, P., & Zmud, R. 2005. A comprehensive conceptualization of the post-adoptive behaviors associated with IT-enabled work systems. *MIS Quarterly*, 29(3): 552-557.
- Laudon, K. & Laudon, J. 2010. 11th Edition, *Management Information Systems: Managing the Digital Firm*: 126-7. Pearson Prentice Hall, Upper Saddle River, NJ.
- Lin, W., & Shao, B. 2000. The relationship between user participation and system success: A simultaneous contingency approach. *Information & Management*, 37(6): 283-295.
- Lorenzi, N. 2003. Organizational issues = change. *International Journal of Medical Informatics*, 69(2-3); 197-203.
- McClure, D. 2007. *From the CIO Trenches: Why Some Projects Fail and Others Succeed*. Stamford, CT: Gartner Group.
- Morgan, J. & Mueller, J. (2010). *Human factors in the effectiveness of password security*.

Oz, E. & Sosik, J.J. 2000. Why information systems projects are abandoned: a leadership and communication theory and exploratory study. *Journal of Computer Information Systems*, 41(1): 66-78.

Pekola, S., Kaarilahti, N., & Pohjola, P. 2006. Towards formalized end-user participation in information systems development process: Bridging the gap between participatory design and ISD methodologies. *Proceedings of the Ninth Participatory Design Conference: 21-30*. Trento, Italy: Association of Computing Machinery (ACM).

Quazi and Talukder. Fall 2011. *Journal of Computer Information Systems*: 34.

Runzheimer International. 2010. Survey

Segal, J. April 2011. Dancing on the Edge of the Volcano. *HR Magazine*: 84.

SHRM. June 2011. Telework, Balance the costs and Benefit. *HR Magazine*: 33-7

Smith, Anderson, Blount, Dorsett, Mitchell & Jernigan, LLP's 2011 Employment Law update, November 9, 2011, Section 2, Page 4.

Zielinski, D. November, 2011. HR Technology: Total Integration. *HR Magazine*: 69-72.

A QUANTITATIVE STUDY OF
LEADERSHIP DEVELOPMENT IN FINANCIAL INSTITUTIONS
IN RURAL ENVIRONMENTS

STAN W. VINSON, PhD.
Assistant Professor of Financial Services
Lander University
864-388-8401
svinson@lander.edu

TERRY M. CHAMBERS, PhD.
Assistant Professor of Marketing
Lander University
864-388-8157
tchambers@lander.edu

Lander University
School of Management
Carnell Learning Center
320 Stanley Avenue
Greenwood, South Carolina 29649-2099

Abstract

This study addresses issues of leadership development programs in rural banks, using data gathered from 80 community banks in South Dakota. Findings suggest that the topic of leadership development is growing in importance to community bank executives, boards of directors, and human resource managers in these organizations. The need for succession planning and the challenges of finding new leadership for rural locations appear to be catalysts for creating leadership development programs in community banks in the state. Facing demographic challenges, new regulations and increased competition has left them struggling to develop new leadership.

Introduction

In conversation with the CEO of a small rural community bank, I casually asked how business was going. He explained that it was the trip to the mailbox every day that defined success or failure in the short-term and put the long-term in perspective.

In early morning, he went to the mailbox and grabbed the local paper, opening it quickly to the obituaries. Looking at the pictures, notices, and short biographies of persons that had passed away—his eye would immediately go to what often were his long-time customers and friends. With some emotion, he would remember when he first met them, usually many years ago, and think about the role they played in building the community—maybe as an elected official or organization board member—and how the small town he grew up and worked in had changed.

Many of the family farms and businesses he financed and was the mainstay of his banking business had been sold or consolidated and were often no longer small operations. They were now sophisticated businesses with equipment costing hundreds of thousands of dollars, land worth millions, and product prices that were determined by global versus U.S. market demand. Over time, these changes meant that he and his organization had to become more sophisticated in their understanding of all aspects of business operations, be comfortable doing complicated financial analysis, and have a clear picture of the markets and prices for the products the customers produced. He was hiring very different people than in the past and spending significantly more money in training—just having an understanding of local business and hometown history no longer suffice. This also meant more time in the office and less time spent at the businesses and on the farms and ranches that long-time employees often grew up with and enjoyed visiting. The growth in the size of the businesses and increasing revenues also meant that larger banks were attracted to his region, offering technology-based and very competitive products. Although seemingly not connected, the obituaries of a small town newspaper were highlighting the long-term challenges of leading a rural community bank.

As was customary and important to him, he always made time to attend the funeral service for his friend. Sometime during the day, he would talk with the family, who he usually knew very well, exchanging condolences and hearing how important his sound advice had been to the deceased and how much everyone appreciated his help. They would often also say that a local lawyer or trust officer was administering the estate and when all the assets were sold and obligations paid, the money would be transferred to another bank in a larger community where the family lived. While everyone appreciated his efforts and assistance and would have gladly stayed with the bank, there was no branch or affiliates anywhere near their home. The banker, aside from losing a friend, was about to lose what was sometimes a significant piece of business.

The story above is a case study for those looking at the challenges of developing community bank leadership programs in rural environments. Unpacking the narrative of this banker's reflections highlights the literature reviewed for this study and supports the survey data collected.

Purpose of Research

The objective of the study is to provide theoretical and practical understanding of leadership development activities in rural community banks. The research looks at the intersection of leadership development, transformational leadership and context – against a backdrop of community banking, corporate social responsibility and the changing demographics of rural environments.

The research was shaped after conversations with a number of community bankers working in rural environments. In these talks, bankers described the unique problems they were having finding and developing follow-on leaders at all levels in their organizations. This convenience sampling led to conversations with bank chief executive officers (CEOs), bank board members, and a series of meetings with bank regulators, who all confirmed this was a major issue facing financial institutions in rural locations.

Methodology

Using quantitative methods, seven hypotheses were created and tested using various insights gained from reviewed literature and informational interviews that framed the study. The hypotheses were built looking to understand the drivers that shaped leadership development at rural community banks and the relative importance of leadership programs in these organizations. The data for the study were collected from financial institutions in South Dakota that were defined by literature and current management teams as community banks. The survey was conducted from October 2010 to November 2010 via phone interviews with the person identified by each bank as being responsible for human resource management. As an assessment of reliability a test/retest was done which did not change the results.

There are 84 FDIC insured banks in South Dakota according to the South Dakota Division of Banking and the FDIC. Of those, 80 would be considered community banks as defined by the literature. Of the 80 banks, seventy two were found to be appropriate for the study. Six were eliminated because of unique ownership structures, control agreements, and/or a pending change in ownership; two others chose not to participate in the survey. Of the revised population of 72, 61 banks participated in the survey; a response rate of 85%.

Results

The combination of survey data collected, literature reviewed, and background conversations produced some interesting insights. While some of the results seem straightforward and will help build a base for future research on leadership in community banks, other information is more subtle, less direct, and additional research is needed to support early findings.

First, it is clear that the majorities of banks in South Dakota do not have formal leadership development programs and have not had formal discussions on the subject at a BOD meeting. According to survey results, 80.3% of those banks surveyed do not have leadership plans and 19.7% do. Of those that do not have plans, 62.3% report that they have not had a formal conversation with the BOD on the subject in the past two years.

Contrasting those findings, when the survey respondents were asked to rate the importance of leadership to the BOD, the executive team, and themselves, the results suggest that the majority believe it to be an important topic. According to the survey, 71.7% of the current executive team, 64.0% of the BOD, and 72.1% of the human resource executives believe that leadership development is an “important” or “very important” subject. All this suggests that while there are few leadership development programs being implemented and a limited number of formal discussions going on, the subject is of interest and background conversations are occurring.

The second finding is that succession planning and the challenges of finding leadership for rural locations appear to be early drivers for those banks that do have a leadership development program. When asked if the bank had a succession plan, 65.6% of all banks responded in the affirmative. When broken down into those with and without leadership development plans, 75% of those with and 63.3% without plans said they did have formal succession plans. However, when those with a leadership plan were asked how important succession planning was to the leadership process, 100% said it was “moderately important” to “very important.” Comments made by several banks with plans, including informational interviews, support the finding that succession planning was the initial catalyst for creating a leadership development plan.

Responses to two other questions give further insights into reasons leadership development programs were started. When asked about the difficulty of finding follow-on leadership for their organization, 45.9% said it was “moderately difficult” and 31.1% said it was “difficult” or “very difficult.” When broken down between those with and without leadership programs, differences were not significant. However, when asked an additional question about how hard it was to find new leadership in rural locations, significant differences between groups appeared. Of those

with programs, 83.3% indicated it is “difficult” or “very difficult” to find new leadership in rural locations versus 54.1% of those without a program and statistical significance was found.

Most conclusively, South Dakota banks characterize themselves as community banks, defined by their culture, and their leadership. Conversations, informational interviews, and data collected leave very little doubt that these banks shape their culture, hiring practices, and operating philosophies to support and perpetuate being branded as a community bank. When asked how important being defined as a community bank was, 86.9% said it was “very important” and the remainder said it was “important.” When asked if being defined as a community bank affected hiring, 60.6% said it made it “much easier” or “easier,” and when asked if it was important to hire the management team from the local community (community involvement being a defining responsibility of community bankers), 59% said it was “very important” or “important.” The question, appropriate given this research, is: Can the organizations find leaders that will support the values and culture of community banks while adapting and changing to new operating paradigms?

Limitations and Future Research

As the data were being collected for this research, there were unanticipated and rapid changes taking place in financial services. A global economic crisis led by the failure of banks around the world was still unsettled, there were no bailouts available for small banks and community banks were struggling to survive. Respondents were clearly affected by the changing global economy.

This paper focused exclusively on South Dakota and its unique operating environment (rural, agriculturally based, and an older than average U.S. population). Future research of community banks in smaller and larger states using a similar or the same survey instrument could test the validity and reliability of the findings. For example do other states with more diversified economies and different demographics have the same challenges building leadership development programs? Would North Dakota, which has a smaller population than South Dakota but a more robust economy because of oil drilling revenue, have similar findings when asked about the challenges of creating leadership development programs?

Future studies also might include a comparative analysis looking at the wants and needs of a new generation of leaders and the leadership expectations of the industry. Additional research could help clarify, define and rank the values, vision and other non-economic factors that are the community bankers’ strengths - contrasting them with the needs and wants of a new generation leader. In addition, the study could offer an interesting opportunity to look at generational issues and leadership in a rapidly changing environment.

Conclusion

Many community banks in the survey recognize they cannot continue operating in the same way. Facing demographic challenges and having to own up to new regulations and increased competition has left them struggling to accept, find, and develop new leadership. They could be described as afraid to leave the past behind or anxious that the future will leave them behind.

Conversely, from comments and survey data collected, it would appear that there is recognition that leadership development is important and building a self-renewing organization is critical to survival. Some community bankers have begun this process and are looking for common ground on which to build shared values that are appealing to the next generation of leaders—even though the challenges of taking on leadership development are many. They recognize what Robert F. Kennedy, Jr. (2003) said: “the present shouts and the future whispers” and, by taking action, they can build confidence and drive their organizations to the next level of performance. These bankers recognize that they can define the future instead of letting the future define them. My conclusion is that transformational leadership lives, even in small banks in small businesses that are demographically challenged and facing rapidly changing environments.

APPENDIX

Survey Questions and Scaling

1. Do you have a formal leadership development plan in your bank?

Yes.....No

- a. If no formal leadership program:

Has your BOD discussed in the last two years creating a formal leadership development program at your bank?

YesNo

2. In your bank do you have formal “training” in any of the following areas?

Goal setting yes...no

Managing conflict yes....no

Negotiation yes....no

Team building yes....no

Technical Training yes....no

3. Given the sparse population of South Dakota how difficult is it for your bank to find new leadership?

Not at all
Difficult

Not Difficult

Moderately
Difficult

Difficult

Very Difficult

4. Using the same scale, how hard is it to find new leadership in rural locations (locations with 2,500K or fewer people and not adjacent to a metro area with 50K or more people)?

Not at all
Difficult

Not Difficult

Moderately
Difficult

Difficult

Very Difficult

5. Does your bank have a formal succession planning process?

Yes.....No

a. If you have a leadership plan:

How important is your leadership training program to the succession planning process?

Very Important	Important	Moderately Important	Of Little Importance	Unimportant
----------------	-----------	----------------------	----------------------	-------------

6. In your bank do you have a formal process or measurement tool to manage any of the following?

Management skills of current employees yes....no

Personnel Individual development plans yes....no

A formal emergency transition plan yesno

7. How important is it that your organization is defined as a “community bank” (having intimate local market knowledge, being regionally focused).

Very Important	Important	Moderately Important	Of Little Importance	Unimportant
----------------	-----------	----------------------	----------------------	-------------

8. How does being defined as a community bank affect your hiring?

Makes it much easier	Easier	No difference	Harder	Makes it much harder
----------------------	--------	---------------	--------	----------------------

9. How important is it that you hire the management team from the local community?

Very Important	Important	Moderately Important	Of Little Importance	Unimportant
-------------------	-----------	-------------------------	-------------------------	-------------

10. From your perspective as the Human Resource Manager how important is leadership development to the:

First level of managers

Very Important	Important	Moderately Important	Of Little Importance	Unimportant
-------------------	-----------	-------------------------	-------------------------	-------------

Current Bank Executive Team

Very Important	Important	Moderately Important	Of Little Importance	Unimportant
-------------------	-----------	-------------------------	-------------------------	-------------

Current Bank Board of Directors

Very Important	Important	Moderately Important	Of Little Importance	Unimportant
-------------------	-----------	-------------------------	-------------------------	-------------

11. From your perspective as the Human Resource Manager how important is leadership development training to your bank?

Very Important	Important	Moderately Important	Of Little Importance	Unimportant
-------------------	-----------	-------------------------	-------------------------	-------------

BIBLIOGRAPHY

- Ardichvili, A., Mitchell, J., & Jondle, D. (2009). Characteristics of ethical business cultures. *Journal of Business Ethics*, 85(4), 445-451.
- Bass, B. M. (1990). From transactional to transformational leadership: Learning to share the vision. *Organizational Dynamics*, 18(3), 19-31.
- Bennis, W. G., & Goldsmith, J. (1994). *Learning to lead*. New York, NY: Addison Wesley Longman.
- Bennis, W. (1989). *On becoming a leader* (2nd ed.). Cambridge, MA: Perseus Books.
- Blaikie, N. W. H. (2003). *Analyzing quantitative data: From description to explanation*. Thousand Oaks, CA: Sage.
- Blanchard, K., Zagarmi, D. & Nelson, R. (1993) Situational leadership after 25 years: A retrospective. *Journal of Leadership Studies*, 1(1), 22-36.
- Boal, K. B. (2000). Strategic leadership research: Moving on. *Leadership Quarterly*, 11(4), 515.
- Bolman, L. G., & Deal, T. E. (2001). *Leading with soul: An uncommon journey of spirit*. San Francisco, CA: Jossey-Bass.
- Borman, W. C., White, L. A., Pulakos, E. D., & Oppler, S. H. (1991). Models of supervisory job performance ratings. *Journal of Applied Psychology*, 76(6), 863-872.
- Bossidy, L., & Charan, R. (2002). *Execution the discipline of getting things done*. New York, NY: Crown Business.
- Boyatzis, R. E. (1998). *Transforming qualitative information: Thematic analysis and code development*. Thousand Oaks, CA: Sage.
- Brown, D. L., Swanson, L. E., Barton, A. W., & NetLibrary, I. (2003). *Challenges for Rural America in the twenty-first century*. University Park, PA: University Press.
- Burke, L. A., & Miller, M. K. (2001). Phone interviewing as a means of data collection: Lessons learned and practical recommendations. *Forum: Qualitative Social Research*, 2(2), 18-23.
- Burke, V., & Collins, D. (2005). Optimising the effects of leadership development programmes: A framework for analysing the learning and transfer of leadership skills. *Management Decision*, 43(7), 975-987.

- Burns, J. M. (1978). *Leadership* (1st ed.). New York, NY: Harper & Row.
- Clarkson, M. B. E. (1995). A stakeholder framework for analyzing and evaluating corporate social performance. *The Academy of Management Review*, 20(1), 92-117.
- Cocheo, S. (1997). Community banks face their future. *ABA Banking Journal*, 89(5), 53.
- Collender, R. N., & Shaffer, S. (2003). Local bank office ownership, deposit control, market structure, and economic growth. *Journal of Banking and Finance*, 27, 27-57.
- Corbin, J. M., Strauss, A. L., & Strauss, A. L. (2008). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (3rd ed.). Los Angeles, CA: Sage.
- Creswell, J. W. (1994). *Research design: Qualitative & quantitative approaches*. Thousand Oaks, CA: Sage.
- Creswell, J. W., & Plano Clark, V. L. (2007). *Designing and conducting mixed methods research*. Thousand Oaks, CA: Sage.
- Critchfield, T., Davis, T., Davison, L., Gratton, H., Hanc, G., & Samolyk, K. (2004). Community banks: Their recent past, current performance, and future prospects. *FDIC Banking Review*, 16, 3-4.
- Day, D. V. (2000). Leadership development: A review in context. *The Leadership Quarterly*, 11(4), 581-613.
- Deyoung, R., Hunter, W. C., & Udell, G. F. (2004). The past, present, and probable future for community banks. *Journal of Financial Services Research*, 25(2), 85-133.
- Drabenstott, M., & Meeker, L. (1997). Financing rural America: A conference summary. *Federal Reserve Bank of Kansas City, Economic Review*, 89-98.
- Farrell, K. L., & Buzzell, D. H. (2005). *Law and banking* (5th ed.). Washington, DC: American Bankers Association.
- Faul, F., Erdfelder, E., Lang, A.-G. & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39, 175-191.
- Fiedler, F. E. (1964). A contingency model of leadership effectiveness. *Advances in Experimental Social Psychology*, 1, 149-190.
- Fiedler, F. E., & Chemers, M. M. (1976). *Improving leadership effectiveness: The leader match concept*. New York, NY: Wiley.

- Fox, S., & Beier, J. (2006). *Online banking 2006: Surfing to the bank*. Pew Internet & American Life Project. Retrieved from http://www.pewinternet.org/~media/Files/Reports/2006/PIP_Online_Banking_2006.pdf.
- Gardner, J. W. (1990). *On leadership*. New York, NY: Free Press.
- Gardner, J. W. (1995). *Self renewal*. New York, NY: W. W. Norton.
- Geyer, A. L. J., & Steyrer, J. M. (1998). Transformational leadership and objective performance in banks. *Applied Psychology: An International Review*, 47(3), 397-420.
- Gibbons, P. T. (1992). Impacts of organizational evolution on leadership roles and behaviors. *Human Relations*, 45(1), 1-18.
- Grady, M. P. (1998). *Qualitative and action research: A practitioner handbook*. Bloomington IN: Phi Delta Kappa International.
- Horton, R. L., & Duncan, D. J. (1978). A new look at telephone interviewing methodology. *The Pacific Sociological Review*, 21(3), 259-273.
- Hox, J. J., & De Leeuw, E. D. (1994). A comparison of nonresponse in mail, telephone, and face-to-face surveys. *Quality & Quantity*, 28(4), 329-344.
- Gummesson, E. (2000). *Qualitative methods in management research* (2nd ed.). Thousand Oaks, CA: Sage.
- Heifetz, R. A. (2002). *Leadership on the line: Staying alive through the dangers of leading*. Boston, MA: Harvard Business School Press.
- Heifetz, R. A. (1994). *Leadership without easy answers*. Boston, MA: Harvard University Press.
- Hernez-Broome, G., & Hughes, R. J. (2004). Leadership development: Past, present, and future. *Human Resource Planning*, 27(1), 24-32.
- Hersey, P., & Blanchard, K. (1996). Great ideas revisited: Revisiting the life-cycle theory of leadership. *Training and Development*, 50(1), 42-47.
- Hesselbein, F. (1996). *The leader of the future: New visions, strategies, and practices for the next era*. New York, NY; Wiley.
- Hoenig, T. M. (2005). *Community banking: Is the playing field changing for bankers and supervisors?* (Unpublished manuscript). Kansas City Federal Reserve Bank, Kansas City, Missouri.

- Hughes, R. L., Ginnett, R. C., & Curphy, G. J. (2009). *Leadership: Enhancing the lessons of experience* (6th ed.). Boston, MA: McGraw-Hill Irwin.
- Humphreys, J. H. (2005). Contextual implications for transformational and servant leadership: A historical investigation. *Management Decision*, 43(10), 1410-1431.
- Ibsen, C. A., & Ballweg, J. A. (1974). Telephone interviews in social research: Some methodological considerations. *Quality & Quantity*, 8(2), 181-192.
- Jacob, Y. (1994). What makes rural finance institutions successful? *World Bank Research Observer*, 9, 49-70.
- Johns, G. (2006). The essential impact of context on organizational behavior. *Academy of Management Review*, 31(2), 386-408.
- Johnson, Kenneth M., (2003). Unpredictable Directions of Rural Population Growth and Migration. Brown, D. L., Swanson, L. E., Barton, A. W., & NetLibrary, I. *Challenges for Rural America in the twenty-first century*. (pp.19 -31) University Park, PA: University Press.
- Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher*, 33(7), 14-26.
- Kanuk, L., & Berenson, C. (1975). Mail surveys and response rates: A literature review. *Journal of Marketing Research*, 12(4), 440-453.
- Kershner, J. Q. (1990). Managing technology in a community bank. *ABA Banking Journal*, 82(11), 26.
- Kennedy, R., Jr. (2003, May 20). *Larry King live* [Interview]. Time Warner.
- Kilkenny, M., & Nalbarte, L. (2000). Keystone sector identification. *Regional Research Institute: West Virginia University*. Retrieved from <http://www.Rri.Wvu.edu/WebBook/Kilkenny/editedkeystone.Html>
- Kincaid, S. B., & Gordick, D. (2003). The return on investment of leadership development: Differentiating our discipline. *Consulting Psychology Journal: Practice and Research*, 55(1), 47-57.
- Kirkpatrick, S. A., & Locke, E. A. (1991). Leadership: Do traits matter? *Academy of Management Executive*, 5(2), 48-60.

- Kotter, J. P. (1999). *John P. Kotter on what leaders really do*. Boston, MA: Harvard Business School Press.
- Kotter, J. P., & Heskett, J. L. (1992). *Corporate culture and performance*. New York, NY: Free Press.
- Kouzes, J. M., & Posner, B. Z. (2002). *The leadership challenge* (3rd ed.). San Francisco: Jossey-Bass.
- Lindgreen, A., Swaen, V., & Maon, F. (2009). Introduction: Corporate social responsibility implementation. *Journal of Business Ethics*, 85, 251-256.
- Markley, M. D. (2001). Financing the new rural economy. *Federal Reserve Bank of Kansas City Rural Conference*, September, 69-80.
- Marshall, C., & Rossman, G. B. (2006). *Designing qualitative research* (4th ed.). Thousand Oaks, CA: Sage.
- Maxim, P. S. (1999). *Quantitative research methods in the social sciences*. New York, NY: Oxford University Press.
- Mayring, P. (2000). Qualitative content analysis. *Forum: Qualitative Social Research*, 1(2), 105-114.
- McCauley, C. D., Moxley, R. S., & Van Velsor, E. (2004). *The center for creative leadership handbook of leadership development*. San Francisco, CA: Jossey-Bass.
- McGregor, D., & Perrin, S. M. (1975). *Leadership and motivation*. Paris, France: Entreprise Moderne d'Édition.
- Muijs, D. (2010). *Doing quantitative research in education with SPSS* (2nd ed.). Thousand Oaks, CA: Sage.
- Musselwhite, K., Cuff, L., McGregor, L., & King, K. M. (2007). The telephone interview is an effective method of data collection in clinical nursing research: A discussion paper. *International Journal of Nursing Studies*, 44(6), 1064-1070.
- Northouse, P. G. (2001). *Leadership theory and practice* (2nd ed.). Thousand Oaks, CA: Sage.
- O-Toole, J. O. (1996). *Leading change*. New York, NY: Ballentine Books.
- Patten, M. L. (1996). *Understanding research methods: An overview of the essentials* (2nd ed.). Glendale, CA: Pyrczak.

- Payne, B. M., Nielsen, J. F., & Tyran, K. L. (2002). An investigation of cultural cohesion in a community bank. *International Journal of Human Resource Management*, 13(4), 677-696.
- Pernick, R. (2001). Creating a leadership development program: Nine essential tasks. *Public Personnel Management*, 30(4), 429-444.
- Popper, D. E., & Popper, F. J. (1987). The Great Plains: From dust to dust. *Planning*, 53(12), 12-18.
- Popper, D. E., & Popper, F. J. (1993). The buffalo commons, then and now. *Focus*, 43(4), 17.
- Robert Woods Johnson Foundation. (2008). *RWJF-qualitative research guidelines*. Retrieved from <http://www.qualres.org/HomeMemb-3696.html>
- Rose, P. S., Hudgins, S. C., & Rose, P. S. (2010). *Bank management and financial services* (8th ed.). New York, NY: McGraw-Hill/Irwin.
- Rost, J. C. (1991). *Leadership for the twenty-first century*. New York, NY: Praeger.
- Rural Life Census Data Center. (2007). *Census of agricultural state and county profile*. Retrieved from <http://sdrurallife.sdstate.edu/population.htm>
- Schermerhorn, J. R. (1997). Situational leadership. *DEAN'S FORUM Critical Success Factors for Community-Based Education* 3, 12(2), 5.
- Segal, M. (1997). *Points of influence: A guide to using personality theory at work*. San Francisco, CA: Jossey-Bass.
- Shelley, L. I. (1998). Crime and corruption in the digital age. *Journal of International Affairs*, 51(2), 605-620.
- Simpson, W. G., & Kohers, T. (2002). The link between corporate social and financial performance: Evidence from the banking industry. *Journal of Business Ethics*, 35(2), 97-109.
- Sproull, N. L. (1995). *Handbook of research methods: A guide for practitioners and students in the social sciences*. Lanham, MD: Scarecrow Press.
- Stogdill, R. M. (1948). Personal factors associated with leadership: A survey of the literature. *Journal of Psychology*, 25(1), 35-71.
- Tashakkori, A., & Teddlie, C. (2003). *Handbook of mixed methods in social & behavioral research*. Thousand Oaks, CA: Sage.

- Taylor, S. J., & Bogdan, R. (1984). *Introduction to qualitative research methods: The search for meanings* (2nd ed.). New York, NY: Wiley.
- Tesch, R. (1990). *Qualitative research : Analysis types and software tools*. New York, NY: Falmer Press.
- Thomas, R., & Purdon, S. (1994). Telephone methods for social surveys. *Social Research Update*, 8, 1-7.
- U.S. Census Bureau. (2008). *State and county quickfacts*. Washington, DC: Author.
- Vilanova, M., Lozano, J., & Arenas, D. (2009). Exploring the nature of the relationship between CSR and competitiveness. *Journal of Business Ethics*, 87, 57-69.
- Vogt, W. P. (2007). *Quantitative research methods for professionals*. Boston, MA: Pearson/Allyn and Bacon.
- Walser, J., & Anderlik, J. (2004). The future of banking in America—rural depopulation: What does it mean for the future economic health of rural areas and the community banks that support them? *FDIC Banking Review*, 16(3), 57-95.
- Walumbwa, F. O., Orwa, B., Wang, P., & Lawler, J. J. (2005). Transformational leadership, organizational commitment, and job satisfaction: A comparative study of Kenyan and U.S. financial firms. *Human Resource Development Quarterly*, 16(2), 235-256.
- Wheatley, M. J. (2005). *Finding our way: Leadership for an uncertain time*. San Francisco, CA: Berrett-Koehler.
- Williams, F. (2001, January 21). Plains sense. *High Country News*, 33, 8-11.
- Wilmers, R. G. (2009, December 19). Not all banks are created alike. *Wall Street Journal*. Retrieved from <http://online.wsj.com/article/SB10001424052748703523504574603691009274998.html>
- Yeager, T. J. (2004). The demise of community banks? Local economic shocks are not to blame. *Journal of Banking & Finance*, 28(9), 2135-2153.

**INFORMATION CONGRUENCY MODEL: THE ROLE OF INFORMATION
CONGRUENCY IN JOB SEEKERS' DECISION MAKING PROCESS**

By:

Dr. Raina M. Rutti
Assistant Professor of Management
School of Business
Dalton State College
650 College Drive
Dalton, GA 30720
rrutti@daltonstate.edu

Dr. Sung-Hee "Sunny" Park
Assistant Professor of MIS
School of Business
Dalton State College
650 College Drive
Dalton, GA 30720
shpark@daltonstate.edu

Dr. Marilyn M. Helms, CPFIM, CIRM, CSCM, CQM/OE
Sesquicentennial Chair and Professor of Management
School of Business
Dalton State College
650 College Drive
Dalton, GA 30720
mhelms@daltonstate.edu

**Southeast Decision Science Institute 43rd Annual Meeting
February 20-22, 2013 Charleston, South Carolina**

Abstract

From the job seeker's point of view, decision making in the employment process is neither simple nor straightforward. In order to examine the decision making of the job seekers, this study is to investigate the relationships among the job seeker's perceptions of the company credibility, job information trustworthiness, usefulness of job, and attractiveness (expected enjoyment and satisfaction) of job, and the effects of the job seekers perceptions on their attitudes toward the job including behavioral intentions to accept the job. Further, this study contributes to the literature by including a moderating variable, namely information congruency, to the traditionally studied relationships and its effect on the links between applicants' perceptions of the job and their attitudes. Two studies were designed to test the model. In order to examine the relationships regarding applicants' perceptions and attitudes, we conducted a large-scale data collection via a structured survey and ran a structural equation model. In order to test the moderation effects of information congruency on the relationships between perceptions and attitudes, a 2 x 3 experimental design was employed and a factorial Analysis of Variance (ANOVA) was used to assess the interactions. Results and findings will be discussed during the presentation at the conference.

Key words: information congruency, the job seeker's perceptions, job preview, internships

INFORMATION CONGRUENCY MODEL: THE ROLE OF INFORMATION CONGRUENCY IN JOB SEEKERS' DECISION MAKING PROCESS

Introduction

Decision making in the employment process from a job seeker's point of view encompasses much more than filling out a job application. From the job seeker's point of view, finding the right job involves not only calculating costs and benefits of the job but also comparing the job with other jobs available in terms of job attributes and expectations. The job seeker even compares attributes and expectations of the company. However, when examining previous studies about the employment process from the job seeker's point of view, there have been dichotomous lines of research centered on the reactions of job seekers. One line of research focuses on the reaction of job seekers to different recruiting practices, while the other explores the reaction to various job attributes. This study will provide an extended view of both streams of research while including job seekers' perceptions of not only alternative recruiting practices when provided with different types of job previews, but also company credibility (as an attribute), trustworthiness of job information available to them, usefulness of the job, and attractiveness (expected enjoyment and satisfaction) of the job. Moreover, this research integrates the job seekers perceptions with their attitudes toward the job including behavioral intentions to accept the job. Further, this study contributes to the literature by including a moderating variable, namely information congruency, to the traditionally studied relationships and its effect on the links between applicants' perceptions of the job and their attitudes.

Further, this study contributes to the literature by including a moderating variable, namely information congruency, to the traditionally studied direct relationship of applicants' perception and its effects. The contribution of this research is exploring how the congruence

between the information provided by the company during recruitment and the information from an outside source moderates the relationship between applicants' perceptions of the job and their attitudes.. The information from the outside source was situated as an article from a reputable published business source (i.e. the *Wall Street Journal*) providing another unique aspect to the study.

The remainder of the paper is organized as follows: first, we discuss 1) the role of job previews, 2) corporate image and credibility, and 3) additional outside information in the literature review section. Then, our research model is presented followed by discussions of sample data descriptions, along with data analyses and their results. Concluding remarks are made in the final section.

Literature Review

Job Previews

Organization recruiters recognize the importance of managing job applicants' impressions and therefore tend to provide positive information of work at their organizations to recruit the best candidates (Buckley, Mobbs, Mendoza, Novicevic, Carraher, & Beu, 2002; Lee, Ashford, Walsh, & Mowday, 1992; Wanous, 1980). However, these initial interactions often create unrealistic job expectations. This disparity tends to lessen job satisfaction, commitment, and employee productivity, and can lead to higher absenteeism. Additionally, unrealistic expectations have been found to affect worker turnover during the first year of employment (Bretz & Judge, 1998; Dugoni & Ilgen, 1981; Meglino, Ravlin, & DeNisi, 1997; Rynes, Bretz, & Gerhart, 1991; Wanous, Poland, Premack, & Davis, 1992). Thus, the ability to create realistic expectations among new hires is particularly significant to organizations in terms of efficiency

and sunk costs in new hires (i.e. screening costs, training costs, certification requirements). One strategy in which organizations can increase realistic expectations is through advertising job openings with realistic job preview information included.

The job preview is the announcement of an available position within a company. It typically includes information on the job, duties, salary provided, and outlines applicant requirements. Realistic job previews (RJPs) are a specific type of job preview that provide more realistic information about the expected job duties. RJPs provide both desirable and not so desirable (i.e., truthful – both positive *and* negative) aspects of the job. Studies have found realistic information decreased respondents' expectations and organizational attraction but increased perceptions of trustworthiness. Additionally, in comparison to traditional previews, RJPs facilitated better matching of individuals to organizations (Adeyemi-Bello & Mulvaney, 1995; Buckley, Fedor, Carraher, Fink, & Marvin, 1997; Travagline, 2002). Other research including a meta-analytic review of RJPs found a relationship between RJPs and higher performance in addition to a relationship between RJPs and lower attrition related to voluntary turnover (Buckley, Fedor, Veres, Wiese, & Carraher, 1998; Phillips, 1998). RJPs have also been studied in connection with alternative recruiting practices. Meta-analysis of the effectiveness of RJPs indicates an increase in job satisfaction for applicants who accept jobs advertised with RJPs due to self-selection, freedom of choice and lowered or more realistic expectations of the job (Meglino, Ravlin, & DeNisi, 2000).

Corporate Image and Credibility

One line of research on the job seeker's perspective in the employment process has focused on the reaction of job seekers to various job attributes (Feldman, Bearden, & Hardestry,

2006; Powell, 1984; Roberson, Collins, & Oreg, 2005; Taylor & Bergmann, 1987). Job attributes encompass many different dimensions including what qualifications are required, what responsibilities and tasks are expected, and may even include information about the company and how a job opening fits within the structure of the firm. Recent studies focusing on job attributes and job seekers have considered such aspects as company culture, advancement opportunities and the nature of work (see for example: Boswell, Roehling, LePine, & Moynihan, 2003; Gardner, Reithel, Foley, Coglisier, & Walumbwa, 2009; Knouse, 2009; Ma & Allen, 2009; Phillips, 1998; Templer, Tay, & Chandrasekar, 2006). These studies have found the attributes play an important part in the decision a job seeker makes about accepting a job. Thus, how a potential applicant views these aspects impacts how the company's image is perceived.

An important aspect of company image is credibility, or how believable and trustworthy the job candidate perceives the company to be. In terms of recruiting efforts and materials and company disseminated information, the company becomes the source of this information. Research has found two factors determine the "source" credibility-- expertness and trustworthiness (Hovland, Janis & Kelley, 1953; Ohanian, 1990; Newell & Goldsmith, 2001). Expertness deals with the perception of the truthfulness of the source of the information (i.e., the company), while trustworthiness is the degree of confidence in and acceptance of a message.

Additional research on alternative recruiting practices has studied applicant reactions to the perceived fairness and justness of the selection procedures. Gilliland (1993) suggests applicant reactions to employment selection procedures will provide a variety of outcomes. For example, applicants are likely to suspend contact with an organization they perceive as having unfair and unjust procedures. Furthermore, this perception of the unfair procedures will lead to a diminished view of the company, which in turn tarnishes the company's image in the eyes of the

job applicant. Other research exploring fairness and attitudes toward an organization found attitudes toward an organization are positively related to the perceived fairness of the interview process and are used by individuals in forming a perceived image of a company (Kohn & Dipboye, 1998). The combination of these findings seem to indicate individuals gather information about organization and make determinations of credibility based on fairness and accuracy of the information provided by the organization and first-hand experiences with the organization.

Additional Outside Information

While organizations may wish to be the gatekeepers of information about themselves in hopes to present a positive image, information about an organization can come from many sources. One study examining corporate and recruitment images in relation to initial job choices, found exposure to information about the organization including personal use of products or services, studying the organization in a college class, and exposure to company advertisements were important to an individual's perception of the corporate image (Gatewood, Gowan, & Lautenschlager, 1993). In addition, this study found both corporate image and recruitment image was significantly correlated to potential job applicant's intent to pursue further contact with an organization. These findings support the idea that an applicant's increased exposure to a company help form a stronger image of that company. Further, it would indicate job applicants will use information from multiple sources to form an opinion of the company and determine their interest in contacting the company as a potential applicant.

Because applicants are obtaining information from multiple sources, how they use that information in determining perceived corporate credibility is important to recruiting.

Explanation-based decision making theory examines how people make decisions based on information provided to them. This theory provides a model whereby the decision maker constructs a causal explanation of the information they are given by combining it with related knowledge and expectations (Pennington & Hastie, 1988). In the realm of information received about job positions and how that impacts decisions based on the credibility of the company, an applicant would utilize explanation-based decision making to provide a suitable rationale as to why information may differ between a job preview and additional information from outside sources such as media, the Internet, or word- of- mouth.

Two ways to explain a discrepancy between this additional outside information and the information provided from the job preview or from the company (source) would be: (1) the company is either being untruthful in their evaluation of the job or (2) the person providing the additional information about the job has limit information (not an expert on the specific job or the overall organization). By providing additional information from a perceived credible outside source (i.e. the *Wall Street Journal* which is considered both truthful and expert) the onus of the discrepancy would lie with the organization which in turn would lower the credibility score, whereas subjects receiving consistent information about a job position would provide a higher credibility rating.

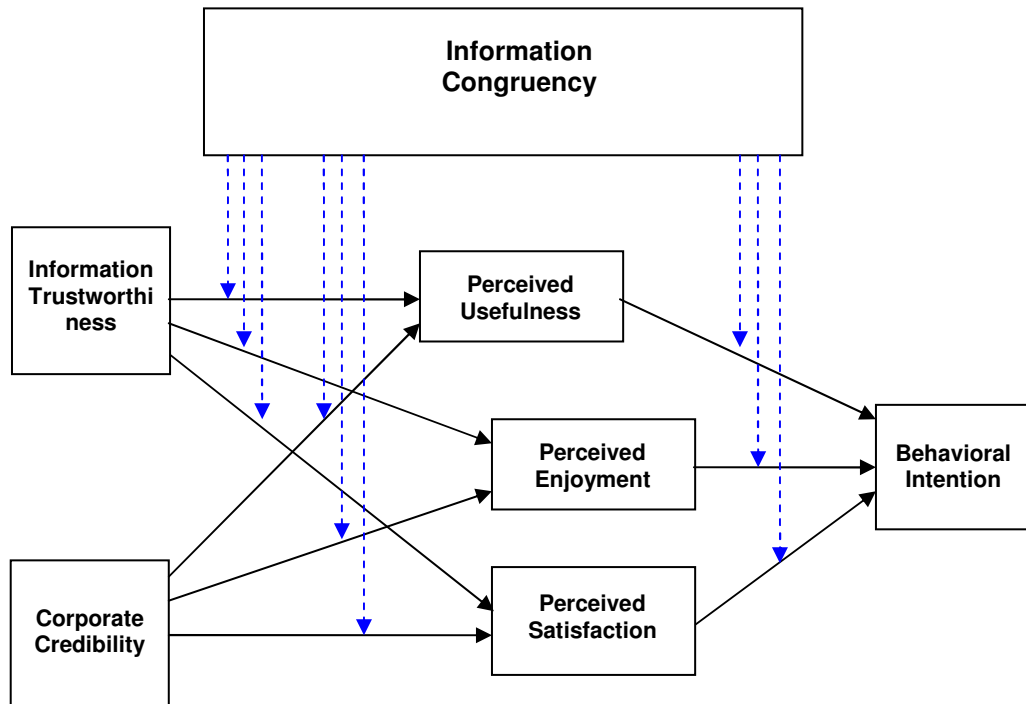
Research Model

The research model is shown in Figure 1. The phenomenon of interest that we intend to investigate is the role information congruency in in the employment process from a job seeker's point of view. The research model proposes that corporate credibility and information trustworthiness are two salient characteristics as the main antecedents to the job seeker's

perceptions, which are conceptualized as consisting of perceived usefulness of the job, perceived enjoyment and perceived satisfaction of the job. They (i.e., job seekers), in turn, can contribute towards attitudes such as behavioral intentions to accept the job.

The research model depicted in Figure 1 also argues that the moderating roles of information congruency (i.e., congruence between internal and external information) on the relationship among job seekers' perceptions, evaluations and their attitudinal outcomes. Thus, information congruency moderates all of the relationships in our research model. In Figure 1, the moderating roles of information congruency are depicted as dotted lines, which moderate all of the paths among the job seeker's perceptions (i.e., corporate credibility and information trustworthiness), user evaluations (i.e., perceived usefulness of the job, perceived enjoyment and perceived satisfaction), and their outcomes (i.e., behavioral intentions).

Figure 1: Research Model



** Please note that we will elaborate on the constructs operationalized in the research model in the final version of our paper. Currently, the section for the elaboration on the constructs is omitted.

Method

Study 1 – Method part of Study 1 will be available on our presentation at the conference

Study 2

Description of the Sample

To test these hypotheses, 131 Business Administration majors enrolled in select classes at the undergraduate (senior-level) and graduate (MBA) level business classes at a large, AACSB-accredited Southeastern university were asked to anonymously complete a survey after reading and reviewing provided information about a company and a job description for an internship opportunity relevant to their field of study. By framing the job preview as an internship allowed the job preview to be presented in a way that was relevant to the student's unique situation in the job market. This study follows the methodology of prior research on realistic job preview information dissemination utilizing student samples (McLean, Smits, & Tanner, 1991; Fisher, Ilgen, & Hoyer, 1979; Saks & Cronshaw, 1990; Travagline, 2002; Spitzmüller, Neumann, Spitzmüller, Rubino, Keeton, Sutton, & Manzey, 2009).

Demographics of the sample were: 65% undergraduate, 45% male, average age 21.8 years, 90% were native English speakers, average full-time work experience was 1.5 years, 41% had participated in an internship, 71% planned on participating in an internship, and 18.5% were minorities. For this study, the use of students was appropriate as they are frequently engaged in the job search process, either searching for an internship to complete during their studies (as this study was framed) or for full-time employment in anticipation of graduation.

Design of the Study

Students were given all information (job description, possible additional information and the three-page survey) to complete during class and were allowed ample time to read the material and complete the survey. Most finished the process in less than half an hour. The researchers were present to answer questions from the respondents. The survey was approved by the

University's Human Subjects Committee prior to administration and also pre-tested with a sample of five students not included in the final results.

In the study, students were asked to examine a job preview (or advertisement) and complete a survey. The job preview described a business internship appropriate for any business major and included all functional areas of business -- accounting/finance, consulting, marketing/advertising, sales/customer service, operations management, and human resources. The format was similar to other jobs describing a student internship that would be posted on the career services website of the Business School's Career Center. In addition, part of the sample was then given additional information about the internship company from a *Wall Street Journal* article. Students were led to believe the job and company were real. They were only informed in debriefing, and after completing the survey, the job and any additional information provided was not real.

The experiment was a two by three factorial design scenario in which the job preview (positive versus realistic) and outside information (none, positive, or mixed) were manipulated. In both versions of the internship posting, the date range, opportunity type, location and much of job details were the same. The **positive** job preview (PJP) provided quotes from past interns to establish buoyant feelings for the job (i.e., "excellent opportunities for advancement following graduation," "I was really able to develop and use my skills and knowledge with the help of my mentor"). In contrast and to avoid ambiguity, the **realistic** job preview (RJP) included three additional statements of judgmental content and medium negativity (i.e., less desirable aspects of the job including an unpredictable work schedule and a micromanaging supervisor) as suggested by Wanous (1989) as well as quotes from past interns (i.e. "more traditional internship duties such as filing and copying will also be expected," "opportunities for advancement may be

limited for some positions,” “aside from the monotonous filing and copying aspect of the job, I feel like I gained good hands-on experience I can use in the future,” “students will be very closely monitored”). Almost half (65) students were given the positive (PJP) version while 66 were given the more realistic (RJP) description.

The group was divided into thirds (44, 44, and 45) for the second manipulation which involved the amount and type of additional information – (1) **no** additional information (NAI), (2) **positive** additional information (PAI), or (3) **realistic** additional information (RAI). The information was an article entitled “New Internship Programs Provide Job Experience.” The more **positive** article (PAI) mentioned that “over the past three years, the company has built a program to help cultivate college students for entrance into the business world.” The more **realistic** article (RAI) mentioned that the training orientation was the intent of the internship but again highlighted the more traditional filing, copying, and errand duties. The RAI also added an additional sentence that read: “However, some of the employees and former interns have mixed feelings.”

Both articles mentioned that “75% of the students from the internship go on to accept positions with the company and start at a more senior level than most new graduates,” while the more realistic copy (RAI) also mentioned students did not move up as quickly as in other companies. A student quote stressed this fact – “I started in a higher job level than other graduates, but I had to make a lateral move to get in line for a promotion. Even though I was discouraged for a while because I had to remain at this level longer, I am satisfied with the direction my career is going.”

**** Analysis, Results, and Conclusions Sections will be available and presented at the Conference**

References

- Adeyemi-Bello, T., & Mulvaney, W. (1995), "The development and administration of realistic job previews." *Equal Opportunities International*, 14(5), 1.
- Boswell, W. R., Roehling, M. V., LePine, M. A., & Moynihan, L. M. (2003), "Individual job choice decisions and the impact of job attributes and recruitment practices: a longitudinal field study." *Human Resource Management*, 42(1), 23-37.
- Bretz, R. D., Jr. & Judge, T. A. (1998), "Realistic job previews: A test of the adverse self-selection hypothesis." *Journal of Applied Psychology*, 83(2), 330-337.
- Buckley, M. R., Fedor, D. B., Veres, J. G., Wiese, D. S. & Carraher, S. M. (1998), "Investigating newcomer expectations and job-related outcomes." *Journal of Applied Psychology*, 83(3), 452-461.
- Buckley, M. R., Fedor, D. B., Carraher, S. M., Fink, D. D., & Marvin, D. (1997), "The ethical imperative to provide recruits realistic job previews." *Journal of Managerial Issues*, 9(4), 468-484.
- Buckley, M. R., Mobbs, T. A., Mendoza, J. L., Novicevic, M. M., Carraher, S. M., & Beu, D. S. (2002), "Implementing realistic job previews and expectation – lowering procedures: A field experiment." *Journal of Vocational Behavior*, 61, 263-278.
- Dugoni, B. L. & Ilgen, D. R. (1981), "Realistic job previews and the adjustment of new employees." *Academy of Management Journal*, 24(3), 579-591.
- Feldman, D. C., Bearden, W. O., & Hardestry, D. M. (2006), "Varying the content of job advertisements: The effects of message specificity." *Journal of Advertising*, 35(1), 123-141.
- Fender, D. L. & Watson, L. E. (2005), "OSH Internships: One program's perspective on benefits for students, employers and universities." *Professional Safety*, 50(4), 36-40.
- Fisher, C., Ilgen, D. & Hoyer W. (1979), "Source credibility, information favorability, and job offer acceptance." *Academy of Management Journal*, 22, 94-103.
- Gardner, W. L., Reithel, B. J., Foley, R. T., Coglisier, C. C., & Walumbwa, F. O. (2009), "Attraction to organizational culture profiles: Effects of realistic recruitment and vertical and horizontal individualism-collectivism." *Management Communication Quarterly*, 22(3), 437-472.

- Gatewood, R. D., Gowan, M. A., & Lautenschlager, G. J. (1993), "Corporate image, recruitment image, and initial job choice decisions." *Academy of Management Journal*, 36(2), 414-427.
- Gilliland, S. W. (1993), "The perceived fairness of selection systems: an organizational justice perspective." *Academy of Management Review*, 18(4), 694-734.
- Hovland, C. I., Janis, I. K., & Kelley, H. H. (1953), *Communication and Persuasion*, New Haven, NJ: Yale University Press.
- Knouse, S. (2009), "Targeted Recruiting for Diversity: Strategy, Impression Management, Realistic Expectations, and Diversity Climate." *International Journal of Management*, 26(3), 347-353,487.
- Kohn, L. S. & Dipboye, R. L. (1998), "The effects of interview structure on recruiting outcomes." *Journal of Applied Social Psychology*, 28, 821-843.
- Lee, T. W., Ashford, S. J., Walsh, J. P., & Mowday, R. T. (1992), "Commitment propensity, organizational commitment, and voluntary turnover: A longitudinal study of organizational entry processes." *Journal of Management*, 18(1), 15-32.
- McLean, E. R., Smits, S. J., & Tanner, J. R. (1991), "Managing New MIS Professionals." *Information & Management*, April, 20(4), 257-264.
- Ma, R. & Allen, D. G. (2009), "Recruiting across cultures: A value-based model of recruitment." *Human Resource Management Review*, 19(4), 334-346.
- Meglino, B. M., Ravlin, E. C., & DeNisi, A. S. (1997), "When does it hurt to tell the truth? The effect of realistic job previews on employee recruiting." *Public Personnel Psychology*, 46, 803-822.
- Meglino, B. M., Ravlin, E. C., & DeNisi, A. S. (2000), "A meta-analytic examination of realistic job preview effectiveness: A test of the tree counterintuitive propositions." *Human Resource Management Review*, 10(4), 407-434.
- Newell, S. J. & Goldsmith, R. E. (2001), "The development of a scale to measure perceived corporate credibility." *Journal of Business Research*, 52 (3), 235-247
- Ohanian, R. (1990), "Construction and validation of a scale to measure celebrity endorsers' perceived expertise, trustworthiness, and attractiveness." *Journal of Advertising*, 19(3), 39-52.
- Pennington, N. & Hastie, R. (1988), "Explanation-based decision making: Effects of memory structure on judgment." *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 14 (3), 521-533.

- Phillips, J. M. (1998), "Effects of realistic job previews on multiple organizational outcomes: A meta-analysis." *Academy of Management Journal*, 41(6), 673-690.
- Powell, G. A. (1984), "Effects of job attributes and recruiting practices on applicant decisions: a comparison." *Personnel Psychology*, 37, 721-732.
- Rynes, S. L, Bretz, R. D., & Gerhart, B. (1991), "The importance of recruitment in job choice: A different way of looking." *Personnel Psychology*, 44, 487-521.
- Roberson, Q. M., Collins, C. J., & Oreg, S. (2005), "The effects of recruitment message specificity on applicant attraction to organizations." *Journal of Business and Psychology*, 19(3), 319-339
- Saks, A. M., & Cronshaw, S. F. (1990), "A Process Investigation of Realistic Job Previews: Mediating Variables and Channels of Communication." *Journal of Organizational Behavior*, 11(3), 221.
- Spitzmüller, C., Neumann, E., Spitzmüller, M., Rubino, C., Keeton, K., Sutton, M., & Manzey, D. (2008), "Assessing the Influence of Psychosocial and Career Mentoring on Organizational Attractiveness." *International Journal of Selection and Assessment*, 16(4), 403-415.
- Taylor, M. S. & Bergmann, T. J. (1987) "Organizational recruitment activities and applicants' reactions at different stages of recruitment process." *Personnel Psychology*, 40, 261-285.
- Templer, K. J., Tay, C., & Chandrasekar, N. A. (2006), "Motivational cultural intelligence, realistic job preview, realistic living conditions preview, and cross-cultural adjustment." *Group & Organizational Management*, 31(1), 154-173.
- Travagline, A. M. (2002), "Online recruiting: Implementing internet-based realistic job previews." *Ph.D. dissertation*, Temple University, United States -- Pennsylvania.
- Wanous, J. P. (1980), *Organizational entry: Recruitment selection, and socialization of newcomers*. Reading, MA: Addison Wesley.
- Wanous, J. P. (1989), "Installing a realistic job preview: Ten tough choices." *Personnel Psychology*, 42, 117-134.
- Wanous, J. P., Poland, T. D., Premack, S. L., & Davis, K. S. (1992), "The effects of met expectations on newcomer attitudes and behaviors: A review and meta-analysis." *Journal of Applied Psychology*, 77(3), 288-297.

Does Gender Influence Attitudes Toward Genetically Modified Food?

Howard G. Ling
University of North Carolina at Pembroke

Marilu E. Santos
University of North Carolina at Pembroke

ABSTRACT

Foods derived from genetically modified (GM) crops and have been a part of the food chain in the United States for more than a decade while incurring little of the controversy exhibited in European countries. GM crops include fruits, vegetables and grains and are the result of a process by which foreign genes are spliced into a related or non-related species resulting in a genetically modified organism. This pilot study examines whether female and male consumers hold different attitudes toward GM food. Surveys of the literature regarding consumer attitudes toward GM foods in the United States, Europe, and developing economies are presented together with an analysis of gender differences in consumer behavior with a particular emphasis on food purchasing. The results of this initial study offers evidence that suggests that women perceive GM food to be less useful, less morally acceptable, more personally risky, less economically necessary, and should be less politically encouraged than their male counterparts. Additionally, women were found to have a less positive attitude towards purchase of GM foods than men. This study concludes with a discussion of the ways by which marketers may consider gender differences when developing marketing strategies for GM food.

INTRODUCTION

Genetically modified (GM) food is food produced from any plant or animal that has been genetically altered during its production using the modern techniques of gene technology. The first wave of GM food possessed enhanced input properties and is producer and environmentally friendly. For example, genes for herbicide resistance have been transplanted from bacterial cells into tobacco plants, demonstrating that these transgenic plants better tolerate the herbicides used for weed control. The second wave of GM foods has enhanced output properties and is designed to be more consumer-friendly. Some examples are fruits and vegetables with higher antioxidant contents to reduce the risk of heart disease, diabetes and cancer as well as rice with higher levels of iron. Other examples of second wave GM foods include milk and other animal products with healthier fat content and lower levels of allergens and horticultural produce with enhanced flavor, texture, and shelf-life. On the horizon are bananas that produce human vaccines against infectious diseases such as hepatitis B, fish that mature more quickly, cows that are resistant to bovine spongiform encephalopathy (mad cow disease), fruit and

nut trees that yield years earlier, and plants that produce new plastics with unique properties.

GM foods provide another market choice alongside conventional foods and organic products. In this current study, attitude and belief dimensions of male and female university students are examined from the context of second-generation, value-enhanced GM foods from crops. Previous studies utilizing European and Canadian respondents have strongly suggested that women do perceive GM foods differently than men and that their attitudes are consistently more negative than men (Moerbeek & Casimir, 2005). Specifically, this study attempts to assess the conjecture that male and female consumers in a United States setting harbor different attitudes towards the willingness to purchase GM food.

LITERATURE REVIEW

Consumer Attitudes toward GM Foods

Many studies have focused on consumer attitudes in the United States (Ganiere, Wen, Chern & Hahn, 2006). Baker and Burnham (2001) investigated American consumers' acceptance of GM corn flakes and found that 30% of consumers surveyed based their purchasing decisions on GM content. According to new research conducted by the U.S. Department of Agriculture's Economic Research Service (2004), consumers in the United States are not as willing to buy foods manufactured from GM grains, oilseeds and other crops. In addition, gender, income, and other demographic characteristics appear to have only a slight impact on consumers' willingness to purchase biotech foods. Surveys by the Pew Initiative on Food and Biotechnology (2005) show American consumers are surprised and even outraged when they learn how pervasive GM foods are. On a scale of 1 to 10 with 10 indicating "very well informed on biotechnology", fifty-three percent rated their awareness at 3 points or below, indicating that they were relatively not well informed regarding biotechnology issues. Nearly an identical number of consumers - (54%) - reported they had heard "not much" or "nothing" about biotech foods in grocery stores.

Conventional wisdom has suggested that attitudes among Americans and Europeans toward GM foods are very different with Americans supporting and Europeans opposing the introduction of GM foods (Pew Initiative on Food and Biotechnology, 2003). However, two recent government-funded surveys indicate the two groups share some similar attitudes. The Eurobarometer (2001), a comprehensive poll of European citizens carried out by the European Commission, shows a large majority of Europeans, 70.9%, say they do not want GM foods. In the United States, the Food Policy Institute at Rutgers University found that 73% of Americans, like Europeans, seem skeptical about GM foods (Hallman, Adelaja, Schilling, & Lang, 2002). Le Marre, Wine, Burkink, Grunhagen, & Wells (2007) studied American versus French perspectives toward GM foods. Respondents from both countries perceive a direct benefit from second generation GM foods with at least a less negative attitude toward them. In another study using university students, Chern and Rickertsen (2001) reported that Americans are more willing to consume GM foods than Norwegians, Japanese and Taiwanese. Lusk, Roosen, and Fox (2003) estimated consumer willingness to purchase beef in France, Germany, the United Kingdom, and the United States using a variety of quality variables, including whether the cattle were fed with GM corn. Their results suggest that, compared with US

consumers, European consumers placed a much higher value on beef from cattle that had not been fed GM corn.

Several studies have compared consumer attitudes toward GM foods among developing countries. The University of Washington's IMPACT Center released the preliminary results of a consumer survey done in Mexico, Chile, and India focusing on attitudes toward GM crops (Curtis, McCluskey, & Wahl, 2004). The survey was conducted at grocery stores and in markets, and included both poor and more affluent demographics. In Chile and Mexico, 70% of respondents said they were willing to purchase GM food if it had more vitamins or other nutrients, or used fewer pesticides. In India, approximately 88% of consumers stated that they would buy GM foods. Although the majority of surveyed consumers in China reported that they had little or no knowledge of biotechnology, their attitudes toward (GM) foods were generally positive, especially for GM foods with product-enhancing attributes (Li, Curtis, McCluskey, & Wahi, 2002). These results imply that, unlike Europe and Japan, there is a potential market for GM foods in China and other developing economies. Korean consumers, who have proven to be strongly resistant to GM products, do show signs of changing attitudes toward GM foods when the promise of its benefits is communicated (Hallman, Jang, Hebden, & Shin, 2005).

Studies that have focused on the consumer acceptance of GM food in less developed countries indicate that technology has a role to play in addressing food insecurity in these nations (Nielsen, Robinson, & Thierfelder, 2001). Consumer surveys in supermarkets, kiosks, and maize mills in Kenya reported that 68% of respondents would purchase GM maize meal at the same price as their favorite brands, although many were concerned with the potential environmental and health risks as well as ethical and equity issues (Kimenju, De Groote, Karugia, Mbogoh & Poland, 2005). Curtis, McCluskey, and Wahl (2004) studied GM food acceptance among developing nations including the Columbia and China. These studies concluded that the generally positive perception towards GM foods in developing nations stems from more urgent needs in terms of food availability and nutritional content. Additionally, perceived levels of risk may be smaller due to somewhat greater trust in government, positive perceptions of science, and positive media influences.

Gender Attitudes toward GM Food

A stream of research developed in a European context suggests that women perceive GM foods less positively than men (Moerbeek & Casimir, 2005). These authors note that although men have become more involved in household responsibilities over the past decades, food selection and preparation remains an area where women have a major role. In a paper examining the role of gender in attitudes towards environmental sustainability, Casimir and Dutilh (2003), reported evidence which suggests that areas associated with environmentalism and sustainability are more closely related with female perspectives. These authors found that there was a negative correlation between countries which ranked higher on the Hofstede masculinity index and countries which ranked higher on an environmental sustainability index. Working from archival data taken from the 1996 and 2002 Eurobarometer data sets, Moerbeek and Casimir (2005), examined the role of gender in determining attitude toward biotechnology and GM foods. The Eurobarometer data was accumulated in surveys carried out in 15 European countries:

Austria, Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Sweden, and the UK. Women were found to have a less positive attitude toward GM foods on every measure that was examined.

Further evidence from a Canadian setting also seems to suggest that women hold more negative attitudes toward GM foods. In their study of 445 Canadian consumers, Gao, Veeman, and Adamowicz (2005), found that women were far more likely to search for additional information when confronted with a potential purchase of GM food. Their findings build on the results from an earlier study by Lin (1995), which found that women are generally more concerned about food safety issues than men.

In an American study done by Lesch, Wachenheim, and Stillerud (2005), partial evidence supporting the existence of a gender bias in terms of attitude toward GM foods was found. In a study of 407 consumers in North Dakota, these authors found that men held a more positive willingness to purchase GM-enhanced pasta and that this higher level of purchasing intention was statistically significant at the 0.10 level on several variables. These variables included: improved texture, more attractive color, and extended shelf life.

OBJECTIVES AND HYPOTHESES OF THE STUDY

The central focus of this study is whether female consumers view GM foods more negatively than their male counterparts. Paralleling the research of Le Marre et al., (2007) on American and French attitudes toward GM foods, this study incorporates the constructs of usefulness, moral acceptability, personal risk, economic necessity, and social imperative to examine attitudes toward GM foods. A sixth hypothesis directly examines the issue of purchase intention. Consequently, the primary research objective can be expressed in the form of the following six hypotheses:

H1: Women will have a less favorable attitude regarding the usefulness of GM food than men.

H2: Women will have a less favorable attitude regarding the moral acceptability of GM food than men.

H3: Women will have less positive perceptions of the personal riskiness of GM food than men.

H4: Women will have a less favorable attitude regarding the economic necessity of GM food than men

H5: Female perceptions of social and scientific policy toward GM foods will be less positive than men.

H6: Women will have a less positive attitude towards the purchase of GM foods than men.

METHODOLOGY

The research setting of our study focused on upper-level undergraduate students from the United States majoring in Biology and Business Administration. Students were offered a modest extra-credit incentive to participate in the study and participation was virtually 100%. Of the 148 respondents, 66 were male and 82 were female – a distribution which roughly approximated the University gender ratio. Our survey utilized a password-protected website in order to increase efficient data collection and control multiple submission issues. The survey questionnaire was largely based upon measures utilized in a cross-cultural analysis of French and American attitudes towards first and second-generation GM food published by Le Marre et al. (2007). These Likert measures were modified to reflect the purpose of our study comparing male and female attitudes toward foods from GM crops (*ex: Food derived from GM crops is useful*). Respondents utilized a 5 point scale where 1 = strongly agree, 2 = mostly agree, 3 = neither agree nor disagree, 4 = mostly disagree, and 5 = strongly disagree. The data was analyzed using SPSS 17.0 for Windows.

RESULTS

Descriptive statistics from the study are presented in Table 1 and include the mean, sample size, standard deviation, and standard error of the mean.

Table 1: Group Statistics Regarding GM Foods

Variables	Mean	N	Std. Dev.	Std. Error Mean
Male Attitude toward Usefulness	1.96	66	0.815	0.120
Female Attitude toward Usefulness	2.37	82	0.889	0.088
Male Attitude on Moral Acceptability	2.30	66	0.866	0.128
Female Attitude on Moral Acceptability	2.56	82	0.929	0.089
Male Attitude toward Riskiness	2.85	66	1.010	0.149

Female Attitude toward Riskiness	2.67	82	0.998	0.099
Male Attitude toward Necessity	2.28	66	0.981	0.145
Female Attitude toward Necessity	2.48	82	0.919	0.093
Male Attitude toward Encouragement	2.61	66	0.998	0.147
Female Attitude toward Encouragement	2.93	82	0.714	0.087
Male Attitude toward Purchase	2.57	66	1.241	0.183
Female Attitude toward Purchase	2.81	82	1.249	0.124

Further analysis of the data was performed utilizing paired t-tests to measure the differences between male and female attitudes toward food derived from GM crops. These results are presented in Table 2. When only means are examined, the evidence supports each of the six hypotheses although only in the first hypothesis was the difference in means found to be significant. Women were found to have less positive attitudes toward GM food on all five constructs as well as the purchase intention measure. In terms of mean differences, women perceived GM food to be less useful to society (-0.416), less morally acceptable (-0.254), more risky (0.181), less economically necessary (-0.139), and should not be socially encouraged (-0.225). The difference in means seen in the construct of riskiness is positive because women found GM food to be more risky. Women also had a less positive attitude regarding purchasing intention (-0.249). A statistically significant difference at the 0.05 level was only reported on the usefulness variable. For H1, females were found to perceive food from GM crops to be less useful than males ($t = -2.702$, $p = 0.008$). For the rest of the hypotheses, the differences that were found were not statistically significant at the 0.05 level. As can be seen from the Table 2, the statistical significance of the mean differences for H2 through H6 ranged widely from $p = 0.118$ to 0.310 . The constructs of moral acceptability ($p = 0.118$) and economic necessity ($p = 0.171$) received substantially more support than did the constructs for riskiness ($p = 0.310$) and societal encouragement ($p = 0.263$). Based upon the findings from our set of six hypotheses, we can only partially accept our central hypothesis that male undergraduate students possess a more generally positive attitude than female undergraduate students toward food derived from GM crops.

Table 2: Paired Samples t-tests of Male vs. Female Attitudes toward GM Foods

Variables	Mean Difference	t-value	Significance
Usefulness	-0.416	-2.702	0.008
Moral Acceptability	-0.254	-1.575	0.118
Riskiness	0.181	1.018	0.310
Necessity	-0.139	-0.822	0.171
Encouragement	-0.225	-1.377	0.263
Purchase Intention	-0.249	-1.123	0.236

LIMITATIONS OF THE STUDY

The limitations to this study mirror those of survey-based studies in general. The first of these limitations is that the data is based upon the self-reported responses of survey participants. While the reporting of attitudes toward GM food is not as controversial as some topics, there remains an element of social bias that cannot be discounted. Nevertheless, the research methodology and the instructions in the survey offered the promise of confidentiality as well as anonymity to respondents thus helping to minimize the social bias problem. A second area of limitations to our study lies in the choice of our sample frame. The conclusions offered in this study are limited to undergraduate Biology and Business Administration majors and may not apply to the general population. As mentioned earlier, the over-riding hypothesis that gender differences in attitudes towards GM foods would be found is largely grounded in the underlying theory of differences in gender roles regarding food acquisition and preparation at the nuclear family level. No attempt was made to collect data regarding whether female participants had children of their own and this may partially explain the lack of statistical significance for hypotheses two through six.

RECOMMENDATIONS FOR FUTURE RESEARCH

The diffusion of innovations is an area of research whose boundaries are constantly expanding. This is particularly the case regarding GM foods. Directions for further research in this area include studies on the attitudes of the general public rather than the sample of undergraduate students utilized in this study. Given the theoretical assumptions regarding the role of women in acquiring and preparing food for the household, a sample comprised solely of men and women with children may go further in examining gender differences regarding attitude toward genetically modified food. Another possible research topic might examine the role of scientific knowledge in determining attitude toward GM food. Biology majors, for instance, have been exposed to a significant amount of training in the areas of microbiology, genetic theory, and biotechnology while Business Administration majors would typically have very little exposure to these topics other than an introductory course in biology.

CONCLUSIONS

The diffusion of GM food technology has been underway for the better part of two decades. This study confirms and extends the research stream which demonstrates that males have more generally positive attitudes toward GM foods than do women. In this study, male consumers have been shown to have more positive attitudes to these foods based upon the grounds of moral acceptability, risk to human health, economic contribution and the usefulness and necessity of the innovation. While statistically significant differences at the .05 level between women and men can only be seen in the usefulness construct, on all measures women were found to have more negative attitudes toward GM foods than did men.

Studies of the adoption of innovation have repeatedly pointed to the relative advantage of the innovation as the most critical aspect of its adoption by consumers (Kotler, 2007). This study suggests that purveyors of GM food must effectively communicate the relative benefits of this innovation to consumers in order for the innovation to be widely adopted. The gender differences in attitudes toward GM food suggest that communication strategies be tailored to female audiences and that they be oriented toward two objectives. Firstly, diminishing the higher perceived risks which women hold regarding GM foods and secondly, highlight the relative advantages of GM food to women.

REFERENCES

- Baker, G. A., and T. A. Burnham (2001), Consumer response to genetically modified foods: Market segment analysis and implications for producers and policy makers. *Journal of Agricultural and Resource Economics*. 26, 2:387-403.

- Burton, M., D. Rigby, D. Young, and S. James (2001), Consumer attitudes to genetically modified organisms in food in the UK. *European Review of Agricultural Economics*, 28, 479-498.
- Casimir, G. and Dutilh, C. (2003), Sustainability: a gender studies perspective. *International Journal of Consumer Studies*, 27: 316-325.
- Chern, W.S. and K. Rickertsen (2001), Consumer acceptance of GMO: Survey results from Japan, Norway, Taiwan and the United States. *Taiwanese Agricultural Economic Review*. 7:1-28.
- Chern, W.S., K. Rickertsen, N. Tsuboi, and T. Fu (2003), Consumer acceptance and willingness to pay for genetically modified vegetable oil and salmon: A multiple country assessment. *AgBioForum*, 5(3), 105-112.
- Cummings, R. and B. Lilliston (2000), *Genetically engineered fish: A self-defense guide for consumers*. New York, N.Y. Marlowe and Company.
- Curtis, K.R., J.J. McCluskey, and T.I. Wahl (2004), Consumer acceptance of genetically modified food products in the developing world. *AgBioForum*, 7(1&2), 70-75.
- De Groote H., S. Mugo, D. Bergvison, G. Owuor and B. Odhiambo (2004), Debunking the myths of GM crops for Africa: The case of Bt Maize in Kenya. Paper presented at the American Association of Agricultural Economics Annual Meeting, Denver, Colorado, August 1-4, 2004
- European Commission (2003), On a generic approach to the safety assessment of micro-organisms used in feed/food and feed/food production. Working paper. Available from Internet: http://europa.eu.int/comm/food/fs/sc/scf/out178_en.pdf.
- Eurobarometer (2001). Europeans, Science and Technology. European Commission, 55.2. December.
- Food and Drug Administration (1992), Completed studies have demonstrated that the food from Bst-treated cows is safe for human consumption. (FDA Talk Paper August 17, 1992.). Available at www.monsantodairy.com.
- Ganiere, P., S. Wen, K. Chern and D. Hanh (2006), A continuum of consumer attitudes toward genetically modified foods in the United States. *Journal of Agricultural and Resource Economics*, 31(1): 129-149.
- Gao, Ce, Michelle Veeman, and Wiktor Adamowicz (2005), Consumers' search behavior for GM food information. *Journal of Public Affairs*, 5: 217-225.
- Golovan, S.P., R.G. Meidinger, A. Ajakaiye, M. Cottrill, M.Z. Wiederkehr, D. Barney, C. Plante, J. Pollard, M.Z. Fan, M.A. Hayes, J. Laursen, J.P. Hjorth, R.R.Hacker,

- J.P. Phillips, C.W. Forsberg (2001), Pigs expressing salivary phytase produce low phosphorus manure. *National Biotechnology*, 19: 741-745.
- Hallman, W. K., A. O. Adelaja, B. J. Schilling, and J. T. Lang (2002), Consumer beliefs, attitudes, and preferences regarding agricultural biotechnology. *Food Policy Institute Report*, Rutgers University, New Brunswick, NJ.
- Hallman, W.K., H.M. Jang., C.W. Hebden and H.K. Shin (2005), Consumer acceptance of GM food: A cross cultural comparison of Korea and the United States. *Food Policy Institute Report*, Rutgers University, New Brunswick, NJ.
- International Centre for Agricultural Science and Technology (1995), Consumer acceptance of potatoes that have been genetically modified through biotechnology. Saskatoon, SK: International Centre for Agricultural Science and Technology.
- Kaneko, N., and W. S. Chern (2005), Willingness to pay for genetically modified oil, cornflakes, and salmon: Evidence from a U.S. telephone survey. *Journal of Agriculture and Applied Economics*, 37(December 2005): pp.701-719.
- Kimenju, Simon Chege , Hugo De Groote, Joseph Karugia, Stephen Mbogoh and David Poland (2005), Consumer awareness and attitudes toward GM foods in Kenya. *African Journal of Biotechnology* Vol. 4 (10), pp. 1066-1075
- Kotler, Philip (2007), *Marketing Management*, Prentice Hall.
- Le Marre, K.N., Wine, C.L., Burkink, T.J., M.Grunhagen and G.J. Wells (2007), A second generation of genetically modified food: American vs. French perspectives. *Journal of Food Products Marketing*, Vol. 13 (1).
- Lesch, William C., Cheryl J. Wachenheim, and Bard S. Stillerud (2005), *Biotechnology: The healthy choice?*, *Health Marketing Quarterly*, 22(3): 55-79.
- Li, Q., K.R. Curtis, J.J. McCluskey, and T.I. Wahi (2002), Consumer attitudes toward genetically modified foods in Beijing, China. *AgBioForum*, 5(4), 145-152.
- Lin, J (1995), Demographic and socio-economic influences on the importance of food safety in food-shopping, *Agricultural and Resource Economics Review*, 24: 190-198.
- Liangxue, Lai.(2006), Generation of cloned transgenic pigs rich in Omega-3 fatty acid. *Nature Biotechnology*, doi:10.1038/nbt1198.
- Lusk, J., J. Roosen, and J. Fox (2003), Demand for beef from cattle administered growth hormones or fed genetically modified corn: A comparison of consumers in France, Germany, the United Kingdom, and the United States. *American Journal of Agricultural Economics*, 85(1), 16-29.

- McCluskey, J.J., K. Grimsrud, H. Ouchi, and T.I. Wahl, Consumer response to genetically modified food products in Japan. *Agricultural and Resource Economics Review*
- Moerbeek, Hester, and Gerda Casimir (2005), Gender differences in consumers' acceptance of genetically modified foods. *International Journal of Consumer Studies*, 29(4), 308-318.
- Momma K, W. Hashimoto, H.J. Yoon, S. Ozawa, Y. Fukuda, S. Kawai, F. Takaiwa, S. Utsumi and K. Murata (2000), Safety assessment of rice genetically modified with soybean glycinin by feeding studies on rats. *Bioscience Biotechnology Biochemistry*, 64:1881-6.
- Mozdziak P.E., S. Borwornpinyo, D.W. McCoy, J.N. Petite (2003), Development of transgenic chickens expressing bacterial beta-galactosidase. *Developmental Dynamics*. March 2003 edition. North Carolina State University.
- Nielsen, C.P., Robinson, S., & Thierfelder, K. (2001). Genetic engineering and trade: Panacea or dilemma for developing countries. *World Development*, 29(8), 1307-1324.
- Novotny, E. (2002), "Report For The Chardon LL Hearing: Non-Suitability Of Genetically Engineered Feed For Animals", Scientists for Global Responsibility. Published by PSRAST. Available at www.psrast.org.
- Pew Initiative on Food and Biotechnology (2003), "U.S. vs. E.U.: An Examination Of The Trade Issues Surrounding Genetically Modified Food", Available online: <http://pewagbiotech.org/resources/issuebriefs/europe.pdf>
- Pew Initiative on Food and Biotechnology (2005), "Public Sentiment About Genetically Modified Food", November 2005 update. Available online: <http://pewagbiotech.org/research/2005update/2005summary.pdf>.
- Preston, C. (2005), "Peer Reviewed Publications On The Safety Of GM Foods. Agbioworld Results Of A Search Of The Pubmed Database For Publications On Feeding Studies For GM Crops", Available at AgBioWorld.org/biotech
- Pusztai A. (2002), "Can Science Give Us The Tools For Recognizing Possible Health Risks Of GM Food"? *Nutr. Health* 16:73-84.
- U.S. Department of Agriculture (2004), "Acreage: Crop Production Supplement," June National Agricultural Statistics Service. Available at <http://usda.mannlib.cornell.edu>.
- U.S. Department of Agriculture (1999), "Environmental Assessment And Finding Of No Significant Impact For Monsanto/Dekalb Petition 97-099-01p For Determination Of Non Regulated States For Transgenic Glyphosate Tolerant Corn Line", GA 21, 1-14.

Zimmerman, R. and M. Qaim (2002),. “Projecting The Benefits Of Golden Rice In The Philippines”, Paper presented at the 6th International ICABR Conference, Ravello, Italy.

APPENDIX

Survey Instrument

GM crops are actual plants that have been created through genetic engineering or that contain products that were created using genetic engineering.

SA = Strongly Agree
 A = Agree
 N = Neutral
 D = Disagree
 SD = Strongly Disagree

	SA	A	N	D	SD
Food derived from GM crops is useful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Food derived from GM crops is morally acceptable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Food derived from GM crops carries a degree of risk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Food derived from GM crops is necessary for society	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Food derived from GM crops should be encouraged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If I were aware that a food item was genetically modified and had enhanced nutritional, taste or appearance qualities and was the same price as a non-GM product, I would purchase it	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do Wine Bottle Sizes & Shapes and Wine Label Colors & Shapes Matter in Agritourism Wine Prices and Sales?

**Forrest Stegelin stegelin@uga.edu , Dept. of Agricultural and Applied Economics,
University of Georgia, Athens, GA 30602-7509**

Key Words: consumer appeal, value-adding, wine bottles and labels, scaled-price index

Abstract: What determines wine prices at farm vineyards and wineries involved in agritourism? Is the solution in a simple competitive market model where the prices are the result of supply and demand, or even matching/meeting the price offered down the road at the next agritourism winery? There appears to be more than the mere price or cost of wine in the bottle; consumer appeal attributes apparently add value above and beyond the sensory wine attributes of clarity, taste, aroma, color, translucence, etc. What the eye sees, the eye buys – and what does the eye see: wine bottle shape and size as well as messaging in wine labels and shapes. Wine consumers rely mainly on the labels to infer quality of the bottle's contents. Initial observations suggested stronger preferences for selected color-shape combinations in label design and for larger, non-standard sizes and shapes of bottles.

Background and Methodology

Any relationship between sales and prices and the bottles' shapes and sizes and labels' shapes and colors is investigated using five north Georgia wineries that market similar types of wines, but in vastly different containers or bottles as well as label shapes and colors. There are over 30 Georgia wineries as members of the Winegrowers Association of Georgia, and many of them are linked via Georgia's Wine Highway – all competing for agritourism dollars from wine

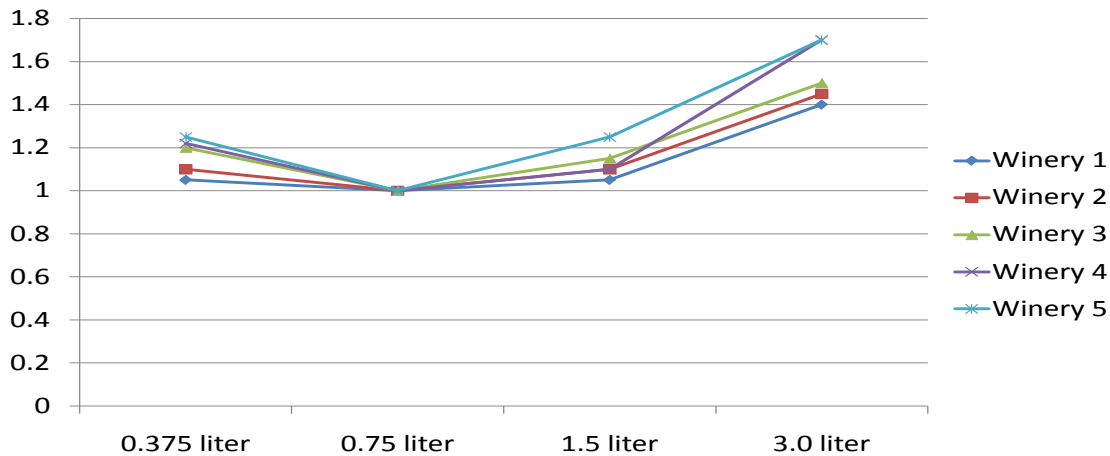
sales at their respective vineyards and wineries. The collaborating wineries ranged from a resort winery along I-85 to small operational wineries on the twisted back roads of the Northeast Georgia Mountains. Students from AAEC-3100, Food and Fiber Marketing, and AAEC-3200, Selling in Agribusiness, spring classes 2012 observed the consumer buying behaviors of wine purchasers of 2009-2011 vintages sold at the five wineries, using approved surveys.

Observations and Results

Initial observations from the 2009 – 2011 vintages sold at the five wineries suggest that the posted price of wine increased more than proportionally with the size of the bottle, and that wine consumers rely mainly on the bottle's label to infer the quality of its content, and that there are strong preferences for selected color-shape combinations in label design, and the consumers are willing to pay "premium" prices for those desired attributes of the bottle and its label.

Bottle sizes ranged from the useful half-bottle (containing 375ml of wine) to the traditional or standard size (0.75 liter) to some 'large format' bottles (magnums (1.5l) and double magnums containing 3l). A relative scaled price index was determined as the ratio of the observed price of the bottle to the normalized price relative to the price of the standard bottle for the same wine, assuming no economies of scale. The relationship between sizes of bottles measured in liters and the price index indicates that whatever the size of the bottle and the perceived quality of the producer was virtually undifferentiated, although the shape of the relationship may be a regional phenomenon.

Relationship Between Bottle Size and Scaled Price Index



A color-shape evaluation of preferences was also conducted. Respondents in the color sample were asked to express preferences on color on the basis of shapes, while the respondents on the shape sample were asked to express preferences on shape on the basis of colors. Z-statistics were calculated for the hypothesis that the color-shape matching proportions are the same between the color and shape samples. A two-tailed test was performed; the numbers of respondents in the shape and color samples were 28 and 34, respectively. The color-shape combinations evaluated follow.

Additional Observations

“It is probably the expressive qualities (primarily of color but also of shape) that spontaneously affect the passively receiving mind, whereas the tectonic structure of pattern (characteristic of shape but found also in color) engages the actively organizing mind,” Rudolf Arnheim stated in *Art and Visual Perception, a psychology of the creative eye*. Color alone on labels does not elicit as strong preferences as do certain shapes, at least when they are assessed

irrespectively of the shapes featured in the labels. Other combinations are very resilient, especially those that contain color hues, such as brown, yellow, black and green, in labels with salient rectangular and hexagonal patterns.

Color-Shape Combinations: Differences in Matching Preferences

Blue Gold Violet Purple Brown Orange White Yellow Black Green

Parallelogram

Circle

Diamond

Ellipse

Pentagon

Round-Edge Rectangle

Isosceles Triangle

Square

Hexagon

Right-Angled Triangle

Rectangle

Octagon

Trapezoid

The analysis is not without caveats. The demographics of the sample is an important limitation to further hypothesis testing using the limited dataset. A larger sample and a greater variation in the data along age, location, education, and socio-economic lines would strengthen any empirical findings.

References available upon request.

Predictive Power of Personal Factors in Studying Students’ Perception of Sales Profession in Ghana

By

Victor Bahhouth

University of North Carolina – Pembroke

John Spillan

University of North Carolina – Pembroke

Edwin Mensah

University of North Carolina – Pembroke

Abstract

The purpose of this study is investigate students’ perceptions of personal selling as a career in the developing nations – Case of Ghana. Studies in United States highlighting the negative perception of sales profession by people are numerous, especially when it comes to issues of ethics and honesty (Futrell 2007). Lee et al (2007) argued that students generally try to avoid salespeople as best as they can; in the addition, the lack of information about the profession perpetrates the negative image in their minds. Logistic regression and Z test are used in this research. The results do confirm the results of preceding studies; personal factors play a significant role in predicting students’ perception of sales profession as a career. Research output showed that Ghanaian students have a biased perception about sales as career; however, interestingly few dimensions showed significant effect.

Introduction

Most people view sales people as pushy, dishonest, aggressive and annoying. In fact, according to a study done by Gallup (as cited by Futrell 2007), it was found that insurance salespeople, advertising practitioners and used car salespeople ranked among the lowest in terms of ethics and honesty, with car salespeople placed at the lowest rung. The roots of this ‘negative’

attitude towards salespeople can perhaps be traced back to the Industrial Revolution, when factories developed tremendous manufacturing capabilities, leading to a huge surplus of inventories that posed problems to manufacturers (Lamb et al. 2007). As a consequence, salespeople were hired to sell as much of the products as possible as well as quickly as possible. To achieve their sales 'target' these salespeople had to adopt an extremely aggressive approach, which is often referred to as 'sales (as opposed to 'market') orientation in marketing theory (Bristow et al. 2006). It is this contradictory attitude towards the sales profession in general and the salesperson that motivated our current research. Specifically, what we are interested in finding out is whether students brought up and educated in vastly different cultures and education systems also harbor different feelings towards the salespersons and choosing the sales profession as a career. The following section provides a review of the relevant literature. In the next section, we develop the conceptual framework for our analysis, which is based on the Marketing Lens Model (MLM henceforth) (Bristow 1998, Bristow et al. 2006, Licatta et al. 1995). The penultimate section of this study describes the implications for the study. At a minimum, the findings can be used by sales managers, salespersons and marketing educators to make a conscious effort in eliminating the misguided notions that students have about the role of salespersons in our society. The concluding section acknowledges the limitations and provides suggestions for advancing the current line of research.

Literature Review

Salespeople have been traditionally considered to be money-hungry, aggressive, eager-to-sell, hardworking, ambitious people. Such stereotypes and preconceived notions of salespeople are further fuelled by statistics. A 1995 Gallup poll, for example, found that car sales was considered the least ethical occupation among 26 careers considered, with insurance salespeople voted 23rd (as quoted in Butler 1996). And such perceptions are prevalent not just in the US but in other countries as well. In some cultures, as a matter of fact, evidence suggests that the profession of 'selling' is used as an insult or to designate a show off (Butler 1996).

Research shows that students' negative opinion about salespeople is also engendered by the negative experience many of them have had with salespeople (Jolson 1972). As Dubinsky (1981) notes, most customers consider salespeople as lowly-paid, monotonous, uneducated, high-pressure phony individuals who they would never want to meet again. Even for students who have actually not had any first-hand interaction with a salesperson tend to harbor and nurture such negative opinions. Such negative students' opinion of salespeople and the sales professions perhaps results from the low prestige status traditionally assigned to a sales job (Mason 1965, Ditz 1968). In other words, since salespeople come from diverse backgrounds and academic qualifications, as well the fact that the profession typically endows very little authority to the person, all these factors result in the sales profession as being considered as one of the lowliest of its kind among comparable professions, even within the same organization.

Finally, research suggests that recruiters fail to adequately articulate the qualifications for, demands, responsibilities and rewards of a sales profession in their recruitment efforts. Consequently, the ingrained negative perceptions in the students' mindset remain 'untouched' (Kurtz 1972, Dubinsky 1981). The repercussions of such a phenomenon are twofold: first, students shy away from applying for sales jobs and second, those who do accept sales jobs behave in a manner that conforms to such preconceived notions and hence, further perpetuates the negative perception towards sales (Lee et al. 2007).

Comparative Studies

The second category of studies in this field draws comparison between different sets of factors such as perceptions of male/female, business/non-business, enrolled/not-enrolled in selling course and student/salesperson. A series of studies conducted by the Sales Management journal (1962 a, b, c) concluded that the underlying attitudes of males towards sales was "...forceful, deceitful, holding positions with low status and prestige, with little security (Swenson et al. 1993, p-53). Paul et al. (1970) on the other hand, found that comparing students across different college majors, there was universal negative feelings about sales careers. Dubinsky (1980) compared students' perceptions of sales careers with other vocational needs to conclude that majority of the respondents harbor a positive feeling toward sales positions. In another study, Dubinsky (1981) compared salespeople's perception with students' perception of selling and found that students had misconceptions about sales positions when compared with that of sales people. Dubinsky et al. (1983) found preferential differences also exist among students in terms of seven sales jobs. In terms of comparison of the sexes, conflicting findings exist. While Cook et al. (1986) found that females are more reluctant than their male counterparts to accept sales positions, Muehling et al. (1988) found college women to be more favorably opinionated towards personal selling than males. Bristow et al. (2006) significant perceptual differences between students who had completed personal selling courses and those also had not. Harmon (1999) used a randomized block design to conclude that depending on whether students were provided a general or a specific description of the sales job, attitude towards the sales job varied between the sexes. Based on the above review, therefore, we frame the following hypotheses:

Based on these findings, therefore, we frame the following hypothesis:

H1: Are knowledge, experience, and expectations significant factors in shaping Ghanaian students' perception about sales career?

RESEARCH METHODOLOGY

RESEARCH METHODOLOGY

The following steps are applied in developing the research methodology:

Research Model

The purpose of the study is to examine the predictive ability of personal factors in determining students' perception of sales profession as a career. The procedure requires the identification of two groups of students (dependent variable). The first group is made of students with negative perception about sales profession ($Y = 0$). The second group is made of students with positive perception about sales profession ($Y = 1$). The independent variables are the personal trait of students (i.e. knowledge, experience and expectations) that are used to classify students into one of the two groups based on their perception.

Binary Logistic Regression Model (BLRM) is used to test the research problem. Logistic regression is superior to linear regression model where normality assumptions of the independent variables are not met. It is simpler to read and to interpret because its values are bound to range between zero and one (Tsun-Siou, Yin-Hua & Rong-Tze 2003).

The use of the logistic regression model in this study is to evaluate the predictive power of the Independent variables (personal trait) in classifying students into two groups (dependent variable). The dependent variable is non-metric measure and it is used to identify the two-student groups. The independent variables are students' personal trait, which is subdivided into three major areas, which are knowledge, experience and expectations; they are captured in 21 statements.

$$Y (0 - 1) = A + B_1X_1 + B_2X_2 + B_3X_3 + \dots + B_nX_n$$

Reliability of the Model

In testing the reliability of the model two measures are used which are the following:

- 1- **Coefficient of Determination:** is similar to that of the ordinary least squares (OLS) regression:

$$R^2_{\text{Logit}} = 1 - (2LL_0 / 2LL_1)^{1/2}$$

$-2LL_0$ is the log-likelihood (represents unexplained variations) of the model without independent variables. $-2LL_1$ is the log-likelihood of the research model based on the independent variables that remained in the model and exhibited significant power in explaining the two stock groups. N is the sample size. In general, the interpretation of R^2_{logit} is similar to coefficient of determination R^2 in the multiple regressions. It has a value that ranges between 0 and 1. When R^2_{logit} approaches 0, the model is poor. R^2_{logit} approaches 1, the model is a perfect predictor.

2- **Hit Ratio:** A Z (student) test is performed to test the significance of hit ratio (percentage of correctly classifying the cases). The following formula is applied:

$$Z \text{ test} = [P - 0.5] / [0.5 (1 - 0.5) / N]^{1/2}$$

Where P = hit ratio = proportion correctly classified results, N = sample size.

The “Z-test” tests the significance of the hit ratio. The hit ratio measures the percentage of times the model accurately classifies the cases into the two stock groups i.e. if the model completely explains the dependent variable, the overall hit ratio would be 100%.

Both measures are tested using a level of significance of 5%.

Cross Validity of the Model

Testing the cross validity of the model is done by applying it in different countries or different time periods.

Data Collection

The data was collected from a sample of 91 students taken at random from Ghanaian universities through a questionnaire. The instrument used a mix of statements and Likert scale rankings of attributes and was made of three parts. In the first part, students were asked to make three statements about their perception of sales profession (Weeks et al. 1987) and also to evaluate thought as being either “positive,” or “negative” by checking the appropriate cell. In the second part, students were asked to provide statements about answers in the form of agreement or disagreement to express their attitude (expectations) towards the sales profession. A Likert scale was used so that the respondent can select a numerical score ranging from 1 to 5 for each statement to indicate the degree of agreement or otherwise, where 1, 2, 3, 4, and 5 denote “Strongly Disagree”, Disagree”, “Neither Agree nor Disagree (Neutral)”, “Agree”, and “Strongly Agree”, respectively. In the third part, students were asked to provide demographic information like age, gender and education.

DATA ANALYSIS

Testing the predictive power of students’ personal trait is done using a level of significance of 5% in a two stages. In stage 1, the twenty one statements are included in the model using “Forward Stepwise Likelihood Ratio” method. This procedure allows only those statements that exhibit significant predictive power to enter into the model. In stage 2, the predictive power of all statements is tested (i.e. all statements remain the model – enter method). The summary output of step (Table 1) showed the following overall hit ratio results:

Table 1 - Predictive Power of Personal Trait

	Predicted - 0	Predicted - 1	Correctly classified

			% - Hit Ratio
<u>Step 01</u>			
Observed - 0	7	26	21.2
Observed - 1	7	51	87.9
Overall Hit Ratio			63.7
<u>Step 02</u>			
Observed - 0	16	17	48.5
Observed - 1	13	45	77.6
Overall Hit Ratio			67.0
<u>All Statements</u>			
Observed - 0	22	11	66.7
Observed - 1	6	52	89.7
Overall Hit Ratio			81.3

In stage 1, the model correctly classified students' perception 67%. At the level of 5% level, two statements only showed significant predictive power and entered the model; they are 1- "Inappropriate Career" entered the model in the first step, which means it had the highest significant power; followed by 2- "Job Requires Much Traveling" entered in the second step and had the second highest predictive power. In stage 2, all variables were included in the model and correctly classified students' perception 81.3%.

Testing Reliability

Testing the reliability of the model is done by using two measures, which are 1- Coefficient of determination (R^2) value, which represents the proportion of total variation that is explained by the independent variables (statements). Table (2) shows the significance of the two stage-process.

Table 2- Coefficient of Determination - Nagelkerke R^2

	Statement	R ²
Stage 1		
Step 1	Inappropriate Career	10.3 %
Step 2	Job Requires Much Traveling	15.8%
Stage 2		
	All Statements	45.2%

Table (2) shows the coefficient of determination of the two-stage model; stage1, “Inappropriate Career” statement had the highest significance, as it entered the model in step 1 and explained 10.3% of the total variations; “Job Requires Much Traveling” entered second in the model and increased the explained variations to 15.8%. in stage 2, all statements kept in the model and explained 45.2% of the total variations.

2- Testing the significance of the overall hit ratio is done by using Z distribution. Z critical value at a level of significance of 5% is = 1.65, N = 91. The following are the output results (Table 3) when statements entered the model.

Table 3- Significance of Hit ratio

	Statement	Hit Ratio %	Z value	CV	Result
Stage 1					
Step 1	Inappropriate Career	63.7	2.61	1.65	Significant
Step 2	Job Requires Much Traveling	67.0	3.24	1.65	Significant
Stage 2					
	All Statements	81.3	5.97	1.65	Significant

Table (3) shows that the three-step are significant at a level of significance of 5% tests.

Limitation of the study

There are three practical problems associated with this study.

- 1- Data is a primary type, which is taken from a survey, which is subject to sample collection and related errors.
- 2- Sample size: cost and time were the primary factor for using sample of 91 only.

- 3- The external validity need to be tested by using the model in other countries.

CONCLUSIONS, LIMITATIONS, AND RECOMMENDATIONS

Results showed significant evidence that Ghanaian students' perception of the sales job and sales people is not neutral, which is consistent with the findings of other studies. However, their perception is driven by ideas / concepts that are different from what have been documented. Gender, major, and class were not significant. In the same direction of other research, our analysis supports the hypothesized relationships pertaining to cultural and sociological differences. From this perspective, the current study not only vindicates and strengthens existing research in this field but also provides substantial contribution to the literature, because Ghana is a middle eastern country where culture and social values play a major role in individual's life.

There are three practical problems associated with this study. 1- Data is a primary type, which is taken from a survey, which is subject to sample collection and related errors. 2- Sample size: cost and time were the primary factor for using sample of 156 observations. 3- The external validity of the model was not tested and need to be addressed. Accordingly, it is recommended to use this model in studying students' perception in other countries.

References

Bowers, Michael and John H. Summey (1983). "A Curriculum for Personal Sales Training in an Academic Setting," *Journal of Marketing Education*, 5(Spring), pp.-11-15.

Bristow, Dennis N. (1998). "Do You See What I See? The Marketing Lens Model in an Academic Setting", *Journal of Marketing for Higher Education*, 8(4), pp. 1-16.

Bristow, Dennis N., Rajesh Gulati, Douglas Amyx and Jennifer Slack (2006). "An Empirical Look at Professional Selling From a Student Perspective", *Journal of Education for Business*, 81 (5), pp.-242-249.

Bureau of Labor Statistics (<http://www.bls.gov/news.release/ocwage.t01.htm>) accessed February 18, 2008.

Butler, Charles (1996). "Why the bad rap"? *Sales and Marketing Management*; 148 (6) pp. 58-61.

CIA World Fact Book: <https://www.cia.gov/library/publications/the-world-factbook/geos/pe.html>, accessed February 24, 2008.

Cook, Robert W. and Timothy Hartman (1986). "Female College Student in a Sales Career: A Comparison," *Journal of Personal Selling and Sales Management*, 6(May), pp. 29-34.

Dubinsky, Alan J (1980). "Recruiting College Students for the Sales Force," *Industrial Marketing Management*, 9(February), pp. 37-46.

_____. (1981). "Perceptions of the Sales Job: How Students Compare with Industrial Salespeople", *Journal of the Academy of Marketing Science*, 9(4), pp. 352-367.

_____ and P.J. O'Connor (1983). "A Multidimensional Analysis of Preferences of Sales Positions", *Journal of Personal Selling and Sales Management*, 3(November), pp. 31-41.

Futrell, Charles (2007). *ABC's of Relationship Selling Through Service*, McGraw-Hill Irwin.

www.gallup.com

Harmon, Harry A. (1999). "An Examination of Students' Perceptions of a Situationally Described Career in Personal Selling", *Journal of Professional Services Marketing*, 19(1), pp. 119-136.

Hawkins, Delbert I., David L. Mothersbaugh and Roger J. Best (2007). *Consumer Behavior*, Irwin Professional Publication.

Heckman, J. (1998). "Internet Sales Focus to Affect Higher Education", *Marketing News*, 9.

Hofstede, G.: 1997, *Cultures and Organizations: Software of the Mind* (New York, McGraw-Hill).

Jolson, M.A. (1972). "Direct Selling" Consumer vs. Salesman," *Business Horizons*, 15 (October), pp. 87-95.

Lagace, Rosemary R. and Timothy A. Longfellow (1989). "The Impact of Classroom Style on Student Attitudes Toward Sales Careers: A Comparative Approach," *Journal of Marketing Education*, 11(Fall), pp. 72-77.

Lamb, Charles W., Joseph F. Hair and Carl McDaniel (2007). *Marketing*, Thomson South-Western.

Lee, Nick, Anna Sandfield and Baljit Dhaliwal (2007). "An Empirical Study of Salesperson Stereotypes amongst UK Students and Their Implications for Recruitment", *Journal of Marketing Management*, 23(7/8).

Lenartowicz, Tomasz and James P. Johnson (2002). "Comparing Managerial Values in Twelve Latin American Countries: An Exploratory Study", *Management International Review*; 42(3), pp. 279-307.

Licata, Jane W; John C Mowen and Goutam Chakraborty (1995). "Diagnosing Perceived Quality in the Medical Service Channel", *Journal of Health Care Marketing*, 15(4), pp. 42-50.

Marklein, Mary Beth (2005). "College Gender Gap Widens: 57% Are Women," *USA Today*, available at http://www.usatoday.com/news/education/2005-10-19-male-college-cover_x.htm, accessed March 23, 2008.

Muehling, Darrell D. and William A. Weeks (1988). "Women's Perceptions of Personal Selling: Some Positive Results," *Journal of Personal Selling and Sales Management*, 8(May), pp. 11-20

Paul, Gordon W. and Parker Worthing (1970). "A Student Assessment of Selling," *Southern Journal of Business*, 5(July), pp. 57-65.

Ghana Travel Adventures: <http://www.Ghana-travel-adventures.com/people-culture.html>, accessed March 30, 2008.

Robertson, Christopher J., Bradley J. Olson, K. Matthew Gilley and Yongjian Bao (2007). "A Cross-Cultural Comparison of Ethical Orientations and Willingness to Sacrifice Ethical Standards: China Versus Ghana", *Journal of Business Ethics*, August.

Sales Management (1962a). "Selling is a Dirty Word", 89 (October 5), pp. 44-47.

_____ (1962b). "People Should Not be Forced to Buy", 89 (October 19), pp. 44-47.

_____ (1962c). "Salesmen Are Prostitutes", 89 (November 2), pp. 46-54.

Stromquist, N.P. (1992). "Feminist Reflections on the Politics of the Ghanaian University In: Women and education in Latin America: knowledge, power, and change, edited by Nelly P. Stromquist. Boulder, Colorado, Lynne Rienner Publishers, pp.147-67

Vitell, S., S. Nwachukwu and J. Barnes: 1993, 'The Effects of Culture on Ethical Decision-Making: An Application of Hofstede's Typology', *Journal of Business Ethics* 12, pp. 753-760.

Weeks, William A. and Darrel D. Muehling (1987). "Students' Perceptions of Personal Selling", *Industrial Marketing Management*, 16, pp. 145-151.

Wolf, Bernhard (2005). "Brunswik's Original Lens Model", University of Landau, Germany, pp. 1-8.

A Comparison of American and Dutch Students' Attitudes toward Women Managers

Tope Adeyemi-Bello, Department of Management, College of Business,
East Carolina University, Greenville, NC 27858

Joseph Tomkiewicz, Department of Management, College of Business,
East Carolina University, Greenville, NC 27858

Edwin Vermeulen, Han University of Applied Sciences, Arnhem, Netherlands

A number of studies have historically been done to assess the attitudes of college students toward women in general. The landmark study was done by Epstein and Bronzaft in 1972. They found that first year college students at the time of their study expected to become more career oriented rather than the 'traditional' housewife. Throughout the 1980s, a number of research studies also found support for more positive attitudes toward women in traditionally male-dominated occupations including the presidency of the United States (Cherlin & Walters, 1981). In addition, a national survey of first year college students conducted in 1993 (Higher Education Research Institute) found increased support for women to be less involved in traditional roles like child rearing and house-keeping.

Over the years, various factors have been hypothesized as indicators and/or moderators of the attitudes toward women. These include prevailing

attitudes in a particular nation and the historic and traditional roles within a culture. Age cohorts have also been found to influence attitudes toward women's roles in society. Dambrot, Papp, and Whitmore (1984), for example, found that older men and women are more conservative in their attitudes toward women's role in society than their younger counterparts.

Regionalism has also been used as an explanatory factor for the variation in attitudes toward women in the United States. Research studies on a state by state basis for example found that students at the University of Washington in Seattle had more liberal attitudes toward women's role in society than a comparable sample of students from the state of Texas (Lunneborg, 1974; Muehlenhard & Miller, 1988). In general, there are indications by a number of studies that men and women in the Southern part of the United States may have more conservative attitudes toward the roles of women (Hurlbert, 1988). For example, it is more common for men and women from the Southern part of the United States to have more negative attitude toward the employment of married women (Rice & Coates, 1995). Nevertheless, one common theme for contemporary research studies that have been done in the United States indicates a more egalitarian attitude toward the role of women in society over the years.

Theoretical discussion

Hofstede's (1980) model was developed to aid in understanding the relationship between cultural values and organizational behavior. The goal of the

research was to provide an explanation for the way people behave in different cultures. The study used a sample of over one hundred thousand people in more than fifty countries. While Hofstede's framework has been used to explain the variations in the structuring of organizations and the differences in decision making styles across cultures, it can also be useful in explaining the plethora of attitudes toward women managers. In essence, the various dimensions that Hofstede found in his study may be useful in explaining why some nations have a higher representation of females in their managerial ranks than others. Hofstede proposed four value dimensions in his original research. They are power distance, uncertainty avoidance, individualism, and masculinity.

The scores for the United States on these four dimensions were 40, 91, 46, and 62 for power distance, individualism/collectivism, uncertainty avoidance, and masculinity/femininity, respectively. Similarly, the Dutch scores were 38, 80, 53, and 14 for power distance, individualism/collectivism, uncertainty avoidance, and masculinity/femininity, respectively. In essence, while there's very little difference in the power distance values between the two nations, the same cannot be said for the masculine/feminine dimension (Ghemawat & Reiche, 2011)

Traditionally, the differences between men and women have been used as excuses to exclude females from certain jobs. Occupational segregation is the term that has been used to describe the heavy concentrations of men and women into different jobs. For example, occupational segregation supposedly explains why men dominate managerial positions while women are often

consigned to other occupations with lower pay, status, and responsibility. Specifically, Fierman (1990) reported that only nineteen of more than four thousand people (less than half of one per cent) listed as the highest paid officers and directors of the largest eight hundred public U.S. companies were women. The number of women in management positions is influenced by the perceptions of men who have traditionally dominated the upper echelons of business organizations (Heilman, 1995). An argument can be made and supported by considerable research that the discouraging plight of women in management is a result of negative stereotypes held about them. Schein (1973, 1975) reported that both male and female middle managers perceived that successful managers in general possessed characteristics ascribed more to men than to women. These characteristics include among others aggression, dominance (Copeland, Driskell, & Salas, 1995), and achievement orientation (Adler, 1988). In fact, the characteristics (e.g., co-operative and communicative) that have often been ascribed to women are considered 'unmanagerial' (e.g., Powell & Butterfield, 1979). It is therefore not surprising that women represent a very low percentage of top executive positions and are often not considered for expatriate assignments (Adler, 1988).

While sex role stereotyping of managerial work can not only result in the perception that females are less capable or qualified than males to hold managerial positions, it may also hinder the entry of women into the upper hierarchies of business organizations. Schein (1978) concluded that such stereotyping tends to reduce the opportunities for females to advance within

business organizations even though the perceived sex differences do not actually exist.

A specific area of study within the general attitude toward women's role is that pertaining to women managers in particular. Since managerial ranks have been dominated by men historically, the present study attempts to investigate the differences in attitude toward women managers by upper level Dutch and American students. The samples are from regional universities in the eastern part of the Netherlands and the southeastern section of the United States. Our hypothesis is that the notable difference in the masculinity/femininity Hofstede's value dimension scores should result in observable disparity in attitude toward women managers in the two samples.

Method

The questionnaire used was the Women as Managers Scale (WAMS; Peters, Terborg & Taynor, 1974). The Women as Managers Scale was chosen because it has been used extensively in previous studies that have attempted to measure attitudes toward women managers, particularly in the United States. However, it has also been used to investigate differences in attitudes toward women as managers across various nations including professionals in Nigeria (Adeyemi-Bello & Tomkiewicz, 1997) and Chile (Cordano, Scherer, & Owen, 2002). The Women as Managers Scale consists of 21 statements about women as managers (e.g. "It is acceptable for women to compete with men for top executive positions"). Respondents indicate how strongly they agree or disagree

with each item on a 7-point scale from "strongly agree" to "strongly disagree."

Scores ranged from 75 to 141 for the Dutch student sample and 71 to 147 for the American student sample, with the highest scores indicating more favorable attitudes toward women as managers. The psychometric properties of the scale have been detailed in Peters, et al. (1974), and Terborg, Peters, Ilgen & Smith (1977) presented evidence for the construct validity of the scale and support for its reliability is provided by Ilgen and Moore (1983).

Results

For both the US and Dutch samples, Significant differences for nationality and gender were tested using analysis of variance (ANOVA) on the total WAMS score and multivariate analysis of variance (MANOVA) for the entire 21 item questionnaire. Significance was also tested (using MANOVA) between same sex groupings by and across nationalities.

The scores for US males and their Dutch counterparts ranged from 71 to 147 and 81 to 141, respectively. There was no statistically significant difference in the scores for US and Dutch males. Conversely, the scores for US females and their Dutch counterparts ranged from 107 to 146 and 75 to 139, respectively. The observed difference in scores for the females in both nations was statistically significant at $p < .000$.

Consistent with previous research, American females scored the highest of all subgroups (i.e., Dutch males, Dutch females, American males, and American females). The difference in scores between American males and

females was also statistically significant at $p < .000$. Conversely, Dutch females scored the lowest for all subgroups. The difference in scores between Dutch males and Dutch females was also statistically significant at $p < .003$. In essence, Dutch males had more favorable attitude toward women managers than Dutch females.

There was statistically significant difference in scores for Dutch males in comparison to American females. In direct contrast to Dutch women, American females had more positive attitude toward women as managers ($p < .000$). When American males are compared to Dutch females, no statistically significant differences were observed.

Discussion and Implications for Business Education

The main result of this study indicates that it cannot always be assumed that females in general across nations have more positive attitudes toward women managers. The more positive attitude of Dutch men toward women managers is indeed reflective of a more feminine culture where roles are often merged or overlap for the sexes. Other characteristics of feminine cultures include among others: cooperation and good working relationships. It is also not unusual in feminine cultures to emphasize people and relationships. It is assumed in these cultures that men and women do not have unique gender tendencies. For example, it is assumed in feminine cultures that males and females should be modest and gentle. Both genders can express weakness, have sympathy for weakness, work to live, and either gender can equally

succeed or fail. In the context of business, managers, regardless of their gender are expected to use intuition and strive for consensus in their decision making. Furthermore, feminine cultures stress quality of work life, and resolve conflicts through negotiation and compromise.

The results of this study, with particular reference to the Dutch sample, contradicts Dubno's (1985) study that male MBA students retained significantly negative attitudes toward women as managers. It is similarly contrary to Powell and Butterfield's (1986) finding that student perceptions of the "good manager" had not changed significantly in its male-dominated characteristics. In the case of the Dutch sample, it appears that Dutch men actually perceive Dutch women to possess characteristics that are managerial (Heilman, Block, Martell, & Simon (1989).

References

- Adeyemi-Bello, T. & Tomkiewicz, J. (1997) "Attitude toward women managers: A developing country's example." *Equal Opportunities International*, 16(3), pp.1-12.
- Adler, N.J. (1988). "Women: world class managers for global competition". *Academy of Management Executive*, 2: pp. 11- 19.
- Bailey, W. T. (1993). College students' attitudes toward abortion. *Journal of Social Behavior and Personality*, 8, 749-756.
- Cherlin, A., & Walters, P. B. (1981). Trends in United States men's and women's sex-role attitudes: 1972 to 1978. *American Sociological Review*, 46, 453-460.
- Copeland, C.L., Driskell, JR, & Salas, E. (1995). "Gender and reactions to dominance". *Journal of Social Behavior and Personality*, 10: pp.53-68.
- Cordano, M., Scherer, R.F. & Owen, C.L. (2002) "Attitudes toward women as managers: Sex versus culture." *Women in Management Review*, 17(2), 51-60.
- Dambrot, F. H., Papp, M. E., & Whitmore, C. (1984). The sex –role attitudes of three generations of women. *Personality and Social Psychology Bulletin*, 10, 469-473.
- Dubno, P. (1985). "Attitudes toward women executives: a longitudinal approach". *Academy of Management Journal*, 28: 235-669.
- Epstein, G. F., & Bronzaft, A. L. (1972). Female freshman view their roles as women. *Journal of Marriage and the Family*, 34, 671-672.

- Fierman, Jaclyn. (1990, December). Do Women Manage Differently?
Fortune, 122(15), 115.
- Ghemawat, Pankaj & Reiche, Sebastian (2011). National Cultural Differences and Multinational Business.
<http://www.aacsb.edu/resources/globalization/globecourse/contents/readings/national-cultural-differences-and-multinational-business.pdf>.
- Heilman, John. (1995). From Hierarchy to Contract. *American Review of Public Administration*, 25(1), 89.
- Heilman, MR, Block, C.J., Martell, R.F., & Simon, M.C. (1989). "Has anything changed? Current characterizations of men, women, and managers".
Journal of Applied Psychology, 74: pp.935-942.
- Helmreich, R. L., Spence, J. T., & Gibson, R. H. (1982). Sex role attitudes: 1972-1980. *Personality and Social Psychology Bulletin*, 8, 656-663.
- Higher Education Research Institute. (1993). *The American freshman: National norms*. Los Angeles: UCLA Press.
- Hofstede, G. (1980). *Culture's Consequences: International Differences in Work-Related Values*. Beverly Hills: Sage Publications.
- Hurlbert, J. S. (1988). The Southern region: A test of the hypothesis of cultural distinctiveness. *Sociological Quarterly*, 30, 245-266.
- Ilgen, D.R., & Moore, C.F. (1983). "When reason fails: a comment on the reliability and dimensionality of the WAMS". *Academy of Management Journal*, 20: pp.89-100.

- Lunneborg, P. W. (1974). Validity of the Attitudes Toward Women scale. *Psychological Reports, 34*, 1281-1282.
- Powell, G.N., & Butterfield, D.A. (1979). "The good manager': masculine or androgynous?" *Academy of Management Journal, 22*: pp.395-403.
- Powell, G.N., & Butterfield, D.A. (1986). "The 'good manager': does androgyny fare better in the 1980's?" Presented at the Annual Meeting of the Academy of Management, Chicago, Illinois.
- McKinney, K. (1987). Age and gender differences in college students' attitudes toward women: A replication and extension. *Sex Roles, 17*, 353-358.
- Muehlenhard, C. L., & Miller, E. N. (1988). Traditional and non-traditional men's responses to women's dating initiation. *Behavior Modification, 12*, 385-403.
- Peters, L.H., Terborg, J.R., & Taylor, J. (1974). "Women as managers scale (WAMS): a measure of attitude toward women in management positions". *Catalogue of Selected Documents in Psychology, 4*: p.27.
- Rice, T. W., & Coates, D. L. (1995). Gender role attitudes in the Southern United States. *Gender and Society, 9*, 744-756.
- Schein, V.E. (1973). "The relationship between sex role stereotypes and requisite management characteristics among female managers". *Journal of Applied Psychology, 57*: pp.95-100.
- Schein, V.E. (1975). "Relationships between sex role stereotypes and requisite management characteristics among female managers". *Journal of Applied Psychology, 60*: pp.340-344.

- Schein, V.E. (1978). "Sex role stereotyping, ability, and performance: prior research and new directions". *Personnel Psychology*, 31: pp.259-268.
- Slevin, K. F., & Wingrove, C. R. (1983). Real vs. perceived differences in how three intra-family generations of women view their roles in society. *Perceptual and Motor Skills*, 56, 959-970.
- Spence, J. T., & Helmreich, R. L. (1972a). The Attitudes Toward Women Scale: An objective instrument to measure attitudes toward the rights and roles of women in contemporary society. *JSAS Catalog of Selected Documents in Psychology*, 2, 667-668.
- Spence, J. T., & Helmreich, R. L. (1978). *Masculinity femininity: Their psychological dimensions, correlates, and antecedents*. Austin, TX: University of Texas Press.
- Spence, J.T., & Helmreich, R. L. (1979a). Comparison of masculine and feminine personality attributes and sex-role attitudes across age groups. *Developmental Psychology*, 15, 583-584.
- Spence, J. T., Helmreich, R. L., & Strapp, J. (1973). A short version of the Attitudes Toward Women Scale. *Bulletin of the Psychonomic Society*, 2, 219-220.
- Terborg, J.R., Peters, L.H., Ilgen, D.R., & Smith, F. (1977). "Organizational and personal correlates of attitudes toward women as managers". *Academy of Management Journal*, 20: pp.89-100.

Thornton, A., & Freedman, D. (1979). Changes in the sex role attitudes of women, 1962-1977: Evidence from a panel study. *American Sociological Review*, 44, 831-842.

Fierman, J. 1990. Why women still don't hit the top. *Fortune*, 30 July, 122:40-62.

Newcomb, T., Koenig, K., Flacks, R., & Warwick, D. *Persistence and change: Bennington college and its students after 25 years*. New York: Wiley, 1967.

VALUE CREATING MEDIATING MECHANISMS WITHIN THE MARKET ORIENTATION-PERFORMANCE RELATIONSHIP: A META-ANALYSIS

James D. Doyle, Ph.D.
School of Business
The University of North Carolina at Pembroke
P.O. Box 1510
Pembroke, North Carolina 28372
Tel.: (910) 521-6871
Email: james.doyle@uncp.edu

Anahit Armenakyan, Ph.D.
School of Business
Faculty of Applied & Professional Studies
Nipissing University
100 College Drive, Box 5002
North Bay, Ontario P1B 8L7
Canada
Tel.: (705) 474-3450
Email: anahita@nipissingu.ca

The authors use meta-analysis to identify mediating mechanisms within the market orientation-performance relationship and to assess the implications of correlations between market orientation and complementary organizational orientations for that relationship. The meta-analysis is based on an integration of extant research of the relationships between market orientation and value-creating marketing capabilities as well as between organizational performance and market orientation, complementary organizational orientations, and value-creating marketing capabilities. The meta-analysis identifies the unique contribution of market orientation to organizational performance. Relationships between market orientation and specific organizational orientations detract from the necessity of market orientation as a precursor to organizational performance. Consistent with expectations, market orientation was found to relate differentially but still more strongly to specific types of firm-level value-creating marketing capabilities than to organizational performance. Results indicate that market orientation may affect performance primarily through its relationships with value-creating marketing capabilities.

Keywords: customer value; market orientation; capabilities; performance.

Concern has been expressed that more conclusive knowledge of the organizational mechanisms (i.e., strategic actions or process effects) and underlying capabilities that transform

organizational resources into superior organizational performance is needed (Morgan, Vorhies, and Mason 2009; Zhou, Brown, and Dev 2009). This paper represents an attempt to address this particular need within the specific context of the relationship between market orientation (MO), an organizational resource, and organizational performance (P). Organizational resources may be necessary inputs for the conception and implementation of strategies that improve firm efficiency or effectiveness (Barney 1991), but customer, market, and financial performance occur not because a resource is *possessed* but because and how that resource is *deployed* (Day 1994; Hult, Ketchen, and Slater 2005; Ketchen, Hult, and Slater 2007). Although it has long been appreciated that MO is a positive organizational performance antecedent, the assertion that MO “is likely to have its effects demonstrated through the strategic actions of an organization” (Foley and Fahy 2009, p. 16) suggests needs for identifying the actions that demonstrate or occur because of MO and for assessing the extents to which these actions mediate the effect of MO on organizational performance.

Recent MO research shows increasing interest in unpacking the firm-specific organizational actions that result in value creation (e.g., Hult, Ketchen, and Slater 2005; Jiménez-Jiménez and Cegarra-Navarro 2007; Langerak, Hultink, and Robben 2007; Morgan, Vorhies, and Mason 2009). With the exception of a meta-analysis by Kirca, Jayachandran, and Bearden (2005) in which it was reported that a particular configuration of organizational innovativeness, product/service quality, and customer loyalty partially mediate the MO-P relationship, however, these mediating effects have not attracted much attention in meta-analytic MO studies.

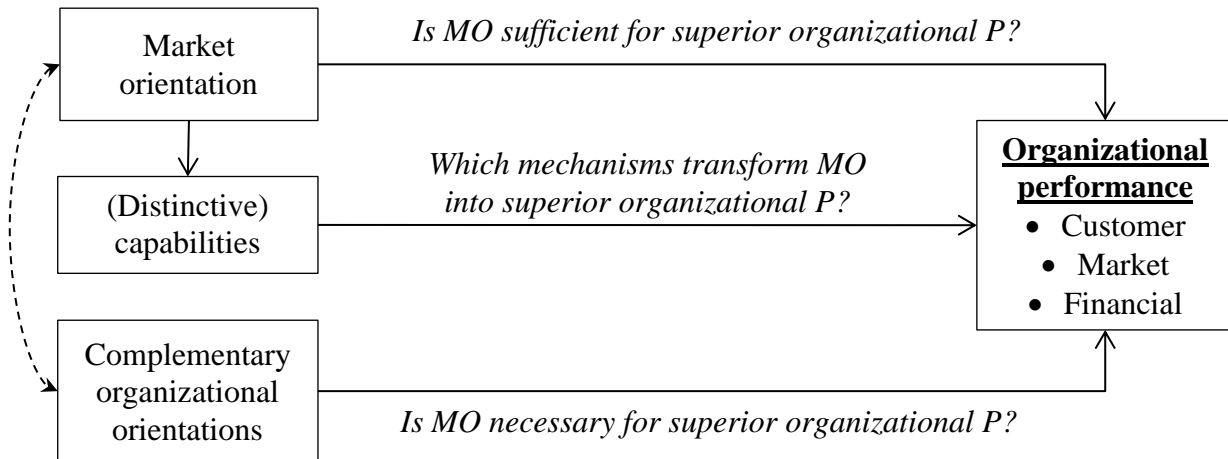
Compounding this concern is meta-analytic research confirming the moderate or strong positive relationships between MO and entrepreneurial, innovation, and learning orientations (Grinstein 2008). Orientations exert influence over decisions and actions (Miles and Arnold 1991; Noble,

Sinha, and Kumar 2002) and, because MO has much in common with other orientations, it is necessary to determine whether or not MO is a necessary prerequisite for the mechanisms that create or drive superior customer value.

Understanding the mediated MO-P relationship in a more exhaustive sense is a pressing need for marketing researchers and practitioners, given that MO has been shown in an international meta-analysis to explain as little as 4.8 (7.3) per cent of the variance in objective (subjective) measurements of organizational performance (Ellis 2006). There is a specific need to identify the organizational competences that associate with MO and to determine the respective extents to which this resource and its related competences explain variance in reports of organization-level *customer, market, and financial* performance.

This research focuses on providing answers to three questions, as illustrated in Figure 1. First, the sufficiency of MO as an organizational performance antecedent requires examination, since mere resource possession may not be adequate in itself. Second, the necessity of MO as an organizational performance antecedent warrants attention, since (at least from a measurement perspective) MO correlates significantly with other organizational orientations. Third, the mechanisms that demonstrate or enact MO require specification. To attempt to address these issues, a meta-analysis was conducted and is reported below; mechanisms that directly or indirectly contribute to superior customer value are considered in this paper for their respective roles within the MO-P relationship. The research framework is presented in Figure 1.

FIGURE 1
RESEARCH FRAMEWORK: THE SUFFICIENCY, NECESSITY, AND ASSOCIATED MECHANISMS OF MO



Theoretical Framework

The resource-based view of the firm and corollary theories (e.g., distinctive competence theory) regard firms as bundles of heterogeneous resources and capabilities (Deligonul and Cavusgil 1997) and, by extension, industries as collections of heterogeneous resource and capability bundles (Adegbesan 2009). Intra-industry performance variance is presumed by the RBV to derive from this heterogeneity, with high-performing firms being the rare, valuable, and imperfectly imitable bundles (Barney 1991; Day and Wensley 1988; Fahy, Hooley, Greenley, and Cadogan 2006; Hooley, Greenley, Cadogan, and Fahy 2005). Studies conducted in accordance with corollary theories have extended this view, arguing that interfirm performance variance derives not so much from heterogeneous resource possession as from heterogeneous resource management (e.g., Hult, Ketchen, and Slater 2005; Hunt and Morgan 1995; Morgan, Vorhies, and Mason 2009). Ketchen, Hult, and Slater (2007, p. 962) argue that “the RBV, as it has evolved over the past 20 years, contends that resources that are valuable, rare, inimitable, and

non-substitutable allow the firm to do a better job of taking strategic actions.” There is, therefore, a critical difference between resources, nouns, and the behaviors, verbs, that occur on, using, or simply because of resources (Grant 1991; Wu, Melnyk, and Flynn 2010).

Deployment is considered the process through which a particular resource is implemented in support of an organization’s effort to create superior customer value or achieve low relative costs. Capabilities are the path dependent, firm-specific aptitudes, skills, and technologies for resource deployment, allocation, and coordination (Wu, Melnyk, and Flynn 2010). Capabilities superior to those of competing firms are termed “distinctive competences” (Conant, Mokwa, and Varadarajan 1990; Snow and Hrebiniak 1980). Marketing capabilities are the “integrative processes designed to apply the collective knowledge, skills, and resources of the firm to the market-related needs of the business” (Weerawardena and O’Cass 2004, p. 421). Two types of marketing capabilities have been identified: marketing mix capabilities and capabilities that support the orchestration of marketing mix capabilities (e.g., market information management, marketing strategy development and execution) (Vorhies and Morgan 2005). Marketing mix capabilities encompass “customer service, advertising effectiveness, quality of sales force, strength of distribution networks, market research ability, speed of new product introduction, and ability to differentiate products” (Weerawardena and O’Cass 2004, p. 423).

Market Orientation and Performance

Even before the MO-P relationship was empirically validated, firms were exalted to develop a MO for the promise of superior organizational performance. Since the early 1990s, MO research has primarily operationalized MO as either an organizational culture or as a set of market-information processing behaviours (Harris and Piercy 1999; Lafferty and Hult 2001).

Viewed as culture, MO is a “state of mind” (Felton 1959, p. 55) that refers to the organization-wide prioritization, as a collective cognitive phenomenon, of the creation and maintenance of superior customer value (Hooley et al. 2005; Narver and Slater 1990; Zhou et al. 2008). In contrast, the behavioural view of MO defines it as “the organizationwide generation of market intelligence pertaining to current and future customer needs, dissemination of the intelligence across departments, and organizationwide responsiveness to it” (Kohli and Jaworski 1990, p. 6). It is a longstanding belief that MO is a valuable and rare resource (e.g., Hunt and Morgan 1995) which, as a consequence, contributes favourably to performance. Hence,

H1: The greater the reported MO of an organization, the better its a) customer, b) market, and c) financial performance.

The MO-P relationship, controlling for related business orientations

A business orientation is the underlying philosophy of an organization within which decisions are made and in the context of which interactions within the marketplace occur (Miles and Arnold 1991; Noble, Sinha, and Kumar 2002). MO has been shown to relate positively to each of the entrepreneurial, innovation, and learning orientations (e.g., Grinstein 2008). To determine the extent to which organizational performance benefits are exclusive to MO, instead of shared by complementary organizational orientations, it is necessary to test the direct, main-effect MO-P relationship while controlling for these orientations. To determine the necessity of MO,

H2.1: Controlling for entrepreneurial orientation, the greater the reported MO of an organization, the better its a) customer, b) market, and c) financial performance.

H2.2: Controlling for innovation orientation, the greater the reported MO of an organization, the better its a) customer, b) market, and c) financial performance.

H2.3: Controlling for learning orientation, the greater the reported MO of an organization, the better its a) customer, b) market, and c) financial performance.

Organizational mechanisms within the MO-P relationship

The preceding hypotheses were predicated on the notion that it is meaningful to assess the extent to which organizational resources relate directly with organizational performance. Correlation does not imply causality, of course, and it may be of little practical significance to assert a relationship that, as Ketchen, Hult, and Slater (2007, p. 962) remarked, “obviously lacks face validity.” The culture of an organization may be a vital performance factor, but it “cannot be expected to shape performance directly,” since “customers do not purchase a firm’s goods and services simply because the firm has a particular type of culture” (Hult, Ketchen, and Slater 2005, p. 1174).

The successful market oriented firm is the one that achieves particularly effective MO implementation by creating exceptional value for customers (Menguc and Auh 2006); indeed, superior customer value, as Guo (2002, p. 1156) asserts, is the “immediate consequence” of the behaviours of market oriented firms and the “intermediate construct that connects market orientation and performance.” Customer value is most commonly taken to refer to the tradeoff involved in the acquisition and consumption of a particular product or service offering, where consumers necessarily give up something (e.g., money, time, ease of mind) in exchange for a good (e.g., Paladino 2007; Palmatier 2008). It is therefore presumed that the nomological network that bridges MO and superior performance is necessarily comprised of the

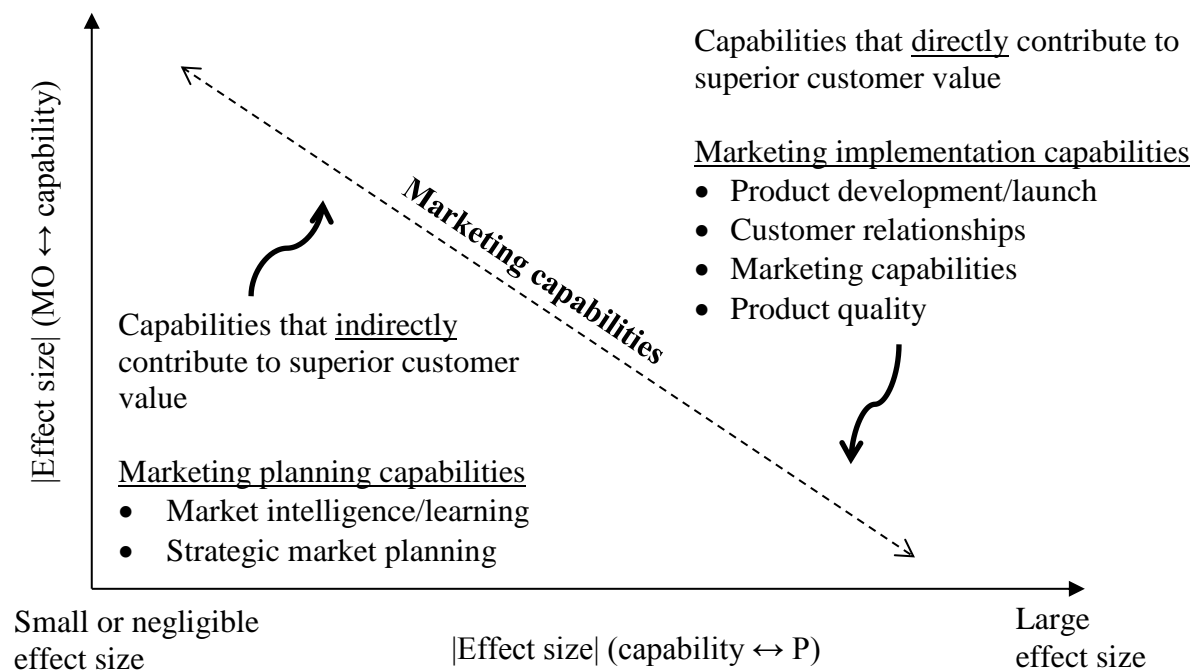
organizational capabilities that (1) involve deployment of MO and (2) have a material, positive effect on customer value.

Recent MO research appears to support the notion that MO is perhaps better considered as a capability antecedent than a performance antecedent. When Morgan, Vorhies, and Mason (2009) assessed the individual main effects of MO and marketing capabilities (i.e., marketing mix processes such as product management and marketing communications) on both objective and subjective performance measures, they found that an otherwise significant MO coefficient was rendered nonsignificant by a strong marketing capabilities coefficient. In their study of “disparate approaches” to operationalizing MO, Hult, Ketchen, and Slater (2005) found that organizational responsiveness (i.e., a firm’s propensity to act on market information) fully mediates the relationships between market orientation and performance and between market information processing and performance. Jiménez-Jiménez and Cegarra-Navarro (2007) found that organizational learning fully mediated the relationships between intelligence generation and dissemination (components of the behavioral view of market orientation) and performance in their study of Spanish firms. Langerak, Hultink, and Robben (2007) showed the proficient product development processes mediate the MO-P relationship in their study of Dutch firms.

Some capabilities are expected to relate to MO and organizational performance more directly than others, however. It is our expectation that marketing capabilities, the “integrative processes designed to apply the collective knowledge, skills, and resources of the firm to the market-related needs of the business” (Weerawardena and O’Cass 2004, p. 421), will differentially relate to MO and organizational performance. Figure 2 implies that MO will relate strongly to organizational capabilities that indirectly, rather than directly, contribute to superior customer value. MO should correlate strongly with (i.e., have a relatively proximal effect on)

these capabilities, given the importance of marketing as the mechanism for enhancing the value of a firm's products in the minds of its current and potential customers (Dutta, Narasimhan, and Rajiv 1999). In contrast, we expect that MO will have a relatively distal effect on marketing capabilities that are regarded for directly contributing to superior customer value.

FIGURE 2
HYPOTHESIZED RELATIONSHIPS BETWEEN MO, ORGANIZATIONAL ACTIONS, AND PERFORMANCE



H3: The effect of the reported MO of an organization on its a) customer, b) market, and c) financial performance will be weaker than that of the reported MO of an organization on its marketing capabilities.

Methodology

A search of academic databases was performed in late 2010 to acquire original empirical studies of the MO-P relationship. In consideration of extant meta-analyses and because

marketing capabilities have attracted considerable recent attention, the search protocol focused primarily on works published post-2000. We are grateful to Professor Ahmet Kirca for providing references to studies examined in Kirca, Jayachandran, and Bearden (2005). For any paper to be included in the present study, it must have been an English-language empirical work with the following keywords present in its abstract: “(market) orientation,” “performance,” “capability,” “competence,” or “action.” Two independent coders assessed each study for its appropriateness and relevance to the present research. Necessary data for calculating effect sizes included correlation coefficients (or equivalent), reliability estimates, and sample size. Studies were excluded from the final dataset for reasons of substantive irrelevance ($n = 9$), methodological incompatibility ($n = 29$), or missing data ($n = 20$). 41 independent studies constitute the final dataset, indicating a retention rate of 41.4% (41/99).

The following steps were taken for transforming bivariate correlations into effect sizes, as they commonly are when the focus is on the degree of association between two continuous variables (see Lipsey and Wilson 2001). Measurement error was corrected at the individual-study level by dividing the effect estimate by the product of the square root of the reliabilities of the two constructs (e.g., Ellis 2006; Kirca, Jayachandran, and Bearden 2005). Effect sizes corrected for measurement error were then transformed to Fisher’s z_r in order to address the issue of nonnormality that has been observed with regard to nontrivial effect sizes (Rosenthal 1984). Mean effect sizes were calculated by weighting each effect by the inverse of its variance ($N - 3$). Mean effect sizes were then transformed back into standard correlational form using the inverse of the z_r transformation.

Analysis and Results

In all, 41 studies were included in the analysis, representing a total sample size of 10,230 respondents or informants ($M = 250$; $SD = 181.3$). Across the 41 studies, a total of 550 effects were recorded ($M = 13.4$; $SD = 12.1$). Research samples were primarily situated in the United States, China, and the European continent, although contextual details of several studies were insufficient for confidently ascertaining the country(ies) in which their data was collected. The MO-P relationship was more commonly assessed in industrial/business markets ($n = 32$) than consumer markets ($n = 17$), with goods firms and services firms receiving very comparable attention. Performance was most commonly assessed in terms of an organization's domestic operations, with only a small number of studies focused specifically on export market performance ($n = 7$). MKTOR and MARKOR both exhibited strong internal consistency ($\alpha = .83$ and $.91$, respectively), although the number of relationships assessed using MKTOR outnumbered that assessed using MARKOR by a factor of 20. Table 1 represents an overview of relationships between MO and constructs of particular interest.

(INSERT TABLE 1 HERE).

H1 predicted a significant positive relationship between MO and each of customer, market, and financial performance. Results provide support for H1 (.41, .32, and .22, respectively) but suggest that the effect of MO on the three performance types is unequal. MO is a stronger driver of customer performance (e.g., customer satisfaction) than either market performance (e.g., market share) or financial performance ($p < .001$). Using accepted guidelines (that $r \leq .10$ is a small effect, $r \approx .25$ is a medium effect, and $r \geq .40$ is a large effect) (Lipsey and

Wilson 2001), MO only has a large effect on customer performance. In all cases, however, MO has at least a medium-level effect on organizational performance.

H2 predicted that certain business orientations have influence in the MO-P relationship. Table 1 shows that MO relates significantly to entrepreneurial (.53), innovation (.60), and learning (.72) orientations. H2 differs from H1 by explicitly controlling for the confounding effects of each of the three orientations on MO in terms of its relationship with P. To test H2, partial MO-P correlations were calculated by removing correlations between MO and each orientation. It was not possible to assess this issue for customer performance because of insufficient incorporation of the orientation constructs in extant research. Table 2 shows that relationships between MO and each of market and financial performance are affected by entrepreneurial, innovation, and learning orientations. Due to the high degree of relatedness between constructs, each MO-P relationship was significantly altered by controlling for the entrepreneurial, innovation, and learning orientations. When considered with either entrepreneurial or innovation orientation, as examples, the value of MO as an antecedent of financial performance evaporates almost altogether. Incorporation of learning orientation detracts significantly from the extent to which MO can explain variance in market performance measures. Results of H2 are decidedly mixed, but there is much reason to consider more cautiously the necessity of MO as a driver of organizational performance.

(INSERT TABLE 2 HERE).

H3 predicted that MO is more appropriately considered a capability antecedent than a performance antecedent. Table 1 shows a clear downward trend in terms of MO effect sizes as

customer-value directness increases. MO relates to marketing planning capabilities relate more strongly than to marketing implementation capabilities. Table 3 could form the basis for future research. Marketing planning and marketing implementation capabilities are highly related ($r = .67$, $se = .02$). Marketing implementation capabilities are very impactful in terms of their association with performance.

(INSERT TABLE 3 HERE).

Concluding Remarks

The results of this analysis reinforce earlier findings reported in meta-analyses as to the positive and significant relationship between MO and performance. On its own, MO appears to possess the characteristics of a resource that is linked with superior organizational performance. Beyond this main-effect bivariate relationship, however, this paper sheds valuable light on the overall nomological network that bridges MO and performance. Results show that MO is actually a relatively distal correlate of organizational performance. By comparison, the organizational capabilities considered in this meta-analysis appear to be relatively proximal correlates of subjective organizational performance. This appears to be particularly true for marketing implementation capabilities. Results also indicate that multiple routes may exist to the performance benefits that are frequently ascribed to market orientation. The next obvious step is to conduct a meta-analytic path (or related) analysis with respect to the mediated market-orientation-performance relationship. The current meta-analysis offers some important insights, but path analysis is better able to comment on the causal nature of relationships.

References

- Adegbesan, J. (2009), "On the origins of competitive advantage: Strategic factor markets and heterogeneous resource complementarity," *Academy of Management Review*, 34(3), 463-75.
- Barney, J. (1991), "Firm resources and sustained competitive advantage," *Journal of Management*, 15, 175-90.
- Conant, J., Mokwa, M., and R. Varadarajan (1990), "Strategic types, distinctive marketing competencies and organizational performance: A multiple measures-based study," *Strategic Management Journal*, 11, 365-83.
- Day, G. (1994), "The capabilities of market-driven organizations," *Journal of Marketing*, 58, 37-52.
- Day, G. S. and R. Wensley (1988), "Assessing advantage: A framework for diagnosing competitive superiority," *Journal of Marketing*, 52(2), 1-20.
- Deligonul, Z. and S. T. Cavusgil (1997), "Does the comparative advantage theory of competition really replace the neoclassical theory of perfect competition?" *Journal of Marketing*, 61(4), 65-73.
- Dutta, S., Narasimhan, O. and S. Rajiv (1999), "Success in high-technology markets: Is marketing capability critical?" *Marketing Science*, 18(4), 547-68.
- Ellis, P. (2006), "Market orientation and performance: A meta-analysis and cross-national comparisons," *Journal of Management Studies*, 43(5), 1089-107.
- Fahy, J., Hooley, G., Greenley, G. and J. Cadogan (2006), "What is a marketing resource? A response to Gibbert, Golfetto and Zerbini," *Journal of Business Research*, 59, 152-54.
- Felton, A. P. (1959), "Making the marketing concept work," *Harvard Business Review*, 37(4), 55-65.
- Foley, A. and J. Fahy (2009), "Seeing market orientation through a capabilities lens," *European Journal of Marketing*, 43(1/2), 13-20.
- Grant, R. M. (1991), "The resource-based theory of competitive advantage: Implications for strategy formulation," *California Management Review*, 33(3), 114-35.
- Grinstein, A. (2008), "The relationships between market orientation and alternative strategic orientations. A meta-analysis," *European Journal of Marketing*, 42(1/2), 115-34.

- Guo, C. (2002), "Market orientation and business performance: A framework for service organizations," *European Journal of Marketing*, 36(9), 1154-63.
- Harris, L. C. and N. F. Piercy (1999), "A contingency approach to market orientation: Distinguishing behaviours, systems, structures, strategies and performance characteristics," *Journal of Marketing Management*, 15(7), 617-46.
- Hooley, G., Greenley, G., Cadogan, J. and J. Fahy (2005), "The performance impact of marketing resources," *Journal of Business Research*, 58, 18-27.
- Hult, G., Ketchen, D. and S. Slater (2005), "Market orientation and performance: An integration of disparate approaches," *Strategic Management Journal*, 26, 1173-1181.
- Hunt, S. D. and R. M. Morgan (1995), "The comparative advantage theory of competition," *Journal of Marketing*, 59(2), 1-15.
- Jiménez-Jiménez, D. and J. Cegarra-Navarro (2007), "The performance effect of organizational learning and market orientation," *Industrial Marketing Management*, 36, 694-708.
- Ketchen, D., Hult, G. and S. Slater (2007), "Toward greater understanding of market orientation and the resource-based view," *Strategic Management Journal*, 28, 961-64.
- Kirca, A., Jayachandran, S. and W. Bearden (2005), "Market orientation: A meta-analytic review and assessment of its antecedents and impact on performance," *Journal of Marketing*, 69(April), 24-41.
- Kohli, A. K. and B. J. Jaworski (1990), "Market orientation: The construct, research propositions, and managerial implications," *Journal of Marketing*, 54(2), 1-18.
- Lafferty, B. A. and G. T. M. Hult (2001), "A synthesis of contemporary market orientation perspectives," *European Journal of Marketing*, 35(1), 92-109.
- Langerak, F., Hultink, E. and H. Robben (2007), "The mediating role of new product development in the link between market orientation and organizational performance," *Journal of Strategic Marketing*, 15(4), 281-305.
- Lipsey, M. and D. Wilson (2001), *Practical meta-analysis*. Thousand Oaks, CA: SAGE Publications.
- Menguc, B. and S. Auh (2006), "Creating a firm-level dynamic capability through capitalizing on market orientation and innovativeness," *Journal of the Academy of Marketing Science*, 34(1), 63-73.
- Miles, M. and D. Arnold (1991), "The relationship between marketing orientation and entrepreneurial orientation," *Entrepreneurship: Theory & Practice*, 15(4), 49-65.

Morgan, N., Vorhies, D. and C. Mason (2009), "Market orientation, marketing capabilities, and firm performance," *Strategic Management Journal*, 30, 909-20.

Narver, J. C. and S. Slater (1990), "The effect of a market orientation on business profitability," *Journal of Marketing*, 54(4), 20-35.

Noble, C., Sinha, R. and A. Kumar (2002), "Market orientation and alternative strategic orientations: A longitudinal assessment of performance implications," *Journal of Marketing*, 66(Oct.), 25-39.

Paladino, A. (2007), "Investigating the drivers of innovation and new product success: A comparison of strategic orientations," *Journal of Product Innovation Management*, 24(6), 534-53.

Palmatier, R. W. (2008), "Interfirm relational drivers of customer value," *Journal of Marketing*, 72(4), 76-89.

Rosenthal, R. (1984), *Meta-Analytic Procedures for Social Research*. Beverley Hills: SAGE Publications.

Snow, C. and L. Hrebiniak (1980), "Strategy, distinctive competence, and organizational performance," *Administrative Science Quarterly*, 25, 317-36.

Vorhies, D. and N. Morgan (2005), "Benchmarking marketing capabilities for sustainable competitive advantage," *Journal of Marketing*, 69(January), 80-94.

Weerawardena, J. and A. O'Cass (2004), "Exploring the characteristics of the market-driven firms and antecedents to sustained competitive advantage," *Industrial Marketing Management*, 33, 419-28.

Wu, S., Melnyk, S. and B. Flynn (2010), "Operational capabilities: The secret ingredient," *Decision Sciences*, 41(4), 721-54.

Zhou, K., Brown, J. and C. Dev (2009), "Market orientation, competitive advantage, and performance: A demand-based perspective," *Journal of Business Research*, 62(11), 1063-70.

Zhou, K., Li, J., Zhou, N. and C. Su (2008), "Market orientation, job satisfaction, product quality, and firm performance: Evidence from China," *Strategic Management Journal*, 29, 985-1000.

TABLE 1
CORRELATES OF MO

	Number of Effects	Sample Size	Corrected E.S.	Standard Error	95% C.I.	Fail safe N
Orientations						
Entrepreneurial	5	1,149	.53	.03	.47 - .59	83
Innovation	9	2,697	.60	.02	.56 - .64	171
Learning	6	1,371	.72	.03	.66 - .78	138
Marketing planning						
Market intelligence	5	912	.72	.03	.66 - .78	115
Strategic market planning	3	560	.58	.04	.50 - .66	55
Marketing implementation						
Product development	6	1,736	.48	.02	.44 - .52	90
Product commercialization	5	1,337	.46	.03	.40 - .52	72
Customer relationships	3	2,006	.40	.02	.36 - .44	62
Marketing capabilities	11	2,885	.46	.02	.42 - .50	158
Performance						
Customer	5	1,822	.41	.02	.37 - .45	63
Market	16	4,721	.32	.01	.30 - .34	155
Financial	19	5,452	.22	.01	.20 - .24	120

TABLE 2
MO-P, CONTROLLING FOR EACH ORIENTATION

Orientations	MO (Table 1)	Effect Indicators	<u>Market</u>		<u>Financial</u>	
			A	B	A	B
Entrepreneurial	.53	r (se)	.40 (.04)	.20 (.01)	.44 (.05)	-.02 (.01)
		95% CI	.32 - .47	.18 - .22	.34 - .54	-.04 - .00
		Fail safe N	37	91	27	-
Innovation	.60	r (se)	.34 (.02)	.23 (.01)	.31 (.03)	.07 (.01)
		95% CI	.30 - .38	.21 - .25	.25 - .37	.05 - .09
		Fail safe N	31	107	37	25
Learning	.72	r (se)	.41 (.03)	.05 (.01)	.21 (.04)	.15 (.01)
		95% CI	.35 - .47	.03 - .07	.13 - .29	.13 - .17
		Fail safe N	38	11	18	76

A: Bivariate effects (performance and each orientation).

B: MO-P relationship, controlling for each orientation.

TABLE 3
CORRELATIONS (SE) BETWEEN MO, MARKETING CAPABILITIES, AND
ORGANIZATIONAL PERFORMANCE

	<u>MO</u>	<u>Marketing Capabilities</u>		<u>Performance</u>	
		<u>Planning</u>	<u>Implement.</u>	<u>Customer</u>	<u>Market</u>
Marketing planning	.66				
Marketing implementation	.45	.67 (.02)			
Customer performance	.41	.42 (.05)	.53 (.02)		
Market performance	.32	.42 (.03)	.40 (.01)	.57 (.02)	
Financial performance	.22	.38 (.03)	.38 (.02)	.54 (.02)	.68 (.02)

Factors Influencing Obesity

Robert T. Barrett, School of Management, Lander University,
Greenwood, SC 29649, 803-388-8232, rbarrett@lander.edu

Neil F. Riley, School of Business, Francis Marion University,
Florence, SC 29506, 803-661-1419, nriley@fmarion.edu

ABSTRACT

The causes of obesity and the resulting health implications are well documented. A recent National Institute of Health publication documented the health implications as: coronary heart disease, high blood pressure, Type 2 diabetes, gallstones, breathing problems, and certain cancers. All of course, leading to reduced quality of life as well as increased medical costs for the individual and society. The factors often studied cover a wide range, from genes and family history to smoking, from the environment to lack of sleep.

This study expands the traditional factors to include socio economic factors. The role of education, income, poverty, and race are introduced in this paper.

INTRODUCTION

Obesity is a major health issue in the United States. Morgan Spurlock chronicled a month of eating only McDonald's food in his 2004 documentary "Super Size Me." New York City Mayor Michael Bloomberg led the fight to limit the size of sugary drinks sold in public places in an attempt to battle obesity. Michele Obama is fighting to get funding to improve the quality of school lunches and to encourage exercise, especially among youth and children. There is certainly the question of government overstepping its authority. Many cities banned smoking in public places several years ago. Has the incidence of cancer from secondary smoke decreased since these bans came into effect? What will be legislated next? Should fried foods and donuts be limited? Will government intervention help to reduce the incidence of obesity? As with smoking, obesity has been tied to numerous health related problems. People are obese due to overeating, unhealthy eating, lack of exercise, and being medically disposed to obesity, among other causes.

We do not propose to specifically address the causes of and cures for obesity in this research project. Here we study the demographic variables that affect obesity. We look at data sets from 2005 and 2010 to identify the statistical impacts of these variables on obesity. Given this knowledge, regional health experts can target certain groups in efforts to fight obesity.

Initially, we compare the percentage of obese people by state in 2005 and 2010. The variable of interest is the percentage of the population in a state that is obese (Body Mass Index greater than 30), and will be referred to as Obese. With the strong push in recent years for healthier lifestyles, it would seem that health conditions in general and obesity specifically would improve. Based on these thoughts, we would hypothesize that obesity would decrease between 2005 and 2010.

We follow this analysis with a look at the variables that could be used to estimate obesity in a state. Potentially, focusing education on the groups identified here could lead to improved health.

LITERATURE REVIEW

A recent article¹ showcased many surprising results and dangers of obesity. Researchers found that *smell* is impacted by obesity. They found that obese mice appear to have a reduced sense of smell compared with those of normal weight. Mice with a super sense of smell appear resistant to obesity. *Sleep* was also found to be impacted by obesity. Obesity was found to have a link with people feeling sleepier and fatigued. Losing weight was found to decrease sleepiness. *Fertility* is also found to be impacted by obesity. Obese teenage males have decreased testosterone compared to normal weight males. Obese females have greater risk to polycystic ovarian syndrome and high levels of testosterone. *Cancer* is also impacted by obesity. Studies found obese people have higher rates and faster progression of certain types of cancer. Tumor cells also appear to recruit fat cells to help cancer grow.

Who is at greatest risk for becoming overweight or obese? According to the National Health and Nutrition Examination Survey (NHANES) 2009–2010, almost 70 percent of Americans are overweight or obese. The survey also shows differences in overweight and obesity among racial/ethnic groups.

¹Wang, Shirley S., “Revealing the Unexpected Dangers of Obesity,” Wall Street Journal, October 30, 2012, pp. D2.

- In women, overweight and obesity are highest among non-Hispanic Black women (about 82 percent), compared with about 76 percent for Hispanic women and 64 percent for non-Hispanic White women.
- In men, overweight and obesity are highest among Hispanic men (about 82 percent), compared with about 74 percent for non-Hispanic White men and about 70 percent for non-Hispanic Black men.
- Children also have become heavier. In the past 30 years, obesity has tripled among school-aged children and teens.
- About 1 in 6 American children ages 2–19 are obese.
- The survey also suggests that overweight and obesity are having a greater effect on minority groups, including Blacks and Hispanics.

SUGGESTED MODELS FOR STUDY & METHODOLOGY

The variables, with anticipated relationships and variable names, include:

- the percentage of the population in a state with less than a high school education, anticipating a positive relationship with obesity [Educ]
- the percentage of the population in a state who are black (positive – [Black])
- the percentage of the population in a state who are smokers (positive – [Smokers])
- the percentage of the population in a state in poverty (positive – [Poverty])
- the per capita income in a state (negative- [PCI])
- the population in a state (positive – [Pop])

We use correlation analysis to investigate relationships of the explanatory variables with obesity. We use regression analysis to estimate obesity in states using these variables.

RESULTS AND CONCLUSIONS

A t-test was used to compare obesity levels in 2005 with levels in 2010. The initiatives described above were not effective in curbing the rise of obesity. Average percentage of obese population in states increased from 2005 to 2010. The average obesity level in 2005 was 24.552 percent. The average obesity level in 2010 was 27.712 percent. Not only has the obesity level per state not decreased, the level has increased significantly. The t-value comparing 2005 with 2010 obesity levels is 5.03 with associated the p-value of less than .0005.

Correlation Analysis

Tables 1 and 2 show the correlations among the variables for 2005 and 2010.

Table 1. Correlations for 2005 Variables

	Obesity	Education	Black	Smokers	Poverty	PCI
Education	0.484 0.000					
Black	0.541 0.000	0.349 0.013				
Smokers	0.673 0.000	0.424 0.002	0.289 0.042			
Poverty	0.553 0.000	0.856 0.000	0.307 0.030	0.441 0.001		
PCI	-0.579 0.000	-0.437 0.002	-0.146 0.310	-0.403 0.004	-0.563 0.000	
Pop	-0.013 0.931	0.420 0.002	0.185 0.198	-0.136 0.346	0.332 0.018	0.229 0.110

Table 2. Correlations for the 2010 Variables

	Obesity	Education	Black	Smokers	Poverty	PCI
Education	0.544 0.000					
Black	0.552 0.000	0.402 0.004				
Smokers	0.683 0.000	0.421 0.002	0.320 0.023			
Poverty	0.485 0.000	0.859 0.000	0.305 0.031	0.367 0.009		
PCI	-0.541 0.000	-0.471 0.001	-0.097 0.501	-0.489 0.000	-0.520 0.000	
Pop	0.041 0.777	0.416 0.003	0.187 0.193	-0.221 0.123	0.410 0.003	0.174 0.228

For both 2005 and 2010, except for the Population variable, all of the explanatory variables have a significant correlation with Obesity (p-values of .000 indicate these strong correlations) and each demonstrates the directional relationship anticipated. As Educ, Black, Smokers, and Poverty levels increase from state to state, obesity level also increases. As PCI increases from state to state, obesity level decreases. The correlation between Obesity and population is not significant.

It is interesting to note correlations among the explanatory variables. The percentage of the population in a state with less than a high school education variable is highly correlated with Black, Smokers, Poverty, and Pop. The Smokers variable is highly correlated with Poverty and PCI. Poverty is highly correlated with PCI. These results are not surprising. These high correlations among the explanatory variables will impact the regression results, as indicated below.

Regression Analysis

Regression models were built for the 2005 and 2010 data and will be used to estimate obesity in a state using the explanatory variables. The model for 2005 was strong with R-squared value of 69.7%. The F-value for this model was 163.5 (p-value = 0.000). The 2005 model is listed below, showing p-values below the model coefficients.

$$\text{Obese} = 21.2 - 0.11 \text{ Educ} + .12 \text{ Black} + .41 \text{ Smokers} + .17 \text{ Poverty} - .0002 \text{ PCI} + 0 \text{ Pop}$$

.489 0 0 .411 .008 .621

Note that Black, Smokers, and PCI have significant influence on obesity, while Educ, Poverty, and Pop do not. Educ and poverty drop out because of their high correlations with more highly significant explanatory variables. Population again is not significant.

The 2010 model shows similar results. The 2010 R-squared value was 67.4%. The F-value was 14.8 (p-value = 0.000). Again Black, Smokers, and PCI have significant influence on obesity, while Educ, Poverty, and Pop do not.

$$\text{Obese} = 25.9 - 0.07 \text{ Educ} + .128 \text{ Black} + .41 \text{ Smokers} - .05 \text{ Poverty} - .0002 \text{ PCI} + 0 \text{ Pop}$$

.721 .001 0 .807 .016 .343

Models of this sort can be used to estimate obesity levels of states going forward. Given these estimates, resources could be allocated to help residents of the high obesity states better educate the groups with most impact on obesity. Further study can identify methods to support these initiatives.

References

“Satcher: Obesity almost as bad as smoking,” CNN Medical Correspondent Dr. Sanjay Gupta contributed to this report, December 2001.

“Former surgeon general wages war on obesity,” Correspondent Eugenia Halsey and Reuters contributed to this report. October 29, 1996.

“Commentary: Why we need an obesity tax,” David Paterson, Special to CNN, December 18, 2008.

“Pudgy in the Punjab Urban Indians increasingly obese,” Fit India Inc. of New Delhi National Institutes of Health Obesity Guidelines, October 25, 1998.

ENGAGING COMMUNITY SERVICE STUDENTS THROUGH VISUAL STORYTELLING OF HIGH SCHOOL STUDENTS WITH DISABILITIES

James P. Lawler
Pace University
Seidenberg School of Computer Science and Information Systems
163 William Street – 2nd Floor
New York City, New York 10038
609-799-4837
lawlerj@aol.com

ABSTRACT

Community engagement is a common course in college curricula of computer science and information systems. In this research-in-progress study, the author attempts to determine the benefits of digital storytelling, in a course engaging college students with high school students with developmental and intellectual disabilities. The author is attempting to discern if a project of self-advocacy storytelling enables higher engagement of both college and high school students. The author is also attempting to learn if the project enables higher impact of the service on these students. The study will benefit instructors in any discipline evaluating digital storytelling technology as a service-learning tool.

KEYWORDS: Community Engagement, Digital Storytelling, Disabilities, Information Systems Curriculum, Life Stories, Service-Learning, Technology, Visual Storytelling

BACKGROUND OF PAPER

Community engagement is a "... approach in learning ... that integrates community service with academic [courses] to enrich learning [and] teach civic responsibility ..., engaging [college] students in addressing [an] unmet issue ... in a community" [19]. The design of the learning in this paper is in a project of service attempting to benefit college students engaged with high school students with developmental and intellectual disabilities (e.g., autism) and to benefit the high school students themselves. The history of individuals with disabilities is considered to be of disempowerment and invisibility [27] if not exclusion from society [2] that is not frequently known by college students not having disabilities. The lives of individuals with disabilities, not merely as individuals with disabilities but of persons with potential, are not considered to be explored frequently nor heard in life passports and storybooks [16] or reflective stories by themselves. Such stories can be a foundation for grit and self-determination if not self-efficacy and self-esteem [23] or self-identity that if helped by the college students may inspire the lives of individuals with disabilities [23]. These stories can be furnished in a media of digital or visual storytelling [6] that can give a persistence and voice to individuals with disabilities [22].

Visual storytelling is defined in the literature as a "... combination of emotional [attitude] and narrative information ..., [furnishing] a barely perceptible emotional context to the telling of the ... narrative [that] is the same as any successful story" [12]. The lives of high school students with developmental and intellectual disabilities who are still verbal can be expressed by these students through narratives of visual storytelling [9]. The media of the narratives or visual storytelling can be a mix of fundamental graphic, photographic and textual technology and movie-making and soundtrack tools. The narratives of reconstructions or situations of the high school students can be the products of a project in a community engagement course of college students without disabilities helping the high school students with disabilities in the recording and sharing of the visual storytelling through the tools. The engagement process of visual storytelling can be helpful to the college students in learning about individuals with disabilities and to the high school students with disabilities in learning about methods of representing their situations and themselves [3].

The benefits of a community engagement course of college students on a project of stories of high school students with disabilities are in advocacy: advocacy of college students for individuals with disabilities, and self-advocacy of individuals with disabilities. High school students with developmental and intellectual disabilities are expected to express self-determination in life optimization and planning [21] [23]. Media projects of visual storytelling can facilitate grit, if not motivate a persistent self-determination of these high school students in societal transition and visioning [23], if helped by the college students. The engagement of the college students on the storytelling can be helpful in learning about a marginalized population that can have meaningful potential in society [5]. Not clear however is the actual extent of engagement impact of a project of self-advocacy visual storytelling on the college students without disabilities and on the high school students with disabilities. The author attempts to analyze the impacts in this study.

INTRODUCTION TO PROJECT AND STUDY

"Every field has some central tension it is trying to resolve, [and] visualization deals with the inhuman scale of the information and the need to present it at the very human scale of what the eye can see" [26].

The author of this study attempts to explore engagement impacts of visual storytelling in a community engagement course, at the Seidenberg School of Computer Science and Information Systems at Pace University. The course concentrates on a project of autobiographical visual storytelling at the AHRC New York City Middle / High School, an institution for high school students with developmental and intellectual disabilities. The essence of the course is for the high school students to be helped by the college students in the development of narratives or stories through visual storytelling tools. The goals of the course are helping in the improvement of self-efficacy and self-esteem of the high school students, and helping in the improvement of self-knowledge of the college students of a neglected population of high school students. The outcomes of the project are in the impacts of increased responsibility in service by the college students without disabilities and increased support to the high school students with disabilities.

The course consists of 38 college students for the summer and fall 2012 semesters, and an estimated 38 students for the spring and summer 2013 semesters, or 76 students for the current study. Each of the college students, from freshmen to senior students, is paired by the author-instructor with a higher-functioning (i.e. less impaired) high school student with disabilities at the beginning of each semester for the duration of the semester. Few of the college students are experienced with individuals with developmental and intellectual disabilities or were even exposed to neighborhood service [14]. They are guided by the instructor in a conceptualized discovery process for developing person-centered stories [18], though the process is of limited scaffolding [20], or limited step-by-step instructions [1], so that it does not stifle the imagination of the students [27]. The focus of the project is the recording and sharing of hopes, joys and interests [11] in personalized stories of the high school students each week, through largely marketplace mobile multimedia technology fully known to the college students [24], if not the high school students.

Helped by the college students, the high school students may express and form storyboards through audio recording of scripts, photographic slide showing, and recording of sounds and videos of digital camera and smart-phone technology. iMovie, Movie Maker and Windows Media Player are frequent tools, already housed at the high school and the university. The high school students and the college students are currently partnered on the technology and the tools on-site at the university 3 hours 1 day each week for 14 semester weeks, with planned presentations of the visual storytelling on the 14th week to the families and the high school staff so that the project has a meaning and a publicized purpose [10].

Literature indicates that media presentations of visual storytelling can motivate the high school students with disabilities in options of post secondary school transition [23]. Self-advocacy and sociality skills can be learned by the high school students [29], as they may be motivated by the partnerships with the college students in the productions of societal transition visualization. Following each week, the students are currently required to furnish anecdotal engagement journals to the instructor reflecting the on-going progress and their relationships on the project. From these journals, the author-instructor may be able to explore the engagement impacts of the project on the college students without disabilities and the impacts on the high school students with disabilities.

Therefore, this study attempts to evaluate the extent of engagement impacts of this project of self-advocacy visual storytelling on both the college students and on the high school students. Video production, if not visual storytelling with individuals with disabilities, can contribute in higher engagement of college students in the context of visual storytelling [10], if not higher impact of the service of visual storytelling on both students. Visual storytelling can contribute in higher engagement, and even in lower shame and stigma [7], of the high school students themselves. Is this project of visual storytelling as practiced at Pace University definitely enabling higher engagement of both the college students and the high school students; and is this project of visual storytelling as practiced at the university definitely enabling higher impact of service on these students? Few studies evaluate the impacts of new media projects on college students

without disabilities and on high school students with developmental and intellectual disabilities as they are partnered on visual storytelling.

FOCUS

The author attempts to explore the engagement impacts of a project in a community engagement course at his university. The author currently is exploring facets of the process of a project of visual storytelling in the course from the summer 2012 semester to the fall 2012 semester, as the college students and the high school students are already partnered on the project, and will extend the study into the spring and summer 2013 semesters. The author is focusing on increased or non-increased engagement of both students on the project, in the observations and the perceptions of the college students and as feasible of the high school students with developmental and intellectual disabilities, as they progress in the semesters. Finally, the author of this research-in-progress study is focusing further on increased or non-increased self-advocacy of the high school students and the college students, in the perceptions of the college students and the high school staff. This study can benefit community engagement instructors evaluating the growing influence [15] of self-advocacy visual storytelling in the service-learning of college students.

RESEARCH METHODOLOGY

The methodology of this study will analyze the project of visual storytelling in the community engagement course in the summer and fall 2012 and spring and summer 2013 semesters, at the Seidenberg School of Computer Science and Information Systems of Pace University. There will be a pre-course instrument of survey of the fall, spring and summer college students on past project service; 14 project reflection journal postings of the college students on the service; 2 mid-term and final reflection journal postings of the college students on the service; a post-course instrument of survey of the college students on the resultant service; and post-course semi-structured focus groups of the college students and the high school organizational staff on open-ended questions on the resultant service, as depicted below in Table 1.

Table 1: Research Methodology Overview

Course: Community Empowerment through Information Systems and Technologies		
Project: Visual Storytelling of High School Students with Developmental and Intellectual Disabilities		
Period	Population	Research Plan Review

<p>2012</p>	<p>-College Students</p> <p>Summer 2012 Semester- Fridays n=6 Fall 2012 Semester- Tuesdays n=24 Fall 2012 Semester- Fridays* n=8</p> <p>Population of College Students n=38</p> <p>(Population of Paraprofessional Staff n=5)</p>	<p>-College Students</p> <p>Pre-Course Instrument of Survey Project Reflection Journal Postings (n=14 Postings) Mid-Term and Final Reflection Journal Postings (n=2 Postings) ** Post-Course Instrument of Survey</p> <p>-College Students and Paraprofessional Staff</p> <p>Post-Course Focus Groups (n=TBD)</p>
<p>2013</p>	<p>-College Students</p> <p>Spring 2013 Semester- Tuesdays n=24 Spring 2013 Semester-Fridays* n=8 Summer 2013 Semester-Fridays n=6</p> <p>Estimated Population of College Students n=38</p> <p>(Estimated Population of Paraprofessional Staff n=5)</p>	<p>-College Students</p> <p>Pre-Course Instrument of Survey Project Reflection Journal Postings (n=14 Postings) Mid-Term and Final Reflection Journal Postings (n=2 Postings)** Post-Course Instrument of Survey</p> <p>-College Students and Paraprofessional Staff</p> <p>Post-Course Focus Groups (n=TBD)</p>
	<p>Estimated Total Population of College Students n=76</p> <p>(Estimated Total Population of Paraprofessional Staff n=5)</p> <p>Estimated Total Population of Study n=81</p>	

* A limited number of other high school students are partnered with other college students in the course on Fridays at the university.

**The mid-term and final reflection journal postings are more reflective and substantial than the project reflection journal postings.

High school paraprofessional staff will be included in the focus groups in lieu of the high school students, due to non-disclosure protection of students with disabilities. Postings will be on an e-Portfolio system of the university. This documented information from the

focus groups and the postings on the system will furnish notation of overall perceptions and progress signs from an estimated 76 college students and 5 high school staff, which will be analyzed by the author beginning in early 2013. This methodology will be largely performed through principles of Yin [28] similar to a previous student study of the author [14].

PRELIMINARY ANALYSIS

The findings from an initial analysis of the observations and the perceptions of the college students, and of the paraprofessional staff, in the periods of the summer and fall 2012 semesters will be completed for conference presentation in early 2013, though the project of storytelling is currently emerging from the e-Portfolio postings to be encouraging, enjoyable and especially exciting by the college students, the high school students with disabilities and the staff, implying higher engagement potential and higher impact potential of the visual storytelling from a preliminary analysis.

POTENTIAL IMPLICATIONS OF STUDY

“When a spider makes a beautiful web, the beauty comes out of the spider’s nature. It is [an] instinctive beauty. How much of the beauty of our lives is about the beauty of being alive? How much of it is conscious and intentional” [4]?

Emerging encouragement from the college students and the high school students on the project may be implying enablement in engagement by visual storytelling. Storytelling is considered in the literature to be founded on friendships on person-centered planning projects [25]. The study may eventually prove that on projects with marginalized populations, visual storytelling is an enabler of higher engagement of students.

Further enjoyment from the college students and the high school students in the summer and fall 2012 semesters may be implying an evident impact of the project service on both of these students. Storytelling is indicated in the literature to be helpful in initiating vocalization of individuals with developmental and intellectual disabilities, even individuals that are non-verbal, such that the high school students may be more interested in the actual storytelling [8], thereby motivating the college students to be more interested in the storytelling. The study may eventually reveal that projects of storytelling vocalization may be an enabler of formative social skills of the high school students and a facilitator of formative service-learning skills of the college students.

Finally, this study may eventually suggest the benefits of having media technology facilitate projects of service-learning involving visual storytelling. Literature is indicating the opportunities of production technology in instructional strategy [13] [17]. This study may in the future suggest that new media production technology, integrated into service-learning and visual storytelling, may be an enabler of positive resultant service of the students at Pace University.

LIMITATIONS AND OPPORTUNITIES IN RESEARCH

The paper is currently a research-in-progress study at one non-profit organization and one university, having a relatively small sample of students at the university and a small sample of high school students with disabilities. The high school students of the study are less impaired individuals and verbal, not individuals more impaired in multiple disabilities (PMD) and non-verbal that might benefit more through media technologies of visual storytelling. Such are the limitations of this study. However this paper may benefit instructors in any discipline interested in the new media of visual storytelling, though instructors on projects with marginalized populations may benefit the most from the storytelling tools. This research will be pursued by the author in 2012-2014.

CONCLUSION OF PAPER

The paper attempts to explore the benefits of engagement of high school students with developmental and intellectual disabilities by college students on a project of digital storytelling. The focus of the paper is on the perceptions of the college students, high school students, and paraprofessional staff, as they currently progress on the project of service-learning visual storytelling. The research-in-progress paper is also attempting to explore the impact of this project on the advocacy of college students for individuals with disabilities, and on the self-advocacy of the individuals with disabilities, through visual storytelling. This paper furnishes input into the potential of the technology of visual storytelling as a service-learning tool. Overall, this study will be relevant to instructors in service-learning and to those in other topics interested in integrating visual storytelling as an instructional strategy.

REFERENCES

- [1] Bamberg, M. *Narrative development: Six approaches*. Mahwah, New Jersey: LEA, 1997.
- [2] Bingham, M.A., Spooner, F., & Browder, D. Training paraeducators to promote the use of augmentative and alternative communication by students with significant disabilities. *Education and Training in Developmental Disabilities*, 2007, 42(3), 339.
- [3] Booth, T., & Booth, W. In the frame: Photo-voice and mothers with learning difficulties. *Disability & Society*, 2003, 18(4), 431-442.
- [4] Campbell, J. *The power of myth*. New York, New York: Doubleday, 1988.
- [5] Danforth, S. A Deweyan perspective on democracy and inquiry in the field of special education. *Journal of the Association for Persons with Severe Handicaps*, 2001, 26(4), 270-280.
- [6] Dow, L. Visual storytelling. *Social Media Today*, 2012, March 20, 1-4.
- [7] Eisenhauer, J. Writing Dora: Creating community through autobiographical zines about mental illness. *Journal of Cultural Research in Art Education*, 2012, 28.
- [8] Grove, N. *Ways into literature*. London, United Kingdom: David Fulton, 2005.
- [9] Grove, N. Exploring the absence of high points in story reminiscence with carers of people with profound disabilities. *Journal of Policy and Practice in Intellectual Disabilities*, 2007, 4(4), 252.

- [10]Hathaway, D., & Norton, P. Video production: Bridging teacher education and classroom practice. *Journal of Technology and Teacher Education*, 2012, 20(2), 131,141,146.
- [11]Holburn, S., Gordon, A., & Vietze, P.M. *Person-centered planning made easy: The picture method*. Baltimore, Maryland: Brookes Publishing Company, 2007.
- [12]Klanten, R., Ehmann, S., & Schulze, F. *Visual storytelling: Inspiring a new visual language*. Berlin, Germany: Gestalten, 4, 2011.
- [13]Lankshear, C., & Knobel, M. *New literacies: Changing knowledge and classroom learning*. Berkshire, United Kingdom: Open University Press, 2003.
- [14]Lawler, J. Engaging community service students through digital portfolios. *Proceedings of the Information Systems Educators Conference (ISECON)*, New Orleans, Louisiana, 2012, November.
- [15]MacLaury, S., Frank, L., Vidar, J., Gillum, K., & Klayman, A. The growing influence of visual storytelling in advocacy. *New York University: Heyman Center for Philanthropy and Fundraising - Panel on Film and Video in Advocacy*, 2012, March 28, 2.
- [16]Middleton, D., & Hewitt, H. Remembering as social practice: Identity and life story work in transitions of care for people with profound learning disabilities. *Narrative Inquiry*, 1999, 9, 97-121.
- [17]Miller, S.M. English teacher learning for new times: Digital video composing as multimodal literacy practice. *English Education*, 2007, 40(1), 6-83.
- [18]Mount, B., & Zwernik, K. It is never too early, it is never too late: A booklet about personal futures planning. *Governor's Council on Developmental Disabilities*, Minnesota., 1988.
- [19]Pritchard, F.F., & Whitehead, G.I. *Serve and learn: Implementing and evaluating service-learning in middle and high schools*. Mahwah, New Jersey: Lawrence Erlbaum Associates, 2004.
- [20]Repenning, A. Programming goes back to school. *Communications of the ACM*, 2012, 55(5), 40.
- [21]Schnapp, L., & Olsen, C. Teaching self-advocacy strategies through drama. *Intervention in School and Clinic*, 2003, 38(4), 211.
- [22]Skouge, J. Assistive technology supports for self-determination and community inclusion. *Review of Disability Studies: An International Journal*, 2007, 3(1-2), 53-62.
- [23]Skouge, J.R., Kelly, M.L., Roberts, K.D., Leake, D.W., & Stodden, R.A. Technologies for self-determination for youth with developmental disabilities. *Education and Training in Developmental Disabilities*, 2007, 42(4), 475-477,480.
- [24]Tapscott, D. *Growing up digital: The rise of the net generation*. New York, New York: McGraw-Hill, 1997.
- [25]Tillmann-Healy, L. Friendship as a method. *Qualitative Inquiry*, 2003, 9(5), 729-749.
- [26]Wattenberg, M. Show me: New ways of visualizing data. *The Economist*, February 25, 2010, 2.
- [27]Willis, J. Held: To carry a story below. *The Children of Freire CCD Journal: New Writings on Community Cultural Development*, 2012, 1, 3,5,7.

[28] Yin, R.K. *Applications of case study research, second edition*. Thousand Oaks, California: Sage Publications, Inc., 2003.

[29] _____. Helping youth build work skills for job success: Tips for parents and families. *InfoBrief: National Collaborative on Workforce and Disability for Youth*, 2012, February, 1-12.

ACKNOWLEDGEMENTS

The author acknowledges funding grants of approximately \$10,000 from the AHRC New York City Foundation to Pace University for stipends to several students who are helping the instructor on the progression of this research study.

Office 2013: Enhanced Ribbon Features plus Cloud Connectivity

Wilma M. Andrews,

Virginia Commonwealth University, Department of Information Systems
Richmond, VA. 23284-4000, 804-827-0956, wandrews@vcu.edu

Robert L. Andrews,

Virginia Commonwealth University, Department of Management,
Richmond, VA. 23284-4000, 804-828-7101, randrews@vcu.edu

Abstract:

This session will explore new Word, Excel and PowerPoint application features in Microsoft Office 2013. The Ribbon user interface is retained though the “look” has changed - to facilitate touch screen use with Windows 8. There is a move toward increased use of the cloud. 2013 provides better collaboration tools within the applications and online in the Web Apps. Session attendees will be encouraged to interact with the presenters.

Microsoft Office 2013

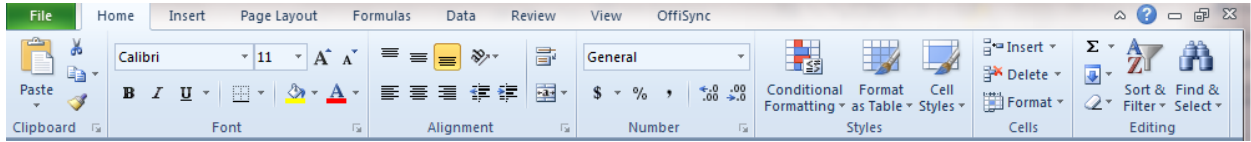
The move toward the cloud with the 2013 release includes: cloud storage options at **SkyDrive**, improved online **Web Apps**, and better collaboration tools within the applications. There are also new annual subscription options as well as the traditional installation for purchase.

New common Office 2013 features include:

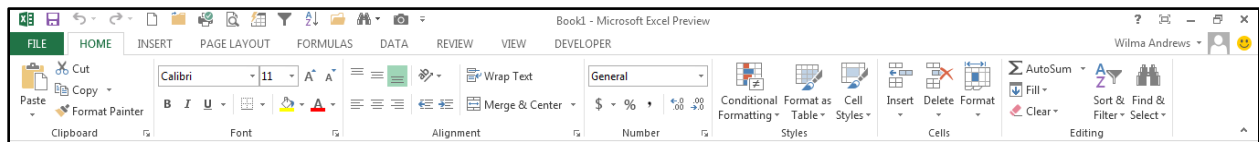


Color changes to the Ribbon User Interface from 2010 to 2013 were made to allow for touch screen use.

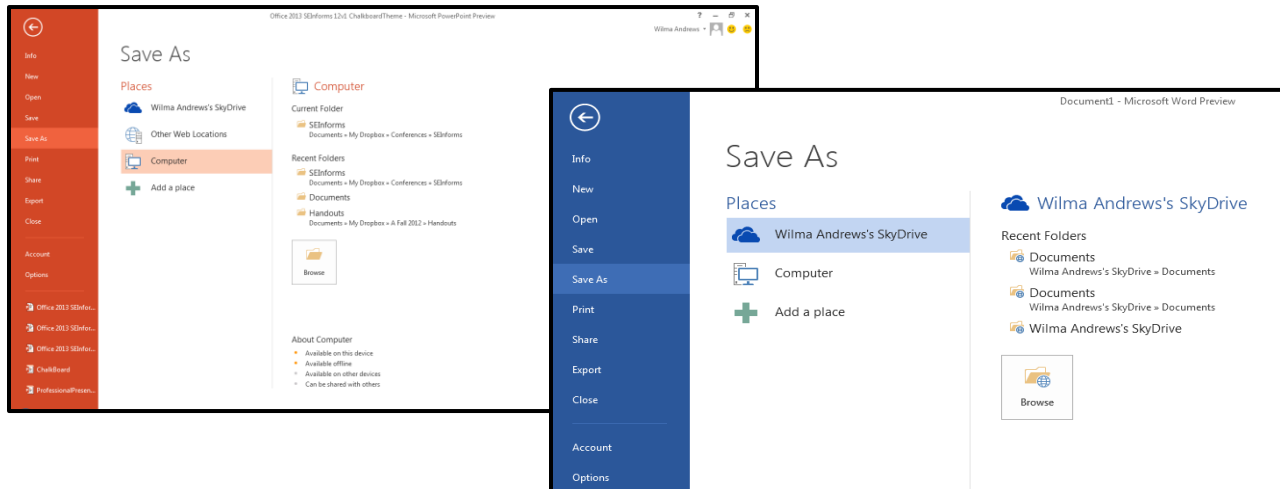
2010



2013



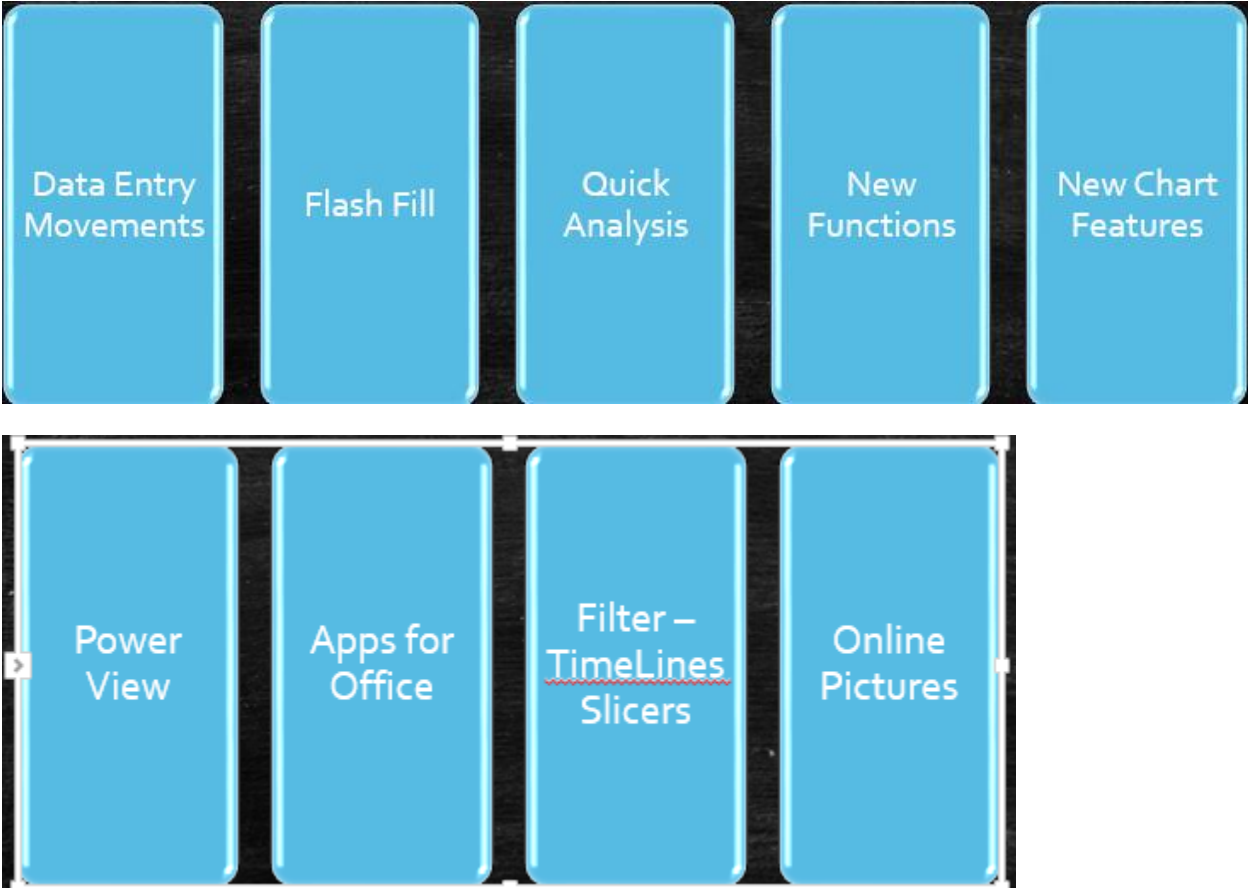
Backstage at the File tab has a very different look. The default setting for saving files is to the **SkyDrive** with emphasis on Cloud connectivity with 2013.



EXCEL 2013

Excel has some exciting features especially for those using Excel for number crunching. PowerPivot is an included Add-In and it works with PowerView and PowerCharts to provide better analytics tools.

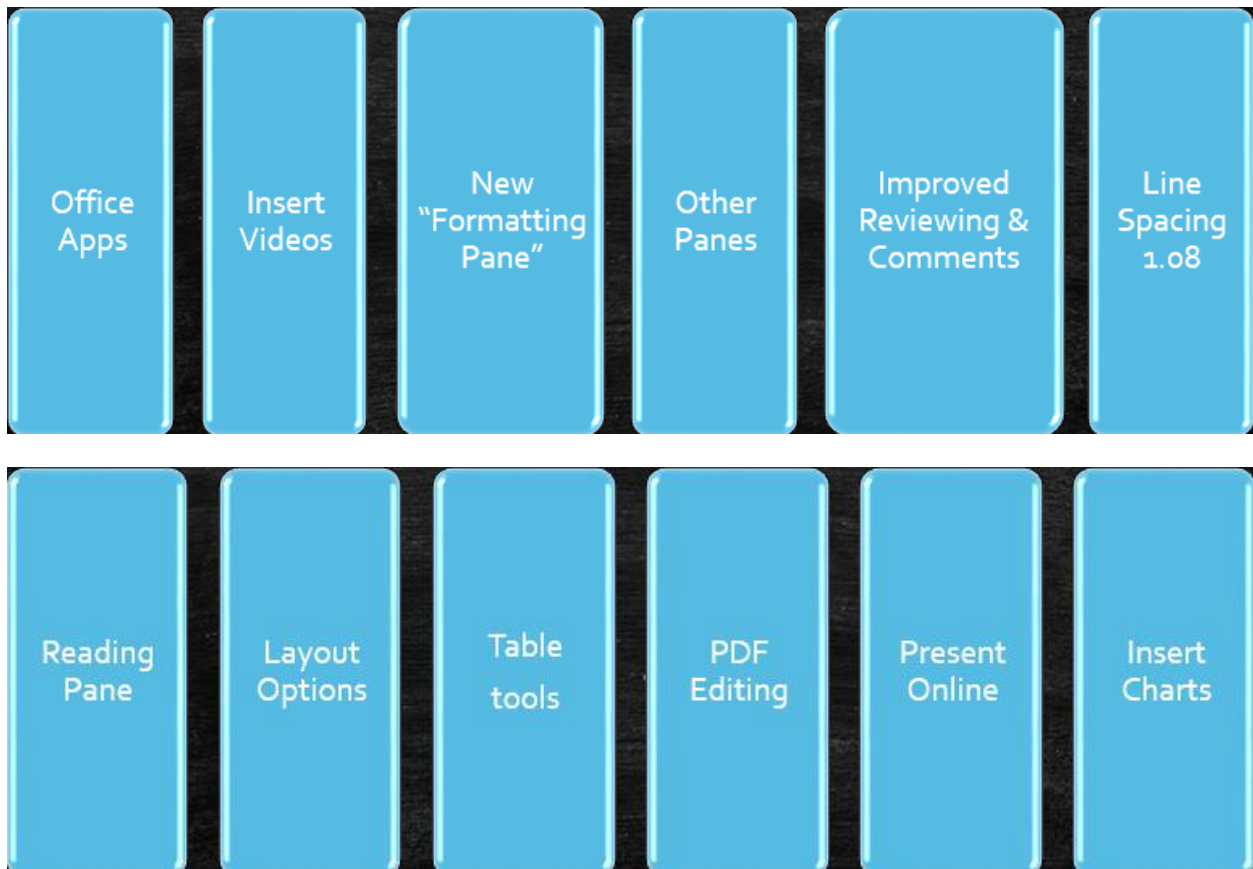
New Excel features include:



WORD 2013

Inserting of images and videos into documents has been made much easier. Reviewing with collaboration now includes a chat feature. PDF documents can be opened and edited in Word. Using **Present Online** at **Share** in the Backstage area, documents can be sent to the cloud which automatically generates a link. The link can be sent to others allowing them to view the document online, even without having Word on their computer.

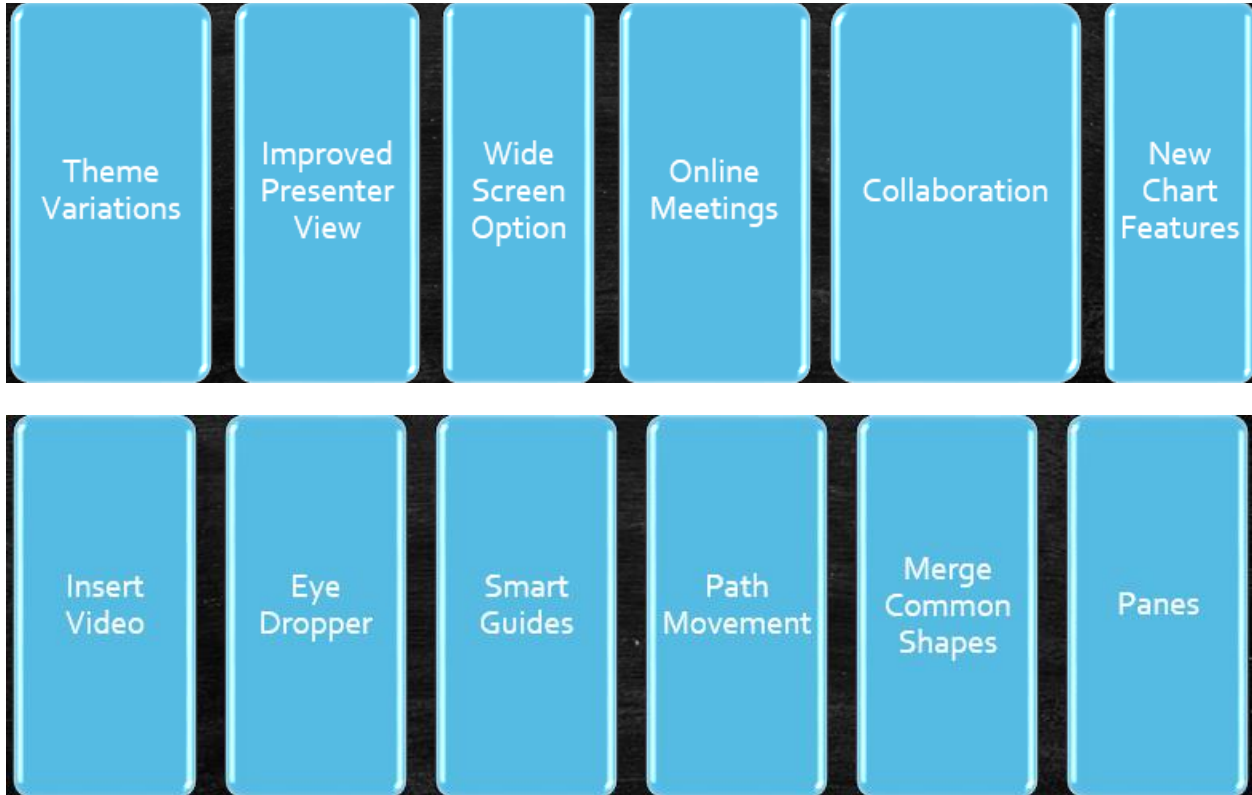
New Word features include:



PowerPoint 2013

Presenter View now includes a view showing the presenter the current slide, current slide notes and the next slide, while only the current slide is projected to the audience. The **Eye Dropper** enables matching and customization of colors. **Online Meetings** can function similarly to **Present Online** in Word to create a link to enable sharing a presentation even if a viewer does not have PowerPoint installed.

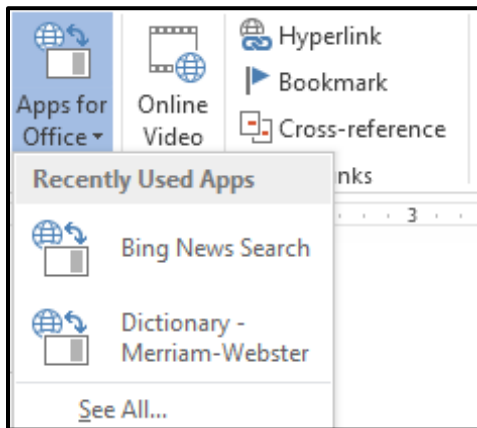
New PowerPoint features include:



Apps for Office 2013

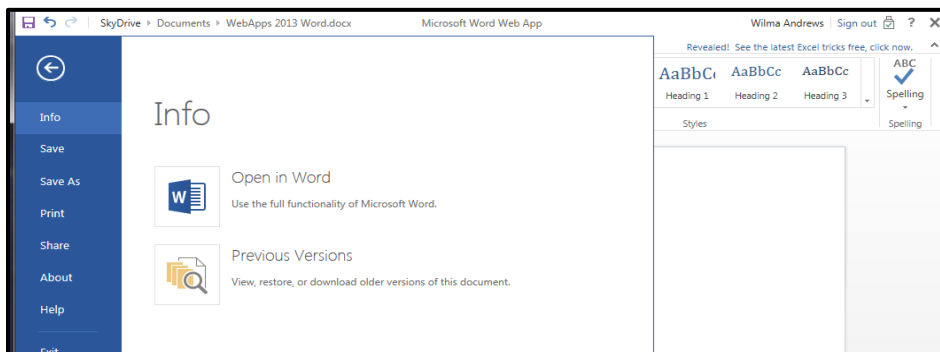
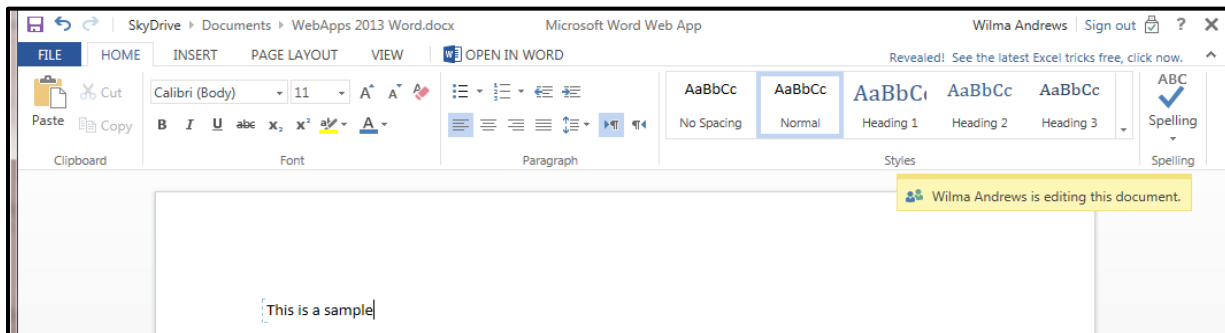
Apps for Office is new to Word and Excel. Many of these apps are free. As new ones become available they can be downloaded from the Office App Store

<http://office.microsoft.com/en-us/store/>. This feature enables the user to obtain Apps from third-party developers and to update Office capabilities without waiting for a new version.



Microsoft Web Apps

There are many new and improved features in the online **Web Apps**. Emphasis is on the cloud experience, collaboration, and being able to use the power of Office online using a **SkyDrive** account. An example of a new feature is the survey option in Excel which allows users to create a survey, email the link to others and analyze the results in Excel.



SkyDrive Accounts

SkyDrive accounts have free storage of 7 GB and include chat, calendar, email and access to Web App documents.

Skype has also been added as an option to SkyDrive accounts.



Office 2013 – Software as a Service

When Office 2013 becomes available to the public, there will be an option to pay an annual fee (around \$99 for individuals) rather than purchasing an installation for one computer (\$400 for Office Professional). Annual fee would include upgrades and new versions.

**DON'T READ THOSE SLIDES!
TIPS FOR IMPROVING CONFERENCE PRESENTATIONS**

A WORKSHOP

George S. Lowry, Randolph-Macon College, glowry@rmc.edu
Wilma Andrews, Virginia Commonwealth University, wandrews@vcu.edu
Catherine L. Franssen, Longwood University, franssencl@longwood.edu
R. Adam Franssen, Longwood University, franssenra@longwood.edu

This workshop focuses on strategies, best practices, and tips to improve the quality of conference presentations. As is often the case, only short intervals of time are available to convey the results of research work; much of which employs the use of PowerPoint or similar projected media. Building on the attention/retention processes of the brain, a variety of examples will demonstrate methods to enhance content delivery, as well as ways to create strong take-away messages. Alternative presentation media will also be discussed along with new features available in PowerPoint.

Running Head: Personality Constructs in College Students

The Effects of Social Support and Self-Efficacy on Depression in College Students

Christina A. King

Savannah State University
3219 College Street
Savannah, GA 31404
865-254-6021
croot@student.savannahstate.edu

Abstract

Many college students today have multiple roles and obligations to play. Therefore, many students have different level of stress and depression. The purpose of this study is to examine the effects of social support, and self-efficacy on levels of depression in college students. The questionnaire packet will consist of three scales: the Beck Depression Inventory (BDI), The Self-Efficacy Scale (SES), and the Young Adult Social Support Inventory (YI-SSI). The intended population to be tested is traditional college students within various academic classes at a HBC university. The hypothesis being considered are as follows: that there will be an inverse relationship between social support and depression, that there will be an inverse relationship between self-efficacy and depression, and that there will be a strong positive relationship between self-efficacy and social support. Multiple regression models will be run as well as analysis of variance will be performed. This study will also test to understand if there is a difference within gender as well.

Introduction

“Today’s typical college student is no longer an 18-year-old recent high-school graduate who enrolls full-time and has limited work and family obligations. Students today are older, more diverse and have more work and family obligations to balance.” (Anonymous, 2011). According to a research conducted by U.S. Department of Education, 43% of college students are employed full time and 32% are working part time. In addition, 23% college students are parents and 13% are even single parents. For many students, college is the first time they have been away from home for any great length of time and they do not have the necessary skills to cope with this transition. When they leave home for the first time, they are losing social support from their family, friends, and other organizations. They are also embarking on a new phase of their life in which they are questioning their self-efficacy or their internal ability to successfully meet the challenges that they will face as college students (Bandura, 1977; Bandura, 1997; Colodro, Godoy-Izquierdo, & Godoy, 2010; Nebbitt, 2009; Trouillet, Gana, Lourel, & Fort, 2009). Therefore, many college students may have a difficult time during their college career trying to balance family, work and college. This can lead to higher levels of depression, which can cause students to fail classes and eventually drop out of college to return home. This study examines social support and self-efficacy as personality factors that predict depression levels within college students.

Literature Review

Self-Efficacy

Self-efficacy has been studied quite extensively since Albert Bandura first published his theory in 1977. Self-efficacy is defined as a person’s internal ability to successfully meet the challenges that one faces (Bandura 1977; Bandura, 1997; Colodro, Godoy-Izquierdo, & Godoy,

2010; Nebbitt, 2009; Smith & Betz, 2002; Trouillet, Gana, Lourel & Fort, 2009). Bandura (1986) stated that self-efficacy is not the actual ability to complete tasks but the person's perception of their ability to complete that task (Bandura 1977; Bandura 1986, Bandura, 1997; Nebbitt, 2009; Smith & Betz, 2002). This study will also examine self-efficacy as a person's perception and not their actual abilities. Self-efficacy is also considered a resource as it helps in a person's ability to cope and as their ability to cope increases so does their levels of self-efficacy (Bandura 1977; Trouillet, Ganna, Lourel & Fort, 2009). The perception of self-efficacy also is the perception of one's control over their environment and this helps a person navigate life's challenges in a positive manner (Bandura, 1997; Smith & Betz, 2002). Self-efficacy is considered to influence how they face external situations (Trouillet, Gana, Lourel, & Fort, 2009).

This confidence or self-efficacy is a person's ability to take knowledge and skill and then change it into a positive coping strategy (Nebbitt 2009). A person can get this confidence from a number of places including a positive perception of community, which can help increase a person's levels of self-efficacy (Nebbitt 2009). Although a person says they have higher levels of self-efficacy, this may not be accurate or produce the desired results, but it may aid in the motivation to improve performance and self-efficacy (Bandura 1997). Bandura also stated the self-efficacy statements are not influenced by the desire to appear socially acceptable. This is due to a person gaining knowledge about his or her abilities, not based on thinking but on an evaluation of numerous past instances of achievements or failures (Bandura, 1997). These achievements or failures for young adults are experienced mostly through school and various social interactions.

Young adults with high levels of self-efficacy will meet the challenges faced within a college setting with confidence as opposed to anxiety (Jerusalem and Mittag, 1995). Whereas,

young adults with low levels for self-efficacy could interpret challenges within the college setting as being personally responsible for failure more than the successes (Jerusalem and Mittag, 1995). According to Jerusalem and Mittag (1995), self-efficacy is considered changeable and less stable in young adults such as college age individuals, even though self-efficacy is viewed as a personality trait. In young adults, some personality traits are still being stabilized and will become so with added experiences. These experiences will enable increased positive experiences and this will in turn increase self-efficacy (Bandura, 1977; Zeiss, Lewinsoln, Muñoz, 1979).

Social Support

Social Support is a network of people and/or organizations that a person turns to in times of need or stress. This network can come from several different sources including but not limited to family, friends, co-workers, religious organizations, and or special groups. Each of the listed social support groups has different effects on an individual. Take family support for example, a study by Brookmeyer, Henrich, Cohen, and Shahar (2001) states that family support can be an important buffer for environmental risks such as violence. Whereas, young adults find that friends that are supportive are important for good mental health as school becomes more important (Auerbach, Begda-Peytom, Ebertert, Welk, & Ho, 2010). Freidlander (2007) found that for freshman college students that friends played a major role in adjustment and was a better predictor of social support than by parents during the first year of college. This is mainly the case with the individual is living mainly in the residence halls and depend more closely on friendships to manage stress (Friedlander, 2007).

As with self-efficacy, social support is measured as the perceived amount of support not the actual amount of support an individual has within their environment on their coping abilities (Trouillet, Gana, Lourel, & Fort, 2009). Social support is also thought of in the literature as a

personality construct (Gayman, Turner, Cislo, & Eliassen, 2011; Steer & Beck, 1985). This personality construct acts as a buffer for negative life events (Robbins, Lese, & Herrich 1993). Individuals that are of sound mind may need social support and encouragement from others to deal with normal everyday stressors (Robbins, Lese, & Herrich 1993), and social support acts as a protector from these stressors or stressor related like symptoms (Lee, Detels, Rolheram-Borus, Duan, & Lord, 2007; Roma, Myers, & Brown, 2010; Robbins, Lese, & Herrich 1993).

When an individual feels that their social support system is not providing them the support they need the individual then starts to develop negative self-images and feel that they will not be able to overcome their issues (Bandura, 1977; Zeiss, Lewinsoln, & Muñoz, 1979). Traditional aged college students in a study by Wei, Russell, & Zakalik (2005) found that social support mediates loneliness and depression when the individual moves away from home for the first time. This loss of social support of the parents can create stressor within in the individual that needs to be compensated for by peer social support. Social support is a very important part of an adolescent's feelings of being loved and valued (Auerbach, Bigda-Payton, Eberhart, Webb, & Ho, 2011).

Depression

Depression among adolescence is a concern for college personal, this is especially true since a study by Lee, Detels, Rotheram-Borus, Duan, and Lord (2007) found that females are twice as likely to have depressive symptoms as opposed to males. Although this is true, another study by Grant, Marsh, Syniar, Williams, Addlesperger, Kenzler, & Cowman (2002) found that commuter males have a higher likelihood of depression than females that are non-commuter. The second study may be the better explanation due to the support of the institution and the less frequency that young adolescent depending on parental support. Whereas, Wong and Whitiker

(1993) did a cross-sectional study of students freshman through graduates and they found that freshmen students had the highest levels for depression. Individuals that experience depression has fewer social interactions, are less verbal, have a slower response time, request and have less social interaction than their counterparts (Friedlander, 2007; Zeiss, Lewinsoln, & Muñoz, 1979).

Depression as a syndrome is a cluster of different things such as sadness, negative self-concept, and sleep/appetite disturbances (Kendell, Hollon, Beck, Hammen, & Ingram, 1987). Adolescents are at a time of rapid change, transitions, emotional and intellectual growth where many may experience depressive symptoms (Auerbach, Bigda-Payton, Eberhart, Webb, & Ho, 2011). By the time young adults reach college they will have experienced at least one depressive episode (Auerbach, Bigda-Payton, Eberhart, Webb, & Ho, 2011). As young adults focused more on school, peer support becomes even more critical for good mental health (Demaray, & Malecki, 2002).

Conceptual Model and Hypotheses

There is little research that examines self-efficacy, social support and depression together. Most studies examine these three variables in different combinations such as: self-efficacy with depression; and social support with depression. The research on both sides provides very rich ideas and a good empirical start to understanding the role of social support, self-efficacy and depression within the general population of college students.

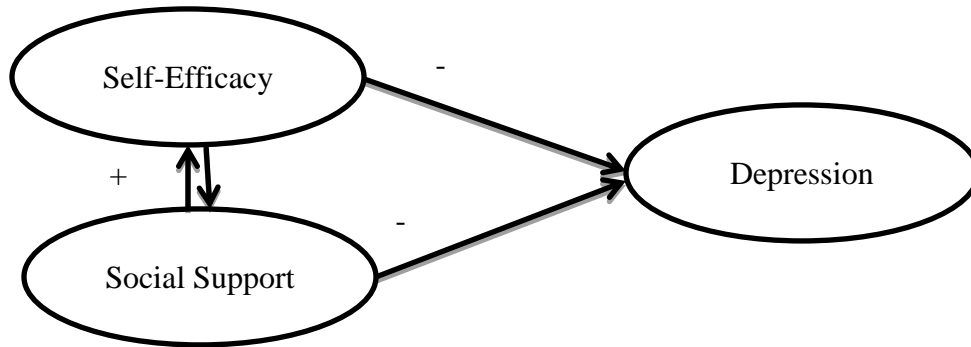
In the study by Roma, Myers and Brown (2010) there is a negative relationship between self-efficacy and depression. So as perceptions of self-efficacy become lower depression symptoms raise and vice versa. Withdrawal is also linked to self-efficacy as a symptom of depression (Harrell, Mercer, DeRosier, 2009). When an individual has high levels of self-

efficacy as a coping strategy the individual will have lower levels of depression because of the direct or indirect use of this resource (Trouillet, Gana, Laurel, & Fort, 2009).

Social support can also help prevent depressive symptoms in college students (Trouillet, Gana, Laurel & Fort, 2009). Individuals that experience depression have fewer social interactions are less verbal, have a slower response time and request and have less social interaction than their counterparts (Gayman, Turner, Cislo, Elissen, 2011; Zeiss, Lewinsoln, & Muñoz, 1979). They also experience depression when they feel that their social support system does not provide the support that the individual needs (Zeiss, Lewinsoln, Muñoz, 1979). In some cases the availability of social support is enough to mitigate depressive symptoms (Abramowitz, Koenig, Chandwani, Orban, Stein, LeGrange, & Barmes, 2009). Young adolescents that are satisfied with their levels for social support report lower levels of depression (Abramowitz, Koenig, Chandwani, Orban, Stein, LeGrange, & Barmes, 2009). In several studies higher levels of social support predicted lower levels of depression in college students (Gaylord-Harden, 2007; Johnson 1999; Lindsey, Joe, & Nibbit, 2010; Zimmerman, 2000). Perceived social support is one factor that plays an important role in the onset of depression in adolescents (Auerbach, Bigda-Payton, Eberhart, Webb, & Ho, 2011).

This study hypothesizes that self-efficacy and social support will have a positive correlation, and both will have a negative correlation with depression level. However, social support is believed to have a higher correlation with depression levels than self-efficacy. This study will examine which variable is a better predictor of depression levels for traditional aged college students. Finally, males and females will be examined separately to determine if there is a difference between the social support and self-efficacy variables as predictors of depression levels, as well as the strength of that relationship. See figure one for the conceptual model.

Figure 1



H1: Self-efficacy and social support will have a positive correlation.

H2: Self-efficacy has a negative relationship with depression.

H3: Social support has a negative relationship with depression.

H4: Social support has a higher correlation with depression than self-efficacy.

METHODS

This study was conducted at a Historically Black University in southern part of Georgia, USA. This study examines self-efficacy and social support as predictors of depression for traditional aged college students. Participants consisted of 155 students (60 males and 95 females) with 126 living in the residence halls and 39 commuters. Participants were recruited from various classes within the College of Business Administration and the College of Social Sciences. The majority of participants were between the ages of 18-23 years of age (147 participants), there were 98 participants ranked as freshman students. There were 2.6% Caucasians, 90.3% African American and 7.1% classified as other within the sample.

Participants completed a questionnaire packet including demographic information (gender, age, class rank, grade point average, ethnicity and where they live), Beck's Depression Inventory (BDI) (Beck and Steer 1987), Self-Efficacy Scale (SES) (Sherer & Adams 1983), and Young Adult Social Support Index (YA-SSI) (McCubbin, Patterson, & Grochowski 1984).

Depression. The depression inventory measure an individual's level of depression. The Beck's Depression Scale (BDI) (Beck and Steer 1987) can be used as a continuous variable or as a categorical variable. For this study, the scale will be used as a continuous variable. There are 21 items on this inventory. The items are scored based on the participants answer to the list of questions. For example, if the participant circled the first statement for the question then the score is zero. The higher the score on the inventory the higher the depression level for that individual. This study is using the BDI because it is a sensitive measure of syndrome depression (Kendell, Hollon, Beck, Hammen, & Ingram, 1987).

Self-efficacy. The self-efficacy inventory measures an individual's level of self-efficacy or one's internal belief that challenges can be met with success. The Self-Efficacy Scale (SES) (Sherer & Adams 1983) contains 18 items to measure self-efficacy, and seven filler items for a total of 25 items. This inventory was a five-point Likert scale ranging from one (disagree strongly) to five (agree strongly). A higher score on the inventory indicates a higher level of self-efficacy.

Social Support. The social support inventory measure an individual's level of social support from five different types of support: emotional, esteem, network, appraisal, and altruistic. The Young Adult Social Support Inventory (YA-SSI) (McCubbin, H.I., Patterson, J., & Grochowski, J. 1984) containing 60 items. The higher the score on the inventory indicates a higher level of social support.

Data Analysis and Results

Analysis

All items on the SES (self-efficacy), YA-SSI (Young Adult Social Support Inventory), and BDI (Beck's Depression Inventory) were summed to create a total sum scores for each. The total summed scores were used in the regression analysis. The dependent variable was depression and the predictor variables were self-efficacy, social support, gender, commuter status, overall grade point average, age, major, class rank, and attendance status. A regression model was obtained for just the dependent variables self-efficacy and social support. Also sample means and standard deviations were obtained. A correlation matrix was created to examine the hypothesis. All analysis was obtained using SPSS.

Correlation and Sample Statistics

A correlation matrix was run for all the predictor variables and depression. The following results are also available in table 1. Overall Grade Point Average was negatively correlated with depression ($r = -0.26$, $p = 0.004$). Self-efficacy was negatively correlated with depression ($r = -0.412$, $p = 0.000$). Social Support was negatively correlated with depression ($r = -0.376$, $p = 0.000$). Social support is positively correlated with self-efficacy ($r = 0.298$, $p = 0.001$). As presented in Table 2, the means and standard deviations were examined for the sample.

A separate correlation model was obtained for only the depression, self-efficacy and social support. The results are displayed in table 3. Hypothesis one was supported in that Self-efficacy and social support are positively correlated ($r = 0.331$, $p = 0.000$). Hypothesis two was supported in that self-efficacy was negatively correlated with depression ($r = -0.355$, $p = 0.000$). Hypothesis three was also supported with social support was negatively correlated with

depression ($r = -0.418$, $p = 0.000$). Finally, hypothesis four was supported for social support has a higher correlation with depression than self-efficacy (See hypothesis two and three).

Regression

To test how well the predictor variables account for the variation in depression a multiple regression was obtained. The first regression model took in account gender, commuter status, overall grade point average, age, major, class rank, and attendance status to control for these variables in the overall regression model. Hierarchical regression was used where variables are entered into multiple blocks. The first block contained gender, commuter status, overall grade point average, age, major, class rank, and attendance status, and the second block contained self-efficacy and social support. This allowed for control of the effect of the other variables. Depression was used as the dependent variable. Table 4 contains these results. The model of self-efficacy and social support as predictors of depression was significant for both factors ($F(2, 89) = 10.626$, $p = 0.000$). The r-squared was higher for the overall model with the self-efficacy and social support included ($r^2 = 0.297$) (Azen & Sass, 2008). Collinearity was not an issue in the regression model (see table 4), all variables are well within tolerance levels (Delqui et.al, 2008).

Since a second correlation matrix was obtained, it was decided that a second regression model also need to be examined. This regression has depression as the dependent variable and self-efficacy and social support as the predictor variables. The model was significant for self-efficacy and social support as predictors of depression ($F(2, 151) = 22.242$, $p = 0.000$). See table 5 for results. The r-squared was lower for the overall model with the self-efficacy and social support included compared to the first model ($r^2 = 0.228$) (Azen & Sass, 2008). Collinearity was not an issue in the regression model (see table 5), all variables are well within tolerance levels (Delqui et. al., 2008).

To analyze the last hypothesis, two regression models were run. The first was a regression analysis for self-efficacy as the dependent variable and social support as the independent variable. There was a significance for the model ($F(1, 153) = 18.720, p=0.000$) (See table 6). Next, a regression analysis was obtained for social support as the dependent variable and self-efficacy was the independent variable. There was significance for this model as well ($F(1, 153) = 18.720, p=0.000$) (See table 7), although the R-square for the regression model is very low, the self-efficacy as the dependent variable and social support as the independent variable and vice-versa are not explaining each other. The cronbach alpha for depression (0.900), self-efficacy (0.673) and social support (0.841) are acceptable.

Factor Analysis/Lisrel

The final step in the analysis was the factor analysis and the structural equation modeling for the conceptual model. A factor analysis was performed for each variable: self-efficacy, social support and depression. The variables did not load onto a set number of factors. A set of five questions were selected based on loading to represent the factors for the model. These fifteen questions were used in Lisrel to construct the structural equation model. The t-test for each question was significant at $p=0.05$. The t-test for the variable self-efficacy to depression was significant at $p=0.07$. The t-test for the variable social support to depression was significant at $p=0.08$. The goodness of fit statistics was not significant. A second model was created using all the variables for self-efficacy, social support and depression. The t-test for each question was significant at $p=0.05$ except for two variable in self-efficacy. The full model was significant ($\chi^2=2430.05, df=1427, p=0.000$). The goodness of fit statistics was not significant. See Table 8.

Conclusion and Discussion

The purpose of this study was to examine self-efficacy and social support in regards to levels of depression in college students. The result of the correlation matrix indicates a significant negative relationship between self-efficacy and depression. This indicates that as a person's perceived ability to meet challenges decrease then level of depression experienced by an individual increases. The same is true for social support and depression; they also have a significantly negative correlation. Whereas, social support and self-efficacy are positively correlated with each other, this indicates that as self-efficacy increases so does social support and vice versa. Social support has a higher correlation than self-efficacy with depression because it is believed that self-efficacy is becoming relatively stable as a person ages (Bandura, 1986) and social support is shifting from parental support to friends and institutional support. The regression analysis that was obtained confirms that these two variables are related to one another. Both regression model showed a significant relationship between self-efficacy and social support.

The significant negative correlation between overall grade point average and depression is interesting but not surprising. It is believed that depression would be the predictor of grade point average and not grade point average predicting depression levels. There is not enough information to assess this idea and it would be a good for future research. The other variables such as gender, commuter status, age, major, class rank, and attendance status were not significantly correlated with depression, self-efficacy or social support. This could be an indication that there sample was not varied enough for a significant correlation. The data for the demographic variables were much skewed. A larger cross-sectional sample may yield different results.

These results may have implications for college students and institutions. College administrators may decide to explore ways to increase levels for social support through institutional support. They may also decide to explore implementing workshops to increase student's awareness of the need for support. This could be included in the first year studies classes. College administrators could also include socials within the residence halls to promote social interaction. These social interactions may assist students in meeting new people and forming social support within their peer group. College counselors could assist students in developing social skill necessary to form social relationships with others. Finally, college instructors can assist by identifying student that are at risk for failing grades to encourage the student to get involved in institutional groups to form social support and self-efficacy. Tutoring is a good way for student to be mentored by peers and increase self-efficacy.

The final step in the analysis was the factor analysis and the structural equation modeling for the conceptual model. A factor analysis was performed for each variable: self-efficacy, social support and depression. The variables did not load onto a set number of factors. A set of five questions were selected based on loading to represent the factors for the model. These fifteen questions were used in Lisrel to construct the structural equation model. The t-test for each question was significant at $p=0.05$. The t-test for the variable self-efficacy to depression and the t-test for the variable social support to depression was not significant at $p=0.05$. This was thought to be explained by the fact that these are already established scales and the cut off for determining the factor to use were set very high in order to eliminate several questions. The goodness of fit statistics was not significant. A second model was created using all the variables for self-efficacy, social support and depression. The t-test for each question was significant at $p=0.05$ except for two variable in self-efficacy. The full model was significant at $p=0.000$.

Although the goodness of fit statistics was not significant for this model, a revised model with some less significant variables removed may improve these statistics. Secondly, the sample used was not diversified.

Limitations and future research to this study need to be listed. The sample size is small with the sample coming from a Historically Black University. Therefore, the small sample size does not take into account cultural differences. A future study would be to examine several samples from different cultures with different ethnicities represented. The study needs to have a better representation of all classes (freshmen through graduate students), a cross-sectional or longitudinal study would be a good idea. The longitudinal study would allow the researchers to follow students to see if low self-efficacy, low social support and high levels of depression cause students to stop attending. Whereas, looking at a cross-sectional study would negate the idea that low levels of self-efficacy and lack of social support will cause a reduction in retention rates with college students. Gender may be significant predictor if a sample with more males were obtained for further study. Lastly, a measure of the students other responsibilities would be helpful to understand if stress is a dedicating factor in self-efficacy and social support on levels of depression.

Although this study has a limited scope and is not a representation of all college students. It does give a strong indication of the need for further research into self-efficacy and social support on levels for depression for college students. This is very important to institutions that are trying to retain students from year to year. This study is also important to students that are trying to navigate the challenges of college life with a lack of social support and higher levels of depression, while trying to balance college, family, and possibly a job.

REFERENCES

- Abramowitz, S., Koenig, L. J., Chandwani, S., Orban, L., Stein, R., LaGrange, R., & Barnes, W. (2009). Characterizing social support: global and specific social support experiences of HIV-infected youth. *Aids Patient Care and STDs*, 23, (5), 323-330.
- Anonymous (2011) [Yesterday's Nontraditional Student is Today's Traditional Student](#). Center for Law and Social Policy, June 29, 2011.
- Auerbach, R. P., Bigda-Peyton, J. S., Eberhart, N. K., Webb, C. A., & Ho, M. R. (2011). Conceptualizing the prospective relationship between social support, stress, and depressive symptoms among adolescents. *Journal of Abnormal Child Psychology* 39, 475-487.
- Azen, R., & Sass, D. (2008). Comparing the squared multiple correlation coefficients of non-nested models: An examination of confidence intervals and hypothesis testing. *British Journal of Mathematical and Statistical Psychology*, 61, 163-178.
- Bandura, A., & Adams, N.E. (1977). Analysis of self-efficacy theory of behavioral change. *Cognitive Therapy and Research*, 1, 4, 287-310.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognition theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. (1997). *Self-Efficacy: The Exercise of Control*. New York, NY: W.H. Freeman and Company.
- Brookmeyer, K. A., Henrich, C. C., Cohen, G., & Shahar, G. (2011). Israeli adolescents exposed to community and terror violence: the protective role of social support. *Journal of Early Adolescence*, 31, (4), 577-603.

Colodro, H., Godoy-Izquierdo, D., & Godoy, J. (2010). Coping self-efficacy in a community-based sample of women and men from the United Kingdom: The impact of sex and health status. *Behavioral Medicine, 36*, 12-23.

Delquière, P. (2008). Interpretation of risk tolerance coefficient in terms of maximum acceptable loss. *Decision Analysis, 5*, 1, 5-9.

Friedlander, C. (2007). Taking the Lead. *Perspective, 38* 2, 2.

Gayman, M. D., Turner, R. J., Cislo, A. M., & Eliassen, A. H. (2011). Early adolescent family experiences and perceived social support in young adulthood. *Journal of Early Adolescence, 31*, (6), 880-908.

Grant, K., Marsh, P., Syniar, G., Williams, M., Addlesperger, E., Kinzler, M. H., & Cowman, S. (2002). Gender differences in rates of depression among undergraduates: measurement matters. *Journal of Adolescence, 2*, 613-617.

Harrell, A. W., Mercer, S. H., & DeRosier, M. E. (2009). Improving the social-behavioral adjustment of adolescents: the effectiveness of a social skills group intervention. *Journal of Child Family Studies, 18*, 378-387.

Jerusalem, M., and Mittag, W., (1995). Self-efficacy in stressful life transitions. In A. Bandura (Ed), *Self-efficacy in changing societies* (pp. 177-201). New York, NY: Cambridge University Press.

Kendell, P. C., Hollon, S. D., Beck, A. T., Hammon, C. L., & Ingram, R. E. (1987). Issues and recommendations regarding use of the Beck Depression Inventory. *Cognitive Therapy and Research, 11*, (3), 289-299.

- Lee, S. J., Detels, R., Rotheram-Borus, M. J., Duan, N., & Lord, L. (2007). Depression and social support among HIV-affected adolescents. *AIDS Patients Care and STDs*, 21, (6), 409-417.
- Lindsey, M. A., Joe, S., & Nebbitt, V. (2010). Family Matters: the role of mental health stigma and social support on depressive symptoms and subsequent help seeking among African American boys. *Journal of Black Psychology*, 36, (4), 458-482.
- Malecki, C. K., & Demaray, M. K. (2002). Measuring perceived social support: Development of the child and adolescent social support scale (CASSS). *Psychology in the Schools*, 39, 1, 1-18.
- McCubbin, H.I., Patterson, J., & Grochowski, J. (1984). Young Adult Social Support Inventory (YA-SSI). In H.I. McCubbins, A.I. Thompson, & M.A. McCubbin (1996). *Family assessment: Resiliency, Coping and adaptation – Inventories for research and practice*, (391-403). Madison: University of Wisconsin System.
- Nebbitt, V. (2009). Self-efficacy in African American adolescent males living in urban public housing. *Journal of Black Psychology*, 35, (3), 295-316.
- Ramo, D. E., Myers, M. G., & Brown, S. A. (2010). Self-efficacy mediates the relationship between depression and length of abstinence after treatment among youth but not among adults. *Substance Use & Misuse*, 45, 2301-2322.
- Robbins, S. B., Lese, K. P., & Herrick, S. M. (1993). Interactions between goal instability and social support on college freshman adjustment. *Journal of Counseling & Development*, 71, 343-348.
- Sherer, M., & Adams, C. H. (1983). Construct validation of the Self-efficacy Scale. *Psychological Reports*, 53(3, Pt.1), 899-902.

- Smith, H. M. and Betz, N. E. (2002). An examination of efficacy and esteem pathways to depression in young adulthood. *Journal of Counseling Psychology*, 49, (4), 438-448.
- Steer, R. A., and Beck, A. T. (1985). Modifying the Beck Depression Inventory: Reply to Vredenburg, Krames, And Flett. *Psychological Reports*, 57, 625-626.
- Trouillet, R., Gana, K., Lourel, M., & Fort, I. (2009). Predictive value of age for coping: the role of self-efficacy, social support satisfaction and perceived stress. *Aging & Mental Health*, 13, (3), 357-366.
- Wei, M., Russell, D. W., & Zakalik, R. A. (2005). Adult attachment, social self-efficacy, self-disclosure, loneliness, and subsequent depression for freshman college students: A longitudinal study. *Journal of Counseling Psychology*, 52, (4), 602-614.
- Wong, J. L. and Whitaker, D. J. (1993). Depressive mood states and their cognitive and personality correlation in college students: they improve over time. *Journal of Clinical Psychology*, 49, (5), 615-621.
- Zeiss, A. M., Lewinsohn, P. M., & Muñoz, R. F. (1979). Nonspecific improvement effects in depression using interpersonal skills training, pleasant activity schedules or cognitive training. *Journal of Consulting and Clinical Psychology*, 47, (3), 427-439.
- Zimmerman, B. J. (1995). Self-efficacy and educational development. In A. Bandura (Ed), *Self-efficacy in changing societies* (pp. 201-231). New York, NY: Cambridge University Press.

Table-1. Correlation matrix for predictor variables and depression.

	Depression	OGPA ¹	Self-efficacy	Social Support
Depression		-0.261*	-0.412*	-0.376*
OGPA ¹			0.161	0.160
Self-efficacy				0.298*

¹ OGPA = Overall Grade Point Average

*Significant at the 0.05 level.

Table-2. Descriptive statistics for Self-efficacy (SES) , Social support (YA-SSI), and Depression (BDI).

	SES	YA-SSI	BDI
GENDER¹			
Male	81.75 (10.27)	127.32 (24.741)	7.58 (9.221)
Female	82.84 (11.328)	130.61 (23.212)	8.33 (7.084)
ATTENDANCE²			
Full-time	82.16 (10.965)	128.99 (24.041)	8.16 (8.091)
Part-time	90.83 (4.262)	136.33 (18.50)	5.33 (4.033)
MAJOR³			
Accounting	81.25 (12.31)	123.56 (21.332)	10.50 (13.028)
Social Science	84.34 (10.741)	131.08 (24.443)	7.47 (7.135)
CLASS RANK⁴			
Freshman	82.48 (11.572)	128.33 (24.712)	8.07 (8.498)
Sophomores	82.66 (9.13)	128.23 (22.960)	9.29 (8.205)

¹ Sample consisted of n=155: 59 males and 95 females.

² Sample consisted of n=153: 6 part-time and 147 full-time.

³ Sample consisted of n=101: 16 accounting and 85 social sciences.

⁴ Sample consisted of n=133: 98 freshman and 35 sophomores.

Table-3. Correlation matrix for self-efficacy (SES), social support (YA-SSI) and depression (BDI).

	Depression	Self-efficacy	Social Support
Depression		-0.355*	-0.418*
Self-efficacy			0.331*

¹ OGPA = Overall Grade Point Average

*Significant at the 0.05 level.

Table-4. Regression Analysis with Depression as dependent variable and demographics, self-efficacy and social support as predictor variables (n=153).

Independent Variables	Beta	T-values	Tolerance	P-value
(Constant)		4.020		0.000
OGPA	-4.231	-3.073	0.818	0.003*
Self-efficacy	-0.242	-3.178	0.781	0.002*
Social Support	-0.071	-2.392	0.858	0.019*
R-Squared	0.297			

*Significant at the 0.05 level.

Table-5. Regression Analysis with Depression as dependent variable and Self-efficacy and social support as predictor variables (n=155).

Independent Variables	Beta	T-values	Tolerance	P-value
(Constant)		7.960		0.000
Self-efficacy	-0.178	-3.208	0.890	0.002*
Social Support	-0.113	-4.455	0.890	0.000*
R-Squared	0.477			

*Significant at the 0.05 level.

Table-6. Regression Analysis with Self-efficacy as dependent variable and Social Support as the predictor variable (n=153).

Independent Variables	Beta	T-values	Tolerance	P-value
(Constant)		13.616		0.000
Social Support	0.152	4.327	1.000	0.000*
R-Squared	0.110			

*Significant at the 0.05 level.

Table-7. Regression Analysis with Social Support as dependent variable and Self-efficacy as the predictor variable (n=153).

Independent Variables	Beta	T-values	Tolerance	P-value
(Constant)		5.011		0.000
Self-efficacy	.723	4.327	1.000	0.000*
R-Squared	0.110			

*Significant at the 0.05 level.

Table-8. Lisrel Goodness of Fit Statistics

Model	Chi-Square	DF	CFI	NFI	RFI	GFI
	2430.05*	1427	0.86	0.74	0.73	0.64

*Significant at the 0.000 level.

DF=Degrees of Freedom: CFI = Comparative Fit Index: NFI= Normed Fit Index: RFI= Relative Fit Index: GFI = Goodness of Fit Index

Antecedents and Effects of Job Satisfaction

Yao Yao

Savannah State University

College of Business Administration

Savannah, Georgia 31404

Email: yyao1@student.savannahstate.edu

Abstract

Many studies proved that job attitude could influence employees' job performance and predict employees' behavior. This paper will focus on antecedents and effects of employees' job satisfaction. First, several hypotheses will be proposed among personality, work motivation, job satisfaction and organizational commitment according to literatures. Two research questions will be explored in this paper are:

- 1) How personality variables and work motivation of an employee will affect his/her job satisfaction and organizational commitment?
- 2) How job satisfaction and organizational commitment will interact with each other?

A survey questionnaire is designed and administrated in a university located in Southern part of the United States of America. Regression and analysis of variance techniques would be employed to evaluate the hypotheses. Data analysis and results are presented.

Key Words: Personality; Work Motivation; Organizational Commitment; Job Satisfaction

Introduction

Job satisfaction and organizational commitment have been extensively studied in the literature. Studies always focus on their antecedents and relationships with job performance (Nasir, Amin, 2010; Kelidbari, Dizgah, Yusefi, 2011). Personality and work motivation are always treated as antecedents of job satisfaction or organizational commitment in studies. Also there are several studies concentrated on any three of them (Samad, 2011; Irshad, Naz, 2011; Careli, Freund, 2004). However, very few studies explored the relationship among personality, work motivation, job satisfaction and organizational commitment.

Depending on the report of the Society for Human Resource Management in 2011¹, overall employee job satisfaction during 2002 and 2009 is growing stably while in recent three years it begins to fall down. Since both job satisfaction and organizational commitment have effect on job performance (Nasir and Amin, 2010; Ward, Davis, 1995), it is important for us to figure out the relationship among personality, work motivation, job satisfaction and organizational commitment. Therefore more ways could be explored to improve the status and increase the whole productivity in all industries.

In this paper, we will first start from literature guides of the four elements, reviewing studies opinion and measurements of them and then conduct our hypotheses about their relationships. A questionnaire will be designed and administrated in a in a historical college and university located in southern part of the United States of America. Regression and analysis of variance techniques would be employed to evaluate the hypotheses. In the next session we will present the result and discuss them.

¹ 2011 Employee Job Satisfaction and Engagement: A Research Report by SHRM

Literature Review

Personality

Personality is the dynamic organization within the individual of those psychophysical systems that determine his unique adjustments to his environment (Allport, 1937, p48). Personality traits can be detailed described as conscientiousness, self-esteem, neuroticism and so on. There are also plenty of studies about personality traits theories. In this paper we will adopt one of most famous and widely used theories—big five personality theory, which measures personality based on five traits of openness, conscientiousness, extraversion, agreeableness and neuroticism (Costa and McCrae, 1992). Among these five traits, openness reflects the degree or range of intellectual curiosity, creativity or preference for novelty and variety; conscientiousness is the tendency to show self-discipline, a measure of reliability; extraversion can be presented by a person's energy, positive emotions, assertiveness, sociability and captures of keeping comfort relationship with others; agreeableness is the tendency to be compassionate and cooperative rather than suspicious and antagonistic towards others while neuroticism (emotional stability) is the tendency to experience unpleasant emotions easily or ability to withstand stress (Robbins, Judge, 2011, p138).

Work Motivation

Work motivation has been defined as the process by which behavior is energized, directed, and sustained in organizational settings (Steers and Porter, 1991).

Amabile, Hill, Hennessey, and Tighe in 1994 developed the Work Preference Inventory (WPI) which was designed to assess individual differences in intrinsic and extrinsic motivational orientations. Intrinsic motivation represents a motivation to engage in an activity

purely for the sake of the activity itself (Lepper, Greene, and Nisbett, 1973) while extrinsic motivation represents a motivation to engage in an activity as a means to an end rather than an end in itself (Pintrich and Schunk, 1996).

Job Attitude

Attitudes are favorable or unfavorable evaluative statements about objectives both on people and events (Robbins and Judge, 2011, p72). According to Breckler's study in 1984, generally, researchers assume that attitude can be divided into three distinct parts as affect, behavior, and cognition components. Cognitive component is a description of or belief in the way things are, which could be consider as a concept comes to be the basic level of attitude while affective attitude is the emotional or feeling segment, which could be classified as a deeper level. Then the last level of attitude would be behavioral component, which will directly reflect employees' action towards what happened. However, the relationship among these three components is not a simple one-way progressive. They will truly interact with each other and finally change the subject's performance (Robbins and Judge, 2011, p73). Job attitude may be the one of the oldest theme in organizational behavior area. It is defined as a set of evaluations of one's job including one's feelings, beliefs and attachment (Judge, Kammeyer-Mueller, 2012). Depending on Moynihan and Pandey's opinion in 2007, job satisfaction and organizational commitment are always classified as two most related-work attitudes, or part concept of job attitude.

Organizational Commitment

During this paper we will treat organizational commitment as the main domain of job attitude (behavioral component) and use related instruments (Meyer, Allen and Smith, 1993)

to analysis data. Organizational commitment is the degree to which an employee identifies with a particular organization and its goals and wishes to maintain membership with the organization (Robbins and Judge, 2011, p77). As the study of Meyer, Allen and Smith in 1993, there are three separate dimensions to organizational commitment: affective commitment, continuance commitment and normative commitment. Affective commitment is an emotional attachment to the organization where the employee belongs to and a belief in its values. Continuance commitment is the perceived economic value of remaining with an organization. And normative commitment is an obligation to remain with the organization for moral or ethical reasons. As we can see, affective commitment, as the relationship feels good, brings a sense of belonging and satisfying, will reflect the member's desire to remain attached to this particular social entity (Byrne and McCarthy, 2005). Continuance commitment could be understood as an employee's awareness about costs of leaving the organization (Yücel, 2012). Employees who prefer staying the organization make their decisions based on a kind of custom or general feeling that they should do like this or they will face some unexpected outcome. And normative commitment will apparently shows a moral aspect of employees' mind.

It will be difficult to tell which commitment has a higher level than others. All of them will have their advantages and disadvantages depending on the different situations. However, Irving, Coleman, and Cooper (1997) examined the relationship between these three organizational commitments and job satisfaction. It resulted that there was a significant positive relationship between job satisfaction and affective, normative commitment while job satisfaction and continuance commitment was negatively related.

Job Satisfaction

Job satisfaction describes a positive feeling about a job and will be resulted from an evaluation of its characteristics (Robbins and Judge, 2011, p76). There are many reasons could cause job satisfaction, such as training, variety, independence of the job (Barling, Kelloway and Iverson, 2003; Bond and Bunce, 2003). Also, as the study of Humphrey, Nahrgang, and Morgeson in 2007, social context, interdependence, feedback, social support, and interaction with co-worker outside the workplace could be strongly related with job satisfaction.

There are several methods to measure job satisfaction. The Job Descriptive Index (JDI, Smith, Kendall and Hulin, 1969), as one of famous methods to measure job satisfaction, measures employees' satisfaction based on five facets of pay, promotions or promotion opportunities, coworkers, supervision, and the work itself.

And Job Satisfaction Survey (JSS, Spector, 1985), as another famous method, measures job satisfaction by nine scales which are pay, promotion, supervision, fringe benefits, contingent rewards (performance based rewards), operating procedures (required rules and procedures), co-workers, nature of work and communication.

In this paper, we use Minnesota Satisfaction Questionnaire (Weiss, Dawis, England and Lofquist, 1967) which is treated as a primate indicator of work adjustment. As the study said, "the work adjustment project is working toward further improvement of measures of vocational abilities and vocational needs, with the aim of providing vocational rehabilitation counselors with better tools for evaluating the work personalities of vocational rehabilitation applicants". MSQ will measure job satisfaction based on 20 items (ability utilization,

achievement, activity, advancement, authority, company policies and practices, compensation, co-workers, creativity, independence, moral values, recognition, responsibility, security, social service, social status, supervision—human relations, supervision—technical, variety and working conditions).

Conceptual Model and Hypotheses

The research conceptual model is an indication of the relationships between variables. In this research, personality, work motivation, organizational commitment and job satisfaction as independent variables, five traits of personality, and two dimensions of work motivation, three dimensions of the organizational commitment and 20 items of job satisfaction as dependent variables were used. The research conceptual model has been displayed in Figure 1.

[Please Insert Figure 1 about here]

Personality, Job Satisfaction and Organizational Commitment

Studies of relationship between personality and job satisfaction or organizational commitment have been developed a lot. The study of Foulkrod, Field and Brown in 2010 indicates that there is a great relationship existed personality traits and satisfaction, especially for the emotional stability (neuroticism) ($r = 0.20$, $P = 0.01$) and extraversion ($r = 0.18$, $P = 0.01$). Also the study of Irshad and Naz in 2011 indicates that employees focus on different personality trait will have different level of organizational commitment.

Also several studies have showed that the relationship between work motivation and job satisfaction or organizational commitment. Employees' intrinsic motivation is found highly depending upon the job satisfaction (Shah, Musawwir-Ur-Rehman, Akhtar, Zafar and

Riaz, 2012). According to the study of Louis and Thara in 2011, work motivation has a significant relationship with organizational commitment (based on the three components).

So depending on findings above, we will make following hypotheses:

H1: Both of Personality and Work Motivation have positive and negative effect on job satisfaction.

H2: Both of Personality and Work Motivation have positive and negative effect on organizational commitment.

Even though depending on Moynihan and Pandey's opinion in 2007, job satisfaction and organizational commitment are always classified as two most related-work attitudes, or part concept of job attitude. In this paper, to be convenient to detailed study, we will distinguish them as two different concepts rather than part of job attitudes, which, depending on the classification of three attitude components, treat job satisfaction as an cognitive job attitude reflect employees' feeling description and organizational commitment as a kind of attitude affect employees' behavior (behavioral component of job attitude). That is job satisfaction and organizational behavior, even though both present job attitude, they still reflect different aspects of it. Organizational commitment will have effects on the job satisfaction. And in turn, job satisfaction also affects organizational behavior.

H3: Job satisfaction will positively affect organizational commitment.

H4: Organizational commitment will in turn positively affect job satisfaction.

Methodology

Instruments

Personality. Personality is measured with the Big Five Personality theory (Costa and McCrae, 1992) by 60-item NEO Five-Factor Inventory (NEO-FFI) test (the short version of NEO Personality Inventory, or NEO PI-R, Costa and McCrae, 2004).

Work Motivation. It is measured by Work Preference Inventory theory (Amabile, Hill, Hennessey and Tighe, 1994) by 30-item WPI test.

Job satisfaction. It is measured by the Minnesota Satisfaction Questionnaire (Weiss, Dawis, England, and Lofquist, 1967) to measure overall job satisfaction. It is a short form MSQ consists of 20 items.

Organizational commitment. It is measured by The Three-Component Model of Organizational Commitment (Allen, Meyer and Smith, 1993) with 18 items.

Participants

This survey package includes five parts. The first part asks the basic demographic information such as gender, age. The rest four parts ask information from the four major concepts described in the section above, which consists of NEO FFI with 60 items, WPI with 30 items, MSQ with 20 items and the Three-Component Model of Organizational Commitment with 18 items.

This survey is administrated in a historical university which is located in the southern part of Georgia, USA. As shown in Table 1-1, the sample was consisted of 198 participates: 82.3 percent African American and 10.6 percent White (Caucasian); 57.6 percent female. Most participants are between 17-30 years old (17-20 years old 23.7%; 21-25 years old

58.1%; 26-30 years old 12.1%) and seniors (53.5%) while 64% participants have part-time jobs. The main participants are from Business Administration (almost 90%).

Results

[Please Insert Table 1 about here]

We conducted an exploratory factor analysis on the 60-item personality scale and five factors, Neuroticism, Extraversion, Openness, Agreeable and Conscientiousness, emerged from the analysis. The five-factor model explained 81.96 percent of the variance. The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was 0.89 and cronbach alphas for Neuroticism, Extraversion, Openness, Agreeable and Conscientiousness were 0.70, 0.75, 0.75, 0.70 and 0.78 respectively. We run a correlation analysis for all the constructs. The correlation matrix is shown in Table 2.

[Please Insert Table 2 about here]

We conducted a series of multiple regression analysis as shown in Table 3. In Model 1, the dependent variable is Job satisfaction and independent variables are Neuroticism, Extraversion, Openness, Agreeable and Conscientiousness, as well as two motivation variables, Intrinsic Motivation and Extrinsic motivation. The model is statistically significant, adjusted R Square is around 28.9%. The analysis showed that all big five personality traits are positive related with job satisfaction, while Neuroticism and Agreeableness are not significant. Extrinsic Motivation has a statistically positive influence on job satisfaction, while Intrinsic Motivation has no influence on Job Satisfaction. Therefore, Hypothesis 1 is only partially supported.

In Model 2, the dependent variable is changed to Organizational Commitment and

independent variables keep the same: big five personality traits as well as two motivation constructs. However, the model is not statistically significant, which means that organizational commitments have no relationship with personality as well as motivation, whatever intrinsic or extrinsic. When we further replace the dependent variable with different types of organizational commitment, for example, Affective Commitment, Continuance Commitment or Normative Commitment, the result did not change. Personality and motivation have no influence on any type of organizational commitment. Therefore, Hypothesis 2 is not supported.

When we added Job Satisfaction into Model 2 as an independent variable (as in Model 3), the model became statistically significant. Job Satisfaction is highly positively related with Organizational Commitment. Conscientiousness became negatively related with Organizational Commitment. We further explored the influence of job satisfaction on different types of Organizational Commitment. In Model 4, 5 and 6, we used Affective Commitment, Continuance Commitment and Normative Commitment as dependent variable respectively. We found that Model 4 and 6 are statistically significant, which means that Job Satisfaction positively influence Affective Commitment, and Normative Commitment, rather than Continuance Commitment. In both these two models, Job Satisfaction is significantly related with commitment. In each of the model, Extrinsic Motivation also always negatively influences commitment. In addition, Conscientiousness has a negative impact on Affective Commitment but not on Normative Commitment. Therefore, Hypothesis 3 is supported.

[Please Insert Table 3-1 about here]

We further explored the influence of Organizational Commitment on Job Satisfaction. In Table 3-2, we have six models. The first two models are the same models from Table 3-1. From Model 7 to 10, every time we added one more variable from organizational Commitment, Affective Commitment, Continuance Commitment, and Normative Commitment into the Model 1 as an extra independent variable. All the models (Model 7 to 10) are statistically significant. And similar to what we found from Table 3-1, Jobs Satisfaction is positively related with general Organizational Commitment, Affective Commitment, Normative Commitment, but not Continuance Commitment. In these models, Extraversion, Conscientiousness and Extrinsic Motivation always have positive influence on job Satisfaction. Therefore, Hypothesis 4 is supported.

[Please Insert Table 3-2 about here]

Conclusion

This paper explores the antecedents and effects of job motivation and job satisfaction. More specifically, this paper examine the influence of the big five personality traits and extrinsic as well as intrinsic motivation on job satisfaction and general organizational commitment as well as different types of organizational commitment such as Affective Commitment, Continuance Commitment, and Normative Commitment. We found that Extraversion, Conscientiousness and Extrinsic Motivation have positive influence on job Satisfaction, while Extraversion, Conscientiousness and Extrinsic Motivation have varied influence on organizational commitment, sometimes positive and sometimes negative. In addition, we found that job satisfaction has positive relationship with general organizational commitment as well as Affective Commitment, Normative Commitment but not Continuance

Commitment. And in turn, general organizational commitment (affective commitment and normative commitment specifically) has positive relationship with job satisfaction.

This paper contributes to the literature by studying the relationship between personality, motivation with job satisfaction and organizational commitment. Except for the general organizational commitment, this paper also explored different types of organizational commitment. In addition, this paper studies the mutual relationship between organizational commitment and job satisfaction.

This paper also provides practical implication to human resource managers. First, our research finds that among the big five personality traits, Extraversion and Conscientiousness are especially important. Both of them have positive influence on job satisfaction and through job satisfaction, they will further influence organizational commitment. Therefore, when managers are selecting new employees, they could choose those candidates who have higher Extraversion and Conscientiousness level. When a company designs its training program, more effort could be exerted to increase the level of Extraversion and Conscientiousness among employees. In addition, Extrinsic Motivation has a positive influence on job satisfaction. It is more effective compared with Intrinsic Motivation. Managers therefore could design more external motivation to stimulate the work force.

Reference

1. Robert R. McCrae and Paul T. Costa (1990). Personality disorders and the five-factor model of personality. *Journal of Personality Disorders*; 1990, 4, p362–371.
2. Robert R. McCrae and Paul T. Costa (1992). *NEO PI-R professional manual*. Odessa, FL: Psychological Assessment Resources, Inc.; 1992.

3. Robert R. McCrae and Paul T. Costa (2004). A contemplated revision of the NEO Five-Factor Inventory. *Personality and Individual Differences*; February 2004, 36 (3), p587–596.
4. Teresa M. Amabile, Karl G. Hill, Beth A. Hennessey and Elizabeth M. Tighe (1994). The Work Preference Inventory: Assessing intrinsic and extrinsic motivation orientations. *Journal of Personality and Social Psychology*; 1994, 66, p950-967.
5. David J. Weiss, Rene V. Dawis, George W. England and Lloyd H. Lofquist (1967). Manual for the Minnesota Satisfaction Questionnaire. *Minneapolis, MN: University of Minnesota*; 1967.
6. John P. Meyer, Natalie J. Allen and Catherine A. Smith (1993). Commitment to Organizations and Occupations: Extension and Test of a Three-component Conceptualization. *Journal of Applied Psychology*; 1993, 78, p538-551.
7. John P. Meyer, Natalie J. Allen, and Catherine A. Smith (2001). The Three-Component Model of Organizational Commitment: An Application to South Korea. *Applied Psychology: An International Review*; 2001, 50 (4), p596-614.
8. Donald P. Moynihan and Sanjay K. Pandey (2007). Finding Workable Levers over Work Motivation: Comparing Job Satisfaction, Job Involvement, and Organizational Commitment. *Administration & Society*; Nov2007, Vol. 39 Issue 7, p803-832.
9. Julian Barling, E. Kevin Kelloway and Roderick D. Iverson (2003). High-quality Work, Job Satisfaction, and Occupational Injuries. *Journal of Applied Psychology*; 2003, 88, no. 2, p276-283.

10. Frank W. Bond and David Bunce (2003). The Role of Acceptance and Job Control in Mental Health, Job Satisfaction, and Work Performance. *Journal of Applied Psychology*; 2003, 88, no. 6, p1057-1067.
11. Stephen E. Humphrey, Jennifer D. Nahrgang and Frederick P. Morgeson (2007). Integrating Motivational, Social, and Contextual Work Design Features: A Meta-Analytic Summary and Theoretical Extension of the Work Design Literature. *Journal of Applied Psychology*; 2007, 92, no. 5, p1332-1356.
12. Richard M. Steers and Lyman W. Porter. Motivation and Work Behavior. *New York: McGraw Hill; 1991.*
13. Michael Ricketta (2008). The causal relation between job attitudes and performance: A meta-analysis of panel studies. *Journal of Applied Psychology (American Psychological Association)*; March 2008, 93 (2), p472–481.
14. Timothy A. Judge and John D. Kammeyer-Mueller (2012). Job Attitudes. *Annual Review of Psychology (Annual Reviews)*; January 10, 2012, 63 (1), p341–367.
15. Deidra J. Schleicher, John D. Watt, Gary J. Greguras (2004). Reexamining the Job Satisfaction-Performance Relationship: the Complexity of Attitudes. *Journal of Applied Psychology*; 2004, Vol. 89, No. 1, p165–177.
16. Cynthia D. Fisher (2000). Mood and Emotions while Working: Missing Pieces of Job Satisfaction? *Journal of Organizational Behavior*; Mar 2000, Vol. 21, No. 2, Special Issue: Emotions in Organization, p185-202.
17. Randy Hodson (1991). Workplace Behaviors: Good Soldiers, Smooth Operators, and Saboteurs. *Work and Occupations*; August 1991, 18, p271-290.

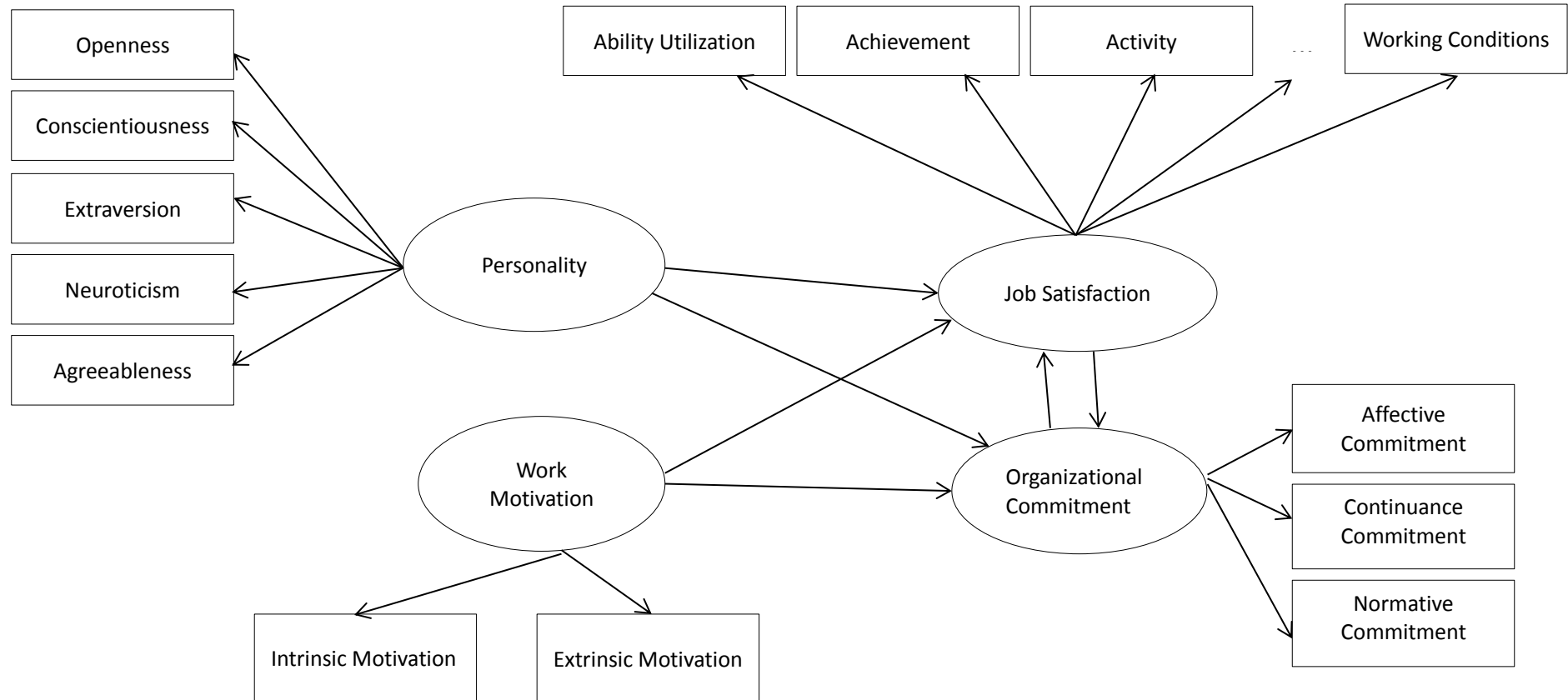
18. David J. Ehrler, J. Gary Evans and Ron L. Mcghee. Extending Big-Five Theory into Childhood: A Preliminary Investigation into the relationship between Big-Five Personality Traits and Behavior Problems in Children (1999). *Psychology in the Schools*; Vol. 36(6), p451-458.
19. Lise M. Saari and Timothy A. Judge (2004). Employee Attitudes and Job Satisfaction. *Human Resource Management*; winter 2004, Vol. 43, No. 4, p395–407.
20. Paul T. Costa, Jr. and Robert R. McCrae (1995). Domains and Facets: Hierarchical Personality Assessment Using the Revised NEO Personality Inventory. *Journal of Personality Assessment*; 1995, 64(1), p21-50.
21. Stephen P. Robbins and Timothy A. Judge (2011). *Organizational Behavior*. New Jersey: Prentice Hall; 2011.
22. Steven J. Breckler (1984). Empirical Validation of Affect, Behavior, and Cognition as Distinct Components of Attitude. *Journal of Personality and Social Psychology*; Dec 1984, Vol 47(6), p1191-1205.
23. Noreen Byrne and Olive McCarthy (2005). An analysis of the credit union's use of Craig's commitment building measures. *Journal of Co-operative Studies*; Number 1, April 2005, Vol 38, p20-27.
24. İlhami Yücel (2012). Examining the Relationships among Job Satisfaction, Organizational Commitment, and Turnover Intention: An Empirical Study. *International Journal of Business and Management*; Oct2012, Vol. 7 Issue 20, p44-58.
25. P. Gregory Irving, Daniel F. Coleman and Christine L. Cooper (1997). Further Assessments of a Three-Component Model of Occupational Commitment:

- Generalizability and Differences across Occupations. *Journal of Applied Psychology*; 1997, Vol 82, No. 3, p444-452.
26. Kelli H. Foulkrod, Craig Field and Carlos V.R. Brown (2010). Trauma Surgeon Personality and Job Satisfaction: Results from a National Survey. *American Surgeon*; Apr2010, Vol. 76 Issue 4, p422-427.
27. Erum Irshad and Summaira Naz (2011). Job Satisfaction, Organizational Commitment and Personality Traits: A relationship Study. *Journal of Humanities & Social Sciences (Pakistan)*; 2011, Vol. 19 Issue 1-2, p37-60.
28. George Louis and Sabapathy Thara (2011). Work Motivation of Teachers: Relationship with Organizational Commitment. *Canadian Social Science*; 2011, Vol. 7 Issue 1, p90-99.
29. Muhammad Jamal Shah, Musawwir-Ur-Rehman, Gulnaz Akhtar, Huma Zafar and Adnan Riaz (2012). Job Satisfaction and Motivation of Teachers of Public Educational Institutions. *International Journal of Business & Social Science*; 2012, Vol. 3 Issue 8, p271-281.
30. Mark R. Lepper, David Greene and Richard E. Nisbett (1973). Undermining Children's Intrinsic Interest with Extrinsic Rewards: A test of the "Overjustification" Hypothesis. *Journal of Personality and Social Psychology*; 1973, 28, p129-137.
31. Paul R Pintrich and Dale H Schunk (1996). *Motivation in education: Theory, research and applications*. Englewood Cliffs, NJ: Prentice Hall; 1996.
32. Sami Abuhamdeh and Mihaly Csikszentmihalyi (2009). Intrinsic and Extrinsic Motivational Orientations in the Competitive Context: An Examination of Person-Situation Interactions. *Journal of Personality*; Oct2009, Vol. 77 Issue 5, p1615-1635.

33. Rohany Nasir and Sakdiah Md. Amin (2010). Job Performance and Marital Satisfaction among Dual-worker Malay Couples. *International Journal of Interdisciplinary Social Sciences*; 2010 Vol. 5 Issue 3, p299-305.
34. Edward A. Ward and Elaine Davis (1995). The Effect of Benefit Satisfaction on Organizational Commitment. *Compensation & Benefits Management*; summer 1995, Vol. 11(3), p35-40.
35. Sarminah Samad (2011). The Effects of Job Satisfaction on Organizational Commitment and Job Performance Relationship: A Case of Managers in Malaysia's Manufacturing Companies. *European Journal of Social Science*; Jan 2011, Vol. 18 Issue 4, p602-611.
36. Abraham Careli and Anat Freund (2004). Work Commitment, Job Satisfaction and Job Performance: An Empirical Investigation. *International Journal of Organization Theory and Behavior*; 2004, 7(3), p289-309.
37. G.W. Allport (1937). *Personality: A Psychological Interpretation*. New York: Holt, Rinehart & Winston; 1937, p48.
38. Hamireza Rrezaei Kelidbari, Morad Rezaei Dizgah and Azim Yusefi (2011). The Relationship between Organization Commitment and Job Performance of Employees of Guilan province Social Security Organization. *Interdisciplinary Journal of Contemporary Research in Business*; Oct2011, Vol. 3 Issue 6, p555-568.
39. Patricia Cain Smith, Lorne M. Kendall and Charles L. Hulin (1969). The measurement of satisfaction in work and retirement: a strategy for the study of attitudes. *Chicago: Rand McNally*; 1969.
40. Paul E. Spector (1985). Measurement of human service staff satisfaction: Development of

the Job Satisfaction Survey. *American Journal of Community Psychology*; 1985, 13, p693-713.

Figure 1 Conceptual Model



Note: ability utilization, achievement, activity, advancement, authority, company policies and practices, compensation, co-workers, creativity, independence, moral values, recognition, responsibility, security, social service, social status, supervision—human relations, supervision—technical, variety and working conditions.

Table 1 General Information Data Description

	Items	Frequency	Valid Percent
Gender	Male	84	42.4
	Female	114	57.6
Age	17-20 years old	47	23.7
	21-25 years old	115	58.1
	26-30 years old	24	12.1
	31-35 years old	3	1.5
	36-40 years old	2	1.0
	41-45 years old	1	.5
	46-50 years old	1	.5
	51-55 years old	4	2.0
	56-60 years old	1	.5
Major	Marketing	25	12.6
	Management	48	24.2
	Accounting;	39	19.7
	CIS	12	6.1
	G-LIB;	1	.5
	General Business	4	2.0
	MBA	49	24.7
	Other	20	10.1
Work Status	Part-time	127	66.5
	full-time	64	33.5
College Standing	Freshman	14	7.1
	Sophomore	27	13.6
	Junior	39	19.7
	Senior	106	53.5
	Graduate Student	2	1.0
	Other	10	5.1
Ethnicity	African American	163	82.3
	White (Caucasian)	21	10.6
	Hispanic/ Latino/ Spanish origin	6	3.0
	Asian	3	1.5
	Other	5	2.5

Table 2 Correlation Matrix

		Mean	Std	1	2	3	4	5	6	7	8	9	10
1	Neuroticism	30.6256	6.87205	1									
2	Openness	37.7716	5.48501	-.202**	1								
3	Extraversion	42.0725	6.09858	-.402**	.083	1							
4	Agreeableness	40.1071	5.40785	-.234**	.036	.103	1						
5	Conscientiousness	45.1768	6.61901	-.385**	-.083	.387**	.173*	1					
6	Intrinsic Motivation	43.9626	7.06070	-.131	.189**	.251**	.094	.278**	1				
7	Extrinsic Motivation	40.8624	5.44724	.091	-.016	.196**	-.042	.327**	.356**	1			
8	Job Satisfaction	73.3711	11.65196	-.172*	.086	.407**	.091	.419**	.284**	.322**	1		
9	Affective Commitment	17.7538	5.07987	.047	-.070	-.056	-.063	-.091	.013	-.084	.177*	1	
10	Continuance Commitment	17.6327	4.05953	.135	.000	-.129	.017	.032	.040	.075	.058	.137	1
11	Normative Commitment	17.3112	4.69370	.083	-.037	.008	-.048	.013	.013	.004	.316**	.389**	.426**

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 3-1 Linear Regression

Model	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Job Satisfaction	Organizational Commitment	Organizational Commi+ment	Affective Commitment	Continuance Commitment	Normative Commitment
(Constant)	-5.967	56.517+	55.435+	30.962+	10.456*	12.071**
Neuroticism	.112	.175	.165	-.026	.099*	.088
Openness	.249*	-.076	-.120	-.131*	.040	-.010
Extraversion	.450***	-.141	-.265*	-.107	-.102*	-.051
Agreeableness	.033	-.094	-.068	-.073	.040	-.033
Conscientiousness	.600+	.104	-.139	-.188**	.049	-.014
Intrinsic Motivation	.141	.138	.081	.065	.015	.003
Extrinsic Motivation	.315*	-.183	-.316*	-.166**	.011	-.137*
Job Satisfaction			.357+	.170+	.028	.170+
F-Statistics	11.128+	0.824	3.590***	3.509***	1.236	3.599***
Adjusted R Square	0.289	-0.007	0.109	0.105	0.011	0.108

+ p< 0.001 *** p< 0.01 ** p< 0.05 *p<0.1

Table 3-2 Linear Regression

Model	Model 2	Model 1	Model 7	Model 8	Model 9	Model 10
	Organizational Commitment	Job Satisfaction	Job Satisfaction	Job Satisfaction	Job Satisfaction	Job Satisfaction
(Constant)	56.517+	-5.967	-17.895	-21.050	-6.442	-10.994
Neuroticism	.175	.112	.033	.122	.084	.005
Openness	-.076	.249*	.178	.237*	.223	.194
Extraversion	-.141	.450***	.461***	.450***	.455***	.418***
Agreeableness	-.094	.033	.022	.060	.020	.035
Conscientiousness	.104	.600+	.603+	.672+	.586+	.539+
Intrinsic Motivation	.138	.141	.114	.095	.148	.137
Extrinsic Motivation	-.183	.315*	.328**	.359**	.316*	.355**
Organizational Commitment			.331+			
Affective Commitment				.615+		
Continuance Commitment					.166	
Normative Commitment						.757+
F-Statistics	0.824	11.128+	13.159+	12.722+	9.853+	14.074+
Adjusted R Square	-0.007	0.289	0.364	0.354	0.290	0.378

+ p< 0.001 *** p< 0.01 ** p< 0.05 *p<0.1

Table 4-1 Fit Indices for Face-to-Face Learning Versus E-Learning Measurement Model

Model	χ^2 (df)	p-value	χ^2 /df	RMSEA	GFI	NNFI	NFI	CFI	IFI
Baseline	23.30(12)	0.025	1.94	0.068	0.98	0.63	0.90	0.93	0.95
Statistics are based on a sample of 198 respondents. Degrees of freedom are in parentheses after the chi-square value. RMSEA = Root mean square error approximation. GFI = Goodness-of-fit index TLI = Tucker Lewis index (Non-Normed Fit index) NFI = Normed Fit index CFI = Comparative Fit index IFI = Incremental Fit index df = Degrees of freedom									

Table 4-2 Unstandardized Path Coefficients for the Baseline Model

Parameter	Path Coefficient	T-value	R ²
Job Satisfaction			57%
Openness	-0.030	-0.57	
Neuroticism	0.043	0.77	
Agreeableness	0.14	2.10**	
Conscientiousness	0.081	1.40	
Extraversion	0.28	3.89***	
Intrinsic Motivation	0.16	1.70*	
Extrinsic Motivation	-0.067	-0.94	
Affective Commitment			2.5%
Openness	0.053	0.77	
Neuroticism	0.024	0.34	
Agreeableness	0.014	0.17	
Conscientiousness	-0.043	-0.57	
Extraversion	0.042	0.48	
Intrinsic Motivation	0.15	1.24	
Extrinsic Motivation	0.036	0.40	
Continuance Commitment			5.8%
Openness	0.11	1.58	
Neuroticism	-0.12	-1.63	
Agreeableness	-0.016	-0.18	
Conscientiousness	0.19	2.43**	
Extraversion	-0.084	-0.90	
Intrinsic Motivation	0.089	0.69	
Extrinsic Motivation	0.038	0.40	
Normative Commitment			6.2%
Openness	-0.11	-1.45	
Neuroticism	0.098	1.27	
Agreeableness	0.22	2.38**	
Conscientiousness	0.12	1.53	
Extraversion	0.15	1.56	
Intrinsic Motivation	-0.069	-0.52	
Extrinsic Motivation	0.071	0.72	

Statistics are based on a sample of 200 respondents.

These are the endogenous variables in the model; the exogenous are listed underneath.

**Significant at the 0.05 level; *Significant at the 0.10 level.

Table 4-3 Covariance among Organizational Commitment and Job Satisfaction

Relationship	Path Coefficient	T-value
Affective Commitment and Job Satisfaction	0.023	0.38
Continuance Commitment and Job Satisfaction	0.10	1.60
Normative Commitment and Job Satisfaction	0.09	-1.40

Running head: PREDICTORS OF SUCCESS AND ACADEMIC PERFORMANCE

College of Business Students' Predictors of Success and Academic Performance: The Effects of
Academic Intervention and Communication,
General Self-Efficacy, Academic Motivation, and Social Activity

Christopher M. Jenner
Savannah State University
College of Business Administration
Savannah, Georgia 31404
Phone: 912-358-4778
Email: cjenner@student.savannahstate.edu

ABSTRACT

This research study will examine the effectiveness of academic intervention and communication, general self-efficacy, academic motivation, and social activity by analyzing predictors of success to assist students in achieving high academic performance. Academic performance, measured by overall grade point average (OGPA) in this study, is strongly linked to positive outcomes that are valued by society. Therefore, adults with high levels of education and success are more likely to be employed and earn higher salaries. Data will be collected from a sample of 158 enrolled college business students. The measurement of Academic Intervention and Communication, General Self-Efficacy, Academic Motivation, Social Activity, and Predictors of Success will be by scales from previous research as well as newly proposed scales by the principle investigator. Structural Equation Modeling along with regression analysis were used to evaluate the hypotheses. The proposed conceptual model hypothesizes that the use of the four constructs will have a significant impact on college students' performance and success. Findings indicate that the model is statistically significant with only General Self-Efficacy being significantly correlated to Academic Performance. The value of these constructs for all types of students is discussed.

TOPIC OF INTEREST AND WHY IT IS IMPORTANT

What is the effectiveness of academic intervention and communication, general self-efficacy, academic motivation, and social activity on a student's academic performance and success? This question is important because it will help determine if these constructs have specific effects correlated with academic performance and success. In addition, this study will

provide insight to how each construct is developed by the students and could help improve processes to achieve maximum utilization.

INTRODUCTION

A major concern with the education system is trying to discover how student performance can be increased. For this concern, research has been focused on how certain constructs are utilized by the student to meet the conditions for academic success. There is no one method that can be implemented to improve students' success but several studies have made it possible to determine efficient pathways (Almaraz et al 2010; Bresó et al 2010; Hwang et al 2004; Ning & Downing 2010). These studies have demonstrated that Academic Intervention and Communication, General Self-Efficacy, Academic Motivation, Social Activity, and Predictors of Success can be considered antecedents for students' academic success.

Opportunities for intervention of student development may come in the form of academic advising, tutoring, career center offerings, internships, involvement in student organizations and activities, and other programs. These types of interventions are an important resource to have available for students so burnout and dropout rates can be reduced (Bresó et al. 2010). Communication between university officials and students are to be mutual interaction i.e. having respectful manners, being understanding and open with each other as well as having the ability to clearly transmit information in a timely manner (Hwang et al. 2004; Witt et al. 1997). Many studies have shown that the way communication is given and received will have an overall impact on how well tasks and goals are accomplished.

Based from past experience on student performance, self-efficacy has been considered the strongest predictor for success and this has been proven across various studies with different

samples (Breso et al 2010; Chen et al 2001; Wesler & Riggio 2010). However, there are other factors such as academic interventions and communication, which may have greater influences towards a higher self-efficacy and thus leading to overall increase in academic success.

LITERATURE REVIEW

Academic Intervention, Communication, and Social Activity

Support for academic intervention may improve retention and graduation rates for colleges. Opportunities for student development may come in the form of academic advising, tutoring, career center offerings, internships, involvement in student organizations and activities, and other programs. Almaraz et al. (2010) found that some researchers suggest that selection of intervention program elements is a critical factor in determining the effectiveness while others think that skillfulness and commitment with a how a program is delivered is a critical component for success. Either way, college-concurrent support programs should be advocated by institutions (Kaelber 2007). Kaelber documented his experience with a freshman program and found that it was not just an orientation but, more importantly, the program helped students' academic skills and taught them how to build relationships with faculty. The program was noted for delivering material beyond most academic preparation. Kaelber also noted that collaboration of faculty and student working together toward students' achievement is a necessary element for program success.

Addus, Chen, and Khan (2007) considered how effective advisement was as a supplement to a lack of precollege preparation and to overcome academic challenges that affect students' performance. The study observed students' overall grade point average (OGPA), identified how academic and related issues that affected students' performance from freshman

year to senior year, and evaluated perceived effectiveness of advisement and counseling services. Most notably, inadequate preparation, working long hours, poor study habits, family responsibilities, lack of self-confidence, and social and extracurricular activities have a direct correlation with low grades and high dropout rates (Addus et al. 2007). In addition, they also found that poor-performing students never took advantage of intervention services and that the students reported that advisement services were not effective.

Alamaraz et al. (2010) conducted a study with the Management and Human Resources (MHR) Department that provided information about careers and career planning, and encouraging students to take advantage of on-campus opportunities for personal and professional development. The results of the research provided support for how effective a course was that integrated curriculum to prepare students for outcomes from their collegiate experience. Furthermore, Almaraz et al. found that when students were done with the course, they had a greater understanding of the MHR curriculum, had increased their use of career center services as well as being involved in co-curricular activities.

Duhon et al. (2009) quantified intervention intensity so they could evaluate student response to increasing frequency. The research took the components of response to intervention (RTI) which consists of 1) the student's level of response and 2) the intensity of the intervention required to produce that level of response. This was refined from the RTI model that was used for the past two decades consisting of 1) the general education program's quality, 2) the ability of the special education program to create significant outcomes for its students, and 3) the precision and meaningfulness of the current process used to diagnose disabilities (Fuchs 2003; Gresham et al. 2005). Duhon's et al. study produced positive outcomes for students involved and provided insight about increasing intervention intensities. They suggest that the purpose of the

RTI model is “to provide information as to how the student can be successful throughout his or her academic career.” (Duhon et al. 2009). This helps understand the impact of increasing intervention frequency on students responsiveness. Even though this aspect may be out of the range of this particular study, it will provide a basis with how university students frequent interventions and if it correlates with academic success at the college level.

Expectations between university officials and students are to be mutual interaction (e.g., having respectful manners, being understanding and open) as well as having the ability to clearly transmit information in a timely manner (Sanchez et al. 2010). The teacher-student relationship is one of the key predictors of academic performance (Yoon 2002). The two major approaches for recognizing relevance of these relationships are separate analysis of professor and student roles, and analysis of the interaction between them. In addition, Sanchez et al. (2001) studied personality traits in regards to relationships between students and academic performance. Likewise, there have been studies that focused on the teacher role and attempted to identify personality traits that might be of relevance in teaching.

As mentioned above, the teacher-student relationship is to also consider interactions between them. Sanchez et al. (2010) states “What students expect of teacher and how they perceive them consequently defines and affects their teachers’ behavior and, thus, the success of their teaching.” The results from this study with students in social science majors showed that there was three common aspects of the ideal role of the professor with teaching ability (good communication skills, explains tasks clearly, organized, fluent), professor-student relationship (respectful manners, comprehensive, open), and social ability (easy to talk to, not authoritarian, fair). These three characteristics place great importance on interaction with students. The aspect that was the least cited was personal qualities relating to intellectual characteristics of the

professor (intelligence, capacity for synthesis). Sanchez et al. suggests that more research needs to be done in other disciplines so results can be compared. Knowing what students are expecting and what essentials university officials need to have, will improve the relationship between them.

What is the minimum communication a student should seek from university officials to have a positive effect on academic performance? The frequency of performance feedback from teaching professional to student does show to be positively correlated with academic performance (Noell et al. 1997; Witt et al. 1997). In general, Mortenson et al. (1998) found that student academic performance improved when the teacher implemented the treatment with integrity. Integrity of teachers can be seen from the results from Sanchez's et al findings about the ideal teacher ability. Mortenson et al concluded that a weekly performance feedback is potentially viable to increase teacher's intervention implementation.

Academic Motivation & Self-Efficacy

Mkumbo's and Amani's theory of academic achievement focused on variation between high performing and low performing university students (Mkumbo, Amani 2012). The study was based on attribution theory and that success or failure is associated with three sets of characteristics (Weiner 1985). The first characteristic is individuals succeed or fail due to factors that originate internally from within people or externally from their environment. The second characteristic is that the cause of success or failure may be stable or unstable. Stable factors are focused on outcomes that are likely to be the same every time an attempt is made at the same or similar tasks. Unstable factors mean they can change and the outcomes of performance are different each time the behavior is performed. The last characteristic is that success or failure may be controllable or uncontrollable. If the condition is controllable, then individuals believe

that they can change these conditions. On the on other hand, if uncontrollable, then the conditions cannot be altered.

Accordingly, self-efficacy is relevant to the attribution theory by definition. Bresó et al. (2010) defines self-efficacy “as a person’s judgment of their capabilities to organize and execute the courses of action required to attain predetermined types of performances.” Self-efficacy is not based on what skills one has but rather on the valuation of what one can achieve with the skills that are currently possessed. Bresó et al. (2010) also finds that self-efficacy is undeniable in the learning process for students. Since the source of efficacy is from internal beliefs, psychological states of students, such as anxiety, stress, and fatigue, may be correlated with self-efficacy. Therefore, intervention based on self-efficacy may positively affect students. This study concluded that self-efficacy-based intervention has positive effects on students’ well-being and performance.

Academic Performance and Success

Previously mentioned, academic intervention and communication, general self-efficacy, academic motivation, and social activity, all have influences on overall academic success and performance but how is this measured? Academic success has frequently been measured by overall grade point average (OGPA). This has been the standard in many research studies but it narrowly measures success. To expand the measurement, personal and professional achievement should also be included. Trockel et al. (2000) used other aspects of physical and mental health criteria as predictors. These aspects have been validated (Locke & Latham 1990; Lahmers & Zulauf 2001; Kahoe 1974; Osborne 1995; Hoy 1997) and included a goal-setting theory, intelligence and study time, sleep issues (time arising, time retiring, and hours of sleep), personal

control issues, spirituality, emotional health issues (self-esteem and emotional stability), dietary health, and leisure habits. Trockel et al. (2000) incorporated a time diary with all of these criteria and suggest that life patterns, clear goals, disciplined personal habits, and health issues greatly influence success and accomplishment. Consequently, when trying to measure success, the educational community should consider predictors other than the traditional OGPA.

METHOD

Procedures

The data was collected during regular schedule class meeting times and lasted approximately 15 minutes per class. All participants gave their consents for this research study. The participants completed the self-administered survey under supervision of the principal investigator to ensure everything was kept confidential and information would be protected. The students completed the three page survey instrument that consisted of: A Background Information Form (used to record demographic information such as age, gender, race, major, overall grade point average (OGPA), and class rank), and 30 questions based on a General Self-Efficacy scale, Academic Motivation scale, Social Activity scale, Predictors of Success scale, and perceived Academic Intervention and Communication based scale proposed by the principal investigator.

Measures

The survey instrument used in this study is based on a five-point Likert scale with responses ranging from 1 (strongly disagree) to 5 (strongly agree). Based on each student's experience, they responded to each item on the survey regarding self-efficacy, academic

motivation, social activity, predictors of success, and intervention activity. For the present study the following scales were created:

General Self-Efficacy: Five items were included in the questionnaire to measure students' levels of general self-efficacy. Using the five-point Likert scale, participants responded to statements such as "When facing difficult tasks, I am certain that I will accomplish them," and "Compared to other people, I can do most tasks very well." These items were from a developed instrument proven by Chen et al. (2001). The levels of self-efficacy can then be established in a student to see if there is a positive relationship with high levels of self-efficacy and academic success. The Chronbach alpha (tests internal reliability) for this instrument was above the minimum threshold level at 0.795 (Hair et al. 1998).

Academic Motivation: Students were asked to answer five items based on the question "Why do you go to college?" to measure intrinsic, extrinsic and motivation in education. This was measured using items from the Vallerand et al. (1992) scale. Items included question such as "Because I think that a college education will help me better prepare for the career I have chosen" and "Honestly, I don't know; I really feel that I am wasting my time in school." The alpha for this instrument was 0.639.

Social Activity: The following seven items were chosen to help understand how students are involved in college social activities, as well as, locating where social support for students is coming from i.e. family or friends. Items on the questionnaire include "In college, I do not feel the need to join college organizations," "It is 'lame' to join college organizations," "My family really tries to help me," and "I count on my friends when things go wrong." Detachment from the university and perceived social support can give insight to motivation and where that motivation is coming from. The alpha for social activity was 0.545

Predictors of Success: Five items were used to measure factors associated with academic and personal success with students. “Your time-management skills are exceptional,” “Your diet is considered a ‘Healthy diet’,” and “You use less time spent in passive leisure” are examples from the questionnaire. These items were used in Darren et al. (2008) study of success among university undergraduates. The alpha for predictors of success was 0.613

Academic Intervention and Communication: Students awareness of intervention, communication with university officials, and how and when interventions are used were measured with eight items. These items were created by the principle investigator for this specific study. Students responded to questions like “I am aware of resources on campus to find academic help,” “I feel that open communication with professors is in my best academic interest,” and “If you are receiving an unsatisfactory grade, do you actively seek help?” The alpha for academic intervention and communication was 0.767.

HYPOTHESIS AND THEORETICAL FRAMEWORK

Literature related to academic intervention and communication, general self-efficacy, academic motivation, and social activity are ubiquitous with influencing academic success. Academic intervention helps students’ skills in academic preparation and beyond with the right student-faculty collaboration as proposed by Kaelber (2007). Bresó et al. (2010) found that no matter the situation, self-efficacy is essential to achieve success and can be a learning process for students to attain high levels of this attribute. Cohesion of these constructs will mediate students’ performance and success. Thus, the following are hypothesized,

H1: The combination of the four constructs, academic intervention and communication, general self-efficacy, academic motivation,

and social activity, will significantly predict academic performance based on OGPA.

H2: The combination of the four constructs, Academic Intervention and Communication, General Self-Efficacy, Academic Motivation, and Social Activity, will positively relate to Predictors of Success.

General self-efficacy is the most common predictor of academic success (Breso et al., 2010). Components of the RTI characterize and address how students respond to intervention by the intensity of that intervention. Duhon et al. (2009) suggests that the RTI model provides information on positive outcomes on a student's success. This model, along with the student-teacher relationship interactions proposed by Sanchez et al. (2010) and other aspects of motivation and success proposed by (Locke & Latham 1990; Lahmers & Zulauf 2001; Kahoe 1974; Osborne 1995; Hoy 1997), show that the four constructs may positively affect general self-efficacy. Thus, the following hypothesis is,

H3: The four constructs, academic intervention and communication, academic motivation, social activity, and predictors of success, will have a significant effect on general self-efficacy.

SAMPLE

Data were collected from a historically black university in the southern part of the United States. Each individual participant answered a questionnaire distributed in class during a regular lecture period in the College of Business Administration. 158 participants from varying ages, ethnicity, and educational levels, responded to this study. As a result, 82.3 percent were African-Americans, and 49.4 percent were males. Most research participants (72.8 percent) were between

18 to 23 years of age, and of the senior class rank (49.4 percent). The majority of the participants were full-time students (91.8 percent).

ANALYSIS

The Academic Performance and Success model presented in Figure 1 was tested using Structural Equation Model (SEM) to evaluate the research Hypothesis 1 and 2 using LISREL computer program (version 8.80, Jöreskog & Sörbom, 2006). The major strength of using SEM is that it permits latent variables to be estimated with relationships among theoretically constructs that are free of the effects of measurement unreliability. The covariance matrix was used as the inputs for all models. To produce the model parameters, the maximum likelihood estimation procedure was employed. To examine model fit, the absolute fit and incremental fit were utilized to determine how well the data fit the hypothesized model (Hair et al. 1998). Additionally for Hypothesis 3, items on the questionnaire were summed to form totals scores. The total scores were then subjected to regression analysis. The internal consistency for the questionnaire was reported using Cronbach's alpha reliability estimates (Hair et al. 1998).

RESULTS AND DISCUSSION

Demographical characteristics for this study are provided in Table 1. The means, standard deviations, zero-order correlations, and reliability estimates are provided in Table 2.

Measures of Model Fit

Structural equation models use indices to measure the fit on the theoretical network developed in Figure 1. The goodness-of-fit index (GFI) measures absolute fit by summarizing

the fitted model with the actual data. The range for this is between 0 and 1. When values are greater than 0.90 then the model is validated as well fitted (Hair et al. 1998). Using the maximum likelihood ratio chi-square statistic (X^2) and GFI, the absolute fit can be measured. This measures the degree to which the covariance matrix estimated by the theoretical model repeats the observed covariance matrix (James & Brett, 1984). The root mean square error approximation (RMSEA) measures the estimate of the measurement error. Additionally, the non-normed fit index (NNFI) considers the penalty for creating additional parameters to the model. Another fit index, the normed fit index (NFI), establishes how much better the model fits than a baseline model instead of a single function of the difference between the reproduced and observed covariance matrix (Bentler & Bonett, 1980). Similar to the NFI, the comparative fit index (CFI) compares the predicted covariance matrix to the observed covariance matrix but is not affected by sample size.

Measurement Model

The data for the following results are provided in Table 3. The measurement model had acceptable fit indices with the chi-square statistic at its minimum and the p-value was not significant. The GFI was above the threshold level of 0.90. (Hair et al., 1998), and the RMSEA was less than 0.08 which suggests an acceptable model (Steiger & Lind, 1980). The chi-square divided by the degrees of freedom coefficient was less than three, indicative of an acceptable model fit (Arbuckle & Wothke, 1995). The following indices, CFI, NFI, and NNFI, were all indicative of an acceptable fit of the model to the data as well.

Interpretation of Structural Equation Model

Table 4 presents the structural coefficients for the overall model. Partial support was established for Hypothesis 1, combining the four constructs, Academic Intervention and Communication, General Self-Efficacy, Academic Motivation, and Social Activity, will significantly predict Academic Performance based on OGPA. Only General Self-Efficacy was a significant predictor of OGPA. Academic Intervention and Communication, Academic Motivation, and Social Activity were not significant predictors of OGPA.

Hypothesis 2 investigated the combination of the four constructs, Academic Intervention and Communication, General Self-Efficacy, Academic Motivation, and Social Activity, will significantly correlate to Predictors of Success. All of the constructs were positively related to Predictors of Success but Academic Intervention and Communication, General Self-Efficacy, and Academic Motivation were significantly related. In addition, expanding measurement for Academic success, Social Activity contrasts previous research with Trockel et al. (2000) due to not finding a significant relationship between Social Activity and Predictors of Success. Squared multiple correlations for OGPA and Predictors of Success were 6.0% and 34% respectively.

Regression Analysis

To test Hypotheses 3 a hierarchical multiple regression analysis was employed. This technique eliminated the effects of Gender, Race, Age, Class Rank, and College Major (Morgan & Griego, 1998). Hierarchical multiple regression allows one to enter variables in blocks and then determine if the second block of variables significantly contributes anything to the prediction equation while controlling for the effect of the first block (independent variables).

For Hypothesis 3, General Self-Efficacy was set as the dependent variable. Gender, Race, Age, Class Rank, College Major, OGPA were entered into the first block as the predictor variables, and Academic Intervention and Communication, Academic Motivation, Predictors of Success, and Social Activity was the criterion for the second block.

The correlation among the total scores for Academic Intervention and Communication, Academic Motivation, Predictors of Success, and Social Activity was computed with the following results. Overall, the regression model was statistically significant ($r = .555$, $p = 0.000$). However, only Predictors of Success was a significant predictor of General Self-Efficacy. In addition, all four constructs were positively correlated to General Self-Efficacy. A model fit index, the coefficient of determination (R-square), was .308, indicating that 30.8 percent of the variation in General Self-Efficacy can be explained by Academic Intervention and Communication, Academic Motivation, Predictors of Success, and Social Activity. Since the R-square value is low, other predictors of General Self-Efficacy were not included in the regression model. Collinearity was not problematic in the regression model, as the tolerance values were well above their minimum threshold value (Hair et al, 1998).

Table 5 contains the results of the hierarchical multiple regression analysis. Partial support was established for Hypothesis 3, which stated that the four constructs, Academic Intervention and Communication, Academic Motivation, Social Activity, and Predictors of Success, will have a significant effect on General Self-Efficacy. Finding a strong relationship with General Self-Efficacy is important because of it being the only predictor for Academic Success. Consistent with previous research, self-efficacy is the strongest predictor of Academic Success with regards to OGPA (Breso et al 2010; Chen et al 2001; Wesler & Riggio 2010).

CONCLUSION

The purpose of this study was to examine the how academic success and performance can be affected by academic intervention and communication, general self-efficacy, academic motivation and social activity. Given the finding from this research study, academic intervention and communication, academic motivation, and general self-efficacy, play an important role in predictors of students' overall success and performance. Other studies have demonstrated the effectiveness of intervention programs that promote healthy psychological states, engagement among students, and teacher-student relationships (Breso, E. et al. 2010, Yoon, J. 2002). Most importantly, the current study provides a strong rationale for initiating such intervention efforts within educational systems for the students to have success in both academic and professional settings.

IMPLICATIONS AND LIMITATIONS

The findings of this study have important and practical implications. Academic educators have to take into consideration the importance of establishing interventions for students from various backgrounds and education levels. In addition, not only are students more willing to take part of these carefully thought out interventions but are more likely to develop a better sense of self confidence knowing that support is available in varying styles and techniques. Not all students learn the exact same way; some students need more time or help than others and as Gardner concludes in his Multiple Intelligences theory, there are seven or more ways people learn and understand the world. Educators that provide interventions will have the best success taking this factor into account and allowing their students to shine and excel in ways they may have never known was possible.

Limitations for this study include that the reliability estimate for the construct of Social Activity was lower than the minimum threshold. This may have caused Social Activity to not be significantly correlated to Predictors of Success. In addition, the scale for academic intervention and communication was not previously tested for validity and reliability. Another limitation of the study was that the survey instrument may not have been as thorough as previous research due to time limitations for this project. Also, the research sample mainly consisted of higher level college students and was completely absent of any freshman level participants.

FUTURE RESEARCH

Suggestion for future research would be to compare and contrast the results with other institutions across different demographic regions. A longitudinal study of college freshman through graduation measuring the effects of interventions is another suggestion for future research. Further, a survey with a more comprehensive scale for intervention should be created to measure more specific interventions within an educational institution. Additionally, a future study focusing only on intervention programs should be conducted to examine how specific programs affect their performance in college.

REFERENCES

- Addus, A., Chen, D., & Khan, A. (2007). Academic performance and advisement of university students: a case study. *College Student Journal*. 41, 316–326.
- Almaraz, J., Bassett, J., Sawyer, O. (2010). Transitioning Into a Major: The Effectiveness of an Academic Intervention Course. *Journal of Education for Business*. 85: 343-348.
- Arbuckle, J. L., & Wothke, W. (1995). *Amos 4.0 user's guide*. Chicago: Smallwaters Corporation.
- Arra, C.T., Bahr, M.W. (2005). Teachers' and Students' Preferences for Mathematics Interventions: Implications for Teacher Acceptability in Consultation. *Journal of Educational and Psychological Consultation*. 16(3), 157-174.
- Bentler, P. M., & Bonett, D. G. (1980). Significance Test and Goodness of Fit in the Analysis of Covariance Structures. *Psychological Bulletin*, 88, 588-606.
- Boretz, E. (2012). Midsemester Academic Interventions in a Student-Centered Research University. *Journal of College Reading and Learning*. 42(2), 90-108.
- Breso, E., Schaufeli, W.B., Salanova, M. (2010). Can a self-efficacy-based intervention decrease burnout, increase engagement, and enhance performance? A quasi-experimental study. *Published with open access at Springerlink.com*. High Educ 61: 339-355.
- Chen, G., Gully, S.M. & Eden, D. (2001). Validation of a new general self-efficacy scale. *Organizational Research Methods*. 4,42-63.
- Cooper, H., Spencer-Dawe, E., McLean, E. (2005). Beginning the process of teamwork: Design, implementation and evaluation of an inter-professional education intervention for first year undergraduate students. *Journal of Interprofessional Care*. 19(5): 492-508.

- Duhon, G.J., et. al. (2009). Quantifying Intervention Intensity: A Systematic Approach to Evaluating Student Response to Increasing Intervention Frequency. *Journal of Behavioral Education*. 18: 101-118.
- Finley, Hervey, J., Brown, U.J., III, & Beale, R.L. (2009). Business students and academic integrity: Examining individual characteristics and situational factors. *Paper Presented at the Academy of Management Annual Conference*. Chicago, IL.
- George, D., Dixon, S., Stansal, E., Gelb, S.L., Pheri, T. (2008) Time Diary and Questionnaire Assessment of Factors Associated with Academic and Personal Success Among University Undergraduates. *Journal of American College Health*. Vol. 58, No. 8, 706-715.
- Hair, J. F., Jr., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate Data Analysis*. Macmillan, New York.
- Hoy WK, Hannum JW. Middle school climate: an empirical assessment of organizational health and student achievement. *Educ Adm Q*. 1997;33:290–312.
- Hwang, A., Kessler, E.H., Francesco, A.M. (2004). Student Networking Behavior, Culture, and Grade Performance: An Empirical Study and Pedagogical Recommendations. *Academy of Management Learning and Education*. Vol. 3, No. 2, 139-150.
- James, L. R., & Brett, J. M. (1984). “Mediators, Moderators, and Tests for Mediation”. *Journal of Applied Psychology*, 69(2), 307-321.
- Kaelber, W. (2007). A senior professor tackles the freshman program. *Liberal Education*. 93(1), 56–60.
- Kahoe RD. Personality and achievement correlates of intrinsic and extrinsic religious orientation. *J Pers Soc Psychol*. 1974;29:812–818.

- Lahmers AG, Zulauf CR. Factors associated with academic time use and academic performance of college students: a recursive approach. *J Coll Stud Dev.* 2001;41:544–556.
- Locke EA, Latham GP. A Theory of Goal Setting and Task Performance. *Englewood Cliffs, NJ: Prentice Hall;* 1990.
- Mkumbo, K.A.K., Amani, J. (2012). Perceived University Students' Attributions of Their Academic Success and Failure. *Canadian Center of Science and Education.* Vol. 8, No. 7, June 2012, 247-254.
- Morgan, G. A., & Griego, O. V. (1998). Easy use and interpretation of SPSS for Windows: Answering research questions with statistics. Mahwah, NJ: Lawrence Earlbaum Associates.
- Mortenson, B.P., et. al. (1998). The use of weekly performance feedback to increase teacher implementation of a prereferral academic intervention. *School Psychology Review.* Vol. 27, Issue 4.
- Ning, H.K., Downing, K. (2010). The impact of supplemental instruction on learning competence and academic performance. *Society of Research into Higher Education.* Vol. 35, No. 8, 921-939.
- Noell, G., Witt, J. C., Gilbertson, D., Rainer, D., & Freeland, J. (1997). Teacher intervention implementation and performance feedback. *School Psychology Quarterly.* 12, 77-88.
- Nonis, S.A., Hudson, G.I. (2010) Performance of College Students: Impact of Study Time and Study Habits. *Journal of Education for Business.* 85: 299-238.
- Osborne JW. Academics, self-esteem, and race: a look at the underlining assumption of the disidentification hypotheses. *J Pers Soc Psychol.* 1995;21:449–456.

- Pan, W., et. al. (2008). Do Intervention Programs Assist Students to Succeed in College? A Multilevel Longitudinal Study. *College Student Journal*. Vol. 42, Issue 1.
- Sanchez, M.M., Martinz-Pecino, R., Rodriguez, Y.T. (2011). Student Perspectives on the University Professor Role. *Social Behavior and Personality*. 39(4), 491-496.
- Steiger, J. H., & Lind, J. C. (1980). *Statistically-based tests for the number of common factors*. Paper presented at the annual meeting of the Psychometric Society, Iowa City, IA.
- Trockel MT, Barnes MD, Egget EL. (2000). Health-related variables and academic performance among first year college students: implications for sleep and other behaviors. *J Am Coll Health*. 2000;49:125–132.
- Vallerand, R.J., Pelletier, L.G., Blais, M.R., Briere, N.M., Senecal, C.B., & Vallieres, E.F. (1992). The academic motivation scale: A measure of intrinsic, extrinsic, and motivation in education. *Educational and Psychological Measurement*. 52, 1003-1017.
- Veenstra, C.P., Dey, E.L., Herrin, G.D. (2008). Is Modeling of Freshman Engineering Success Different from Modeling of Non-Engineering Success? *Journal of Engineering Education*. 467-479.
- Vitasari, P. et. al. (2010). The Use of Study Anxiety Intervention in Reducing Anxiety to Improve Academic Performance among University Students. *International Journal of Psychological Studies*. Vol. 2, No. 1; 89-95.
- Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review*. 92(4), 548-573. <http://dx.doi.org/10.1037/0033-295X.92.4.548>
- Welser, D.A., Riggio, H.R. (2010). Family background and academic achievement: does self-efficacy mediate outcomes? *Social Psychology Education*. 13: 367-383

- Woosley, S.A., Shepler, D.K. (2011). Understanding the Early Integration Experiences of First-Generation College Students. *College Student Journal*. 700-714.
- Yoon, J. S. (2002). Teacher characteristics as predictors of teacher-student relationships: Stress, negative affect, and self-efficacy. *Social Behavior and Personality: An international journal*.30(5), 485-494. 30(5), 485-494.
- Witt, J. C., Noell, G., LaFleur, L, & Mortenson, B. P. (1997). Teacher use of intervention in general education settings: Measurement and analysis of the independent variable. *Journal of Applied Behavior Analysis*, 30, 693-696.
- Zimet, Gregory, D. (1988). The Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment*. 52 (1), 30-41.

FIGURE 1: Academic Performance and Success; Theoretical Framework and Model

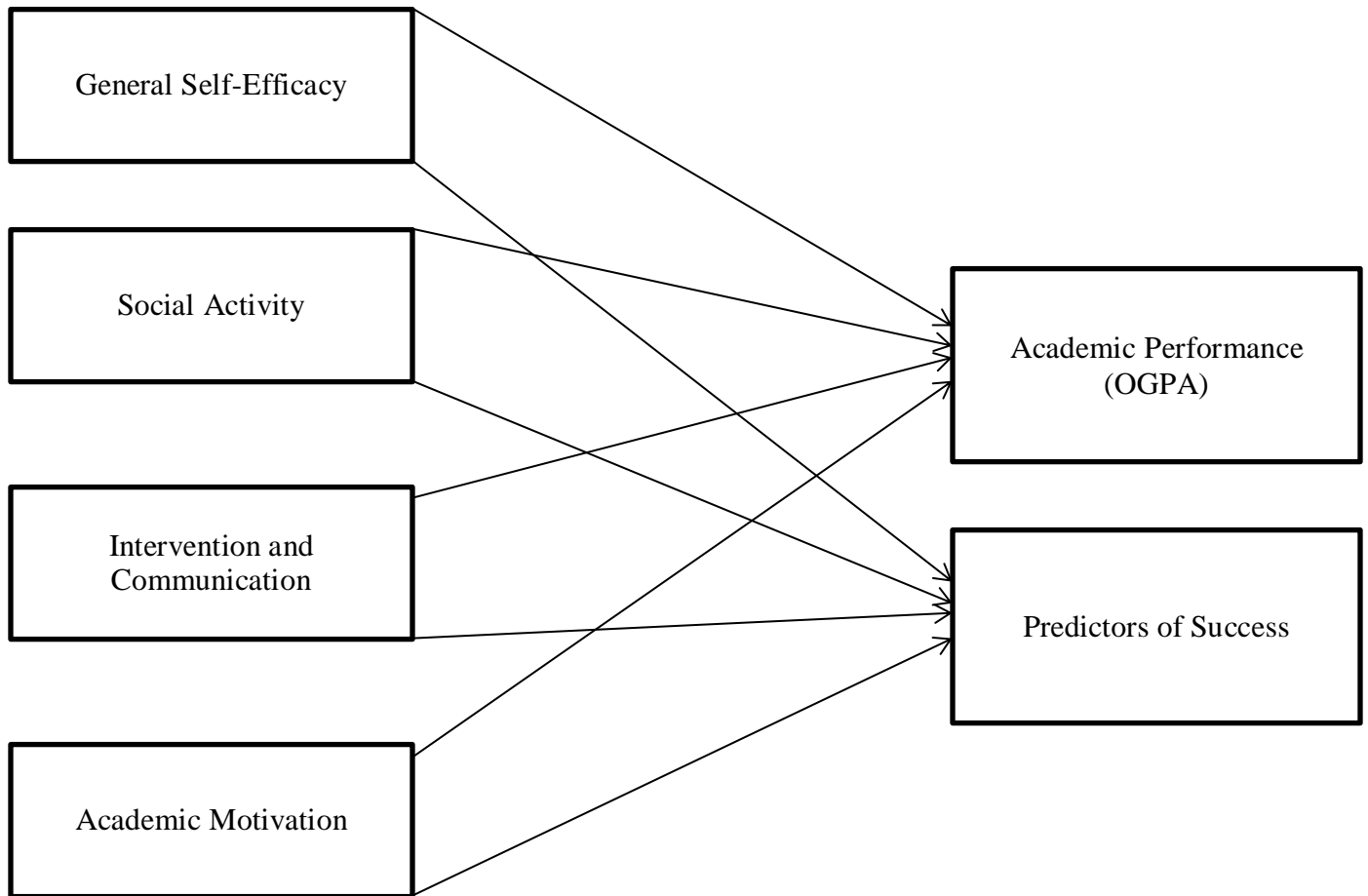


TABLE 1: Demographical Characteristics

Sample Characteristics (n=158)	% of Sample
Gender	
Male	49.4
Female	50.6
Ethnicity	
African-American	82.3
Caucasian	11.4
Asian	1.3
Hispanic (Black)	1.9
Hispanic (White)	0.6
Native American	0.6
Other	1.9
Age	
18-23	72.8
24-29	24.1
30-35	1.9
36-41	1.3
42-47	0
48-53	0
54-59	0
60 and over	0
Class Rank	
Freshmen	0
Sophomore	14.6
Junior	34.8
Senior	49.4
Graduate	1.3
College Major	
ACCT	32.9
CISM	12
MGNT	31
MKTG	11.4
GENERAL BUSINESS	2.5
FINANCE	1.9
GLIB	0.6
MBA	1.3
OTHER	6.3
Enrollment Status	
Full-time Student	91.8
Part-time Student	8.2

TABLE 2: Means, Standard Deviations, Zero-Order Correlations, and Reliability Estimates

Variables	Means	S.D.	1	2	3	4	5	
1. Academic Performance (OGPA)	2.98	0.42						
2. General Self-Efficacy	22.06	2.45	0.216**	(.795)				
3. Social Activity	22.95	3.90	0.155	-0.028	(.545)			
4. Predictors of Success	17.94	3.26	0.440**	0.179*	0.178*	(.613)		
5. Intervention and Communication	30.98	4.72	0.359**	0.225**	0.497**	0.142	(.767)	
6. Academic Motivation	19.08	2.20	0.202*	0.144	0.347**	0.438**	0.047	(.639)

n=158; Reliability estimates are on the diagonals in parentheses. *p≤ .05 **p≤ .01.

TABLE 3: Fit Indices for Academic Performance and Success Measurement Model.

Model	X ² (df)	p-value	X ² /df	RMSEA	GFI	NNFI	NFI	CFI
Baseline	1.06(3)	0.787	0.353	0.000	1.000	1.060	0.99	1.000
<p>Statistics are based on a sample of 158 respondents. Degrees of freedom are in parentheses after the chi-square value. RMSEA = Root mean square error approximation. GFI = Goodness-of-fit index TLI = Tucker Lewis index (Non-Normed Fit index) NFI = Normed Fit index CFI = Comparative Fit index df = Degrees of freedom</p>								

TABLE 4: Unstandardized Path Coefficients for the Baseline Model.

Parameter	Path Coefficient	T-value	SMC
Academic Performance (OGPA)			6.0%
General Self-Efficacy	0.030	2.340**	
Social Activity	-0.010	-0.960	
Intervention and Comm.	0.010	1.080	
Academic Motivation	0.000	-0.300	
Predictors of Success			34%
General Self-Efficacy	0.380	4.100**	
Social Activity	0.030	0.600	
Intervention and Comm.	0.220	4.160**	
Academic Motivation	0.210	1.950*	

Statistics are based on a sample of 158 respondents.

These are the endogenous variables in the model; the exogenous are listed underneath.

*Significant at the 0.05 level; **Significant at the 0.01 level.

SMC= Squared Multiple Correlation.

Table-5: Regression Analysis with General Self-Efficacy as the Criterion Variable and Academic Intervention and Communication, Academic Motivation, Predictors of Success, and Social Activity as the Predictor Variables, (n = 158).

<u>Independent Variables</u>	Beta	T-value	Tolerance	P-value
(Constant)		5.366		.000
Intervention and Communication	.133	1.522	.624	.130
Academic Motivation	.047	0.589	.747	.556
Predictors of Success	.257	3.015	.654	.003**
Social Activity	.061	0.823	.875	.412
R-Squared	.308			

**Significant at the 0.01 level.

THE DYNAMICS OF AUTISM: MEETING THE SOCIAL & ECONOMIC CHALLENGE

SONYA MYRICKS, JESSICA VICKSON

CLAYTON STATE UNIVERSITY

November 2, 2012

TABLE OF CONTENTS

ABSTRACT	3
INTRODUCTION	4
CO-OCCURRING CONDITIONS ASSOCIATED WITH AUTISM	5
Sensory Integration Disorder (SID)	5
Intellectual Disability (ID)	5
Epilepsy	5
Attention-Deficit/Hyperactivity Disorder (ADHD)	5
Adults	5
Children	5
Fragile X Syndrome	6
SOCIOLOGICAL AND CULTURAL ASPECTS OF AUTISM	6
North America	6
Europe.....	7
Asia.....	7
FAMILIES AND THE IMPACT OF AUTISM.....	8
Reactions to diagnosis.....	8
Effects of delay in diagnosis	9
EFFECTS ON THE FAMILY	9
Parents	9
Siblings	10
Partners.....	10
ECONOMIC COSTS OF AUTISM.....	10
Table 1	11
CONCLUSION.....	13
REFERENCES	14
APPENDIX	16
Exhibit 1 [see ref #4].....	16
Exhibit 2 [see ref #4].....	16

ABSTRACT

The reported cases of autism diagnoses have increased steadily over the years and so has the costs. Some estimate that autism costs society approximately \$137 billion per year [14]. This research will focus on co-occurring conditions associated with autism, sociological and cultural aspects of autism, families and the impact of autism, effects on the family and economic costs of autism. Also, we will introduce that early intervention has shown to significantly reduce the costs of treating autism.

INTRODUCTION

Over the past decade, there has been an increase in the number of children diagnosed with an autism spectrum disorder (ASD). According to the Center for Disease Control and Prevention (2012), 1 out of every 88 children in the United States meets the criteria for an ASD. Previous research has shown that having a child with a disability such as ASD presents a unique set of challenges that affect the entire family unit and individual family members' health, well-being, and experiences across the life span [14]. These stressors include challenges navigating the myriad of educational, medical, and behavioral services; financial hardships related to the cost of care; and emotional aspects of having a child with a disability [14]. The core deficits associated with an ASD are impairment in social interaction and communication, as well as the presence of unusual behaviors and/or interests [12].

ASDs occur in all racial, socioeconomic, and ethnic groups and are four times more likely to occur in boys than in girls. According to Jacobson et al., (1998), autism is defined as a disorder of brain development arising before age three, and often spotted by that age or shortly thereafter. Other behavioral, developmental, psychiatric, and medical problems can co-occur with autism such as sensory integration disorder (SDI), intellectual disability (ID), epilepsy, attention deficit hyperactivity disorder (ADHD), and fragile X syndrome.

Autism is diagnosed behaviorally by observing a child for qualitative impairments in three main areas: disordered social interactions delayed or disordered communication, and restriction in range of interests and activities. To help understand the economic costs of ASD, and the importance for early intervention, four topics were researched. These topics include 1) co-occurring conditions associated with autism; 2) sociological and cultural effects of autism on families as observed by experts in North America, Europe, and Asia; 4) financial costs of autism treatment and early intervention. Understanding the complexity of autism spectrum disorder will help us to precisely deal with its effects on the individuals and on society as a whole. With better understanding we will be able to establish treatment options that can decrease the overall economic costs of ASD.

CO-OCCURRING CONDITIONS ASSOCIATED WITH AUTISM

Sensory Integration Disorder (SID)

Children who have been diagnosed with autism sometimes suffer from a condition that causes them to be impartial to sensation. For example, some sensations such as loud noise, hot or cold, can be extremely detrimental to a child whose sensory nodes are insensitive to the touch. It also can make them unable to pull away from something that is extremely cold or hot.

Intellectual Disability (ID)

It has been documented that many children who suffer from autism are diagnosed as having intellectual disability and that may be the reason they are also autistic. Much research is required to provide a more reliable link between the two. As researchers show, some degree of intellectual disability is quite common in children who are autistic, and sometimes they are normal in all other areas of life, but weak in others [7].

Epilepsy

Seizures are another common problem for children and teens that are autistic. According to researchers, “one in four children with an Autism Spectrum Disorder will develop seizures. Seizures are caused by abnormal electrical activity in the brain, and can result in temporary loss of consciousness, convulsions, unusual movements, and staring spells” [7]. However, there are many medications that are used to help control seizures.

Attention-Deficit/Hyperactivity Disorder (ADHD)

Adults

Attention-deficit/hyperactivity disorder (ADHD) in adults is associated with significant difficulties in social functioning. “Adults with ADHD often experience problems with social activities, social interactions, and social relationships; they do not make friends as easily as others and they are less likely to marry” [14].

Children

“In the United States disorders that are not as common, such as ADHD..., are less commonly recognized than more widespread disorders such as depression. In addition, youth who develop a disorder before early adolescence lack the ability to recognize mental health disorders in themselves. As such, recognizing the signs of a disorder is the responsibility of the

THE DYNAMICS OF AUTISM

child's parents. From this perspective the age at which a child with ASD will be diagnosed will be effected by the ability of the parent to recognize difficulty in their child's development." [13]

Fragile X Syndrome

At this point it is important to mention another condition that is gaining more awareness. Some individuals that have been diagnosed with autism might actually be suffering from Fragile X syndrome. Fragile X syndrome is a genetic condition involving changes in part of the X chromosome. It is the most common form of inherited intellectual disability (mental retardation) in boys. It is also considered a "genetically transmitted form of autism." Fragile X syndrome is caused by a change in a gene called FMR1. "Although all children with this chromosomal abnormality do not have autism; 10-15% probably does" [8].

SOCIOLOGICAL AND CULTURAL ASPECTS OF AUTISM

Culture frames our worldview and helps us make sense out of what we know. It is the goals, beliefs, and attitudes shared by a group of people [18]. This may be why some in the autistic community view autism as an identity more than a disability or medical condition. For example, the autistic community sees all symptoms of autism as characteristics that do not need correcting; they are just another way of relating and looking at the world differently [23]. Therefore, it would be a mistake to assume that what may work here in one culture will work in another culture [18].

North America

Autism is the fastest-growing developmental disability and it is estimated that 1% of the population may have a diagnosable autistic spectrum disorder (ASD) [1]. According to the Centers for Disease Control (CDC) 2012 report, the prevalence of autism has been raised to 1 in 88 births in the United States and nearly 1 in 54 boys [2]. The rate of autism has increased tremendously from the 1980s when children were diagnosed at a rate of two to five in 10,000 [22]. So society is either getting better at diagnosing the problem, people are more willing to seek treatment for their disabled child; more individuals are developing an ASD, or any combination of the three.

"Beliefs exist both at a cultural level and in the minds of individuals. Cultural beliefs about autism among those in the U.S. "ranked other parents of a child with autism as a source of

THE DYNAMICS OF AUTISM

support (68%) more often than they did their family members (53%). These “other parents” were non-relatives, people they would never have met if their child did not have this diagnosis, and yet they were the most-endorsed source of support” [16]. Perhaps this is due in part because parents with an autistic child are better able to understand what other parents with an autistic child is going through.

Europe

In Western medicine, an illness is seen as an individual’s problem caused by defects in the function of his or her body leaving the individual being seen as a variant from the norm [7]. “It is said that illness in Western medicine results in barriers, stereotypes, and personal suffering that the individual must fight to overcome or continue to suffer through. Western medicine has defined autism as a developmental disorder resulting from cognitive impairments and manifesting in various characteristics. The cause of cognitive impairments in autism is unknown and widely debated. Autism is perceived in Western cultures as an incurable, disabling illness in which individuals are limited in many aspects of their daily lives” [7].

In Europe, there are millions of children who have been diagnosed with autism. “British autism advocates want autistic people acknowledged as a minority rather than as disabled, because they say that ‘disability discrimination laws don’t protect those who are not disabled but who ‘still have something that makes them look or act differently from other people’” [21].

Asia

Culture can play a large part in the process of diagnosing ASD. In some cultures such as many Asian cultures, where the amount of children a family has is limited, having a disabled child can be seen as a negative or shame on the family.

The absence of proper means of identification and treatment procedures for individuals with autistic disorder (AD) (a term interchangeable with childhood autism) is the result of the religious practices and Traditional Chinese Medicine (TCM) of the 18th century [15]. The general perspective was that mental disturbances were the consequence of bad deeds committed by either oneself or members of an individual’s family. Consequently, blessings for individuals diagnosed with autism, were sought from the gods in the local temples [9].

“Over the past thirty years, China has changed from an isolated, poor country to one of the world’s largest and globalized economies. During that period of time, the lives of people with disabilities such as autism have been greatly impacted” [15].

A blind study in Korea showed an estimated 2.64% prevalence whereas in other general population samples the prevalence was more in the range of 0.75%. Additionally many of the students identified as having an ASD by this study “were in regular schools, without having been diagnosed and without support [10]. South Korea’s education system is very structured with minimal socialization having 12+ hour school days, 5 – 6 days awake. This environment is an ideal setting for a functioning ASD student to work [10].

What singled this study from other studies is that they targeted the mainstream school population without adding the stigma of identifying children with disabilities. This lessened the apprehension of participation in a society where having a child with a disability is considered shameful on the family.

FAMILIES AND THE IMPACT OF AUTISM

Reactions to diagnosis

People respond to things differently from others. A child being diagnosed with autism is no different. Many parents welcome a diagnosis of any sort because it gives them a sense of relief in at least having something to work with. They no longer feel as if the behavior of their child is due to something they may have done as parents. Having a diagnosis also makes it easier to help explain the child’s behavior to other people who are not familiar with ASD behaviors [8].

Some parents may cry, get angry, lash out at others or try to place blame. This may be due to the fact that even though they have received some information about what autism is, it is not enough to satisfy their deep concerns. “The National Initiative for Autism: Screening and Assessment (NIASA) report (2003) stresses the need to provide more information and to involve families throughout the assessment process” [8].

In addition, some parents who had learned their child was autistic were in total disbelief. They could not understand how something like this could happen to their child. There is enormous guilt and grief overwhelming the parents. Many begin to question the professionals

THE DYNAMICS OF AUTISM

who gave the analysis. For instance, some questioned whether the professionals really knew what they were doing.

In the end, one of the main questions on parents' minds was what the prognosis will be for their child. In reality, this cannot be given because it is not readily known. However, in most cases some level of care will be inevitable throughout the autistic child's life [8].

Effects of delay in diagnosis

Some parents are completely devastated upon learning that their child has been diagnosed with autism. On the other hand, according to researchers, the earlier a child was diagnosed, the sooner the parents came to accept the diagnosis [8]. This early diagnosis in turn, leads to early treatment that can offer a child that is autistic a better chance of a semi-normal life.

EFFECTS ON THE FAMILY

Parents

People deal with traumatic news differently, and parents are no exception. Researchers suggest there is considerable and consistent evidence that mothers are much more impacted than fathers [8]. In other words, mothers of autism diagnosed children react much more personally. However, fathers did not experience as much of a personal effect.

Fathers tend to view a child diagnosed with autism as getting more stressed by the behavior of their wives than their autistic child. According to researchers [8], the child's problems led to direct confrontations between the parents and threatened their marriage. As a result, many couples divorce; however, the divorce rate is the same as it is for the rest of the population.

"The relatively less severe impact of the child's autism on most of the fathers appeared to be at least partially due to gender roles connected to work and child nurturing [8]. In a few cases, fathers acknowledged that their child's autism might have encouraged a greater commitment to work. But, this is not to say that fathers were not emotionally distressed by their child's autism" [8].

It was found that mothers were much more likely to claim that their child's autism had severely affected their emotional well-being [8]. In addition, many mothers who worked were

THE DYNAMICS OF AUTISM

often forced to miss work. They performed below average and some eventually worked part-time or ultimately left the workplace altogether.

Siblings

“Because parents need to spend so much time and energy with an autistic child, it leaves very little room to attend to other siblings [20]. Sometimes siblings feel as if they are not loved as much as their autistic sibling and began “acting out” their frustrations. Therefore, it is imperative that parents take time out to attend to the non-autistic children by taking them to the park to play and involve them more in the autistic child’s life.

Partners

It was once thought that people with autism never married. However, this is not true; there are many undiagnosed individuals with autism who have partners and children [8]. Some adults are quite capable of managing their partnerships and children with very little difficulty. On the other hand, some have a difficult time dealing with marriage and children.

ECONOMIC COSTS OF AUTISM

The prevalence of a developmental disability is greater in boys than in girls, and boys are more likely to be diagnosed earlier. The prevalence is about the same in non-Hispanic whites and blacks but both are greater than Hispanics. This could be because of the culture or could also be due to underreporting because many Hispanics in the United States are not citizens and are fearful of deportation. A greater percentage of those diagnosed with a developmental disability are on government funded insurance. This opens the question of whether economic status plays a part in the development of an ASD, but more research is needed to make a determination on that issue (see Appendix, Exhibit 1). All these occurrences play a part in being able to identify where the costs are and where early intervention education needs to be focused.

There was an increase in the prevalence of autism from 1987 – 2008 of 0.47%, an increase in the prevalence of ADHD of 6.69%, and an increase in the prevalence of Intellectual Disabilities of 0.71%. The percentage change in autism from 1997 – 1999 versus 2006 – 2008 was an incredible increase of 289.5%. (See Appendix, Exhibit 2)

According to a study in 2005 the expenses for a child with autism was more than triple that of a child without, and for those children that also had a co-occurring condition the costs were even higher. Table 1 shows the breakdown of these costs.

Table 1

Expenses for an Autistic Child in 2005*				
<u>No ASD</u>	<u>Autism Only</u>	<u>Autism + ID</u>	<u>Autism + Epilepsy</u>	<u>Autism + ADHD</u>
\$1,812	\$7,200	\$19,200	\$11,900	\$9,500
				[see ref #10]

*Information was obtained using children enrolled in Medicaid [5]

A more recent study shows that an individual living in the United States with autism will incur an estimated \$1.4 million USD (\$1.46 million USD in the UK) over their lifetime but that increases to \$2.3 million USD (\$2.4 million USD in the UK) if the individual has autism as well as ID [3]. “The research team [for the above mentioned survey] found that the cost of autism in the U.S. alone is greater than the entire Gross Domestic Product (GDP) of 139 countries around the world” [3].

From these numbers we can see that the cost of autism is excessive but when ID is a co-occurring condition with autism the costs are astounding. The larger portion of the expense is incurred during adulthood. While many high functioning autistics can function in society there are many, especially those with ID, that must have continued supervision to survive.

When we consider the increase in the prevalence of autism and combine that with the average cost per individual with autism the costs will continue to increase at a steady pace. Therefore, one reason that we must consider alternatives such as early intervention methods is to decrease these costs.

“Clinical research and public policy reviews that have emerged in the past several years now make it possible to estimate the cost-benefits of early intervention for infants, toddlers, and preschoolers with autism or pervasive development disorder” [12]. With early intervention, it has been documented that cost savings range from \$187,000 to \$203,000 per child for ages 3-22 years and from \$656,000 to \$1,082,000 per child for ages 3-55 years [12].

SOLUTIONS TO MINIMIZE COSTS OF AUTISM

Early intervention has been proven to stimulate the brain receptors in autistic children under the age of 3 and taught to respond in a similar manner to a child without an ASD. This early intervention not only helps an autistic child better understand their environment but also helps to increase IQ scores [2]. With the increase in IQ scores and the increase in diverse education ability many autistics that would have in the past required expensive special facilities and services will be able to learn the necessary skills to function in society more independently.

There are currently many treatment programs available to sufferers of ASD; however many of these treatments are costly and only isolate one or two symptoms and work towards adjusting those symptoms independently of other issues that might also need to be dealt with. Many of these treatments are currently used because of the delay in development after a child reaches three years of age. It is important for early intervention to be extremely effective that it be administered as early in the development of a child, before the age of three.

One early intervention method that is finding positive results is the Early Start Denver Model (ESDM). This behavioral program “improves not only social skills, but also brain activity in response to social cues such as facial expressions...’This may be the first demonstration that a behavioral intervention for autism is associated with changes in brain function as well as positive changes in behavior, says Tom Insel, M.D., director of the national Institute of Mental Health” [2].

Since most of the cost for autistics is incurred in their adult years for services that provide living conditions and supervision being able to forgo these costs with early intervention at a young age would be advantageous. For adults with disabilities, employment is a way for them to become accepted by society and full participants [15].

Getting children early intervention that increases IQ’s, social interactions and communication skills will increase the ability for individuals with ASD to gain employment and be able to live independently. This will increase the individual’s well-being and decrease the costs to them and to society as well.

CONCLUSION

In closing, autism spectrum disorders (ASDs) are easier to detect today than they were in times past. Most people have become more familiar with the typical symptoms associated with autism. As people learn what autism is and is not, the more tolerable people will be toward those who have been diagnosed as autistic. The more we understand how ASDs affect individuals and society the easier it is to identify needed resources, utilize effective treatments such as early intervention, and decrease the costs associated with each individual situation. Early intervention reduces costs because it targets treatment at the beginning allowing individuals to live independently therefore eliminating the need for expensive services as adults.

REFERENCES

- [1] Andreica-sândică, B., Patca, S., Panaete, A., & Andreica, S. (2011). THE IMPACT OF AUTISM DIAGNOSIS ON THE FAMILY. *Acta Medica Transilvanica*, 16(3), 478-480.
- [2] Autism Speaks. (2012). Intensive Early Intervention Improves Social Skills and Brain Responses. Retrieved From: www.autismspeaks.org/science/science-news/intensive-early-intervention-improves-social-skills-and-brain-responses
- [3] Autism Speaks. (2012). New Research Finds Annual Cost of Autism Has More Than Tripled to \$126 Billion in the U.S. and Reached 34 Billion in the U.K. Retrieved from: <http://www.autismspeaks.org/about-us/press-releases/annual-cost-of-autism-triples>.
- [4] Boyle, Coleen A.; Boulet, Sheree; Schieve, Laura A.; Blumberg, Stephen J.; Yeargin-Allsopp, Marshalyne; Visser, Susanna; and Krogan, Michael D. (2011). Trends in the prevalence of Developmental Disabilities in US Children 1997-2008. *Pediatrics: Official Journal of the American Academy of Pediatrics*. DOI: 10.1542/peds.2010-2989. Retrieved from: <http://pediatrics.aappublications.org/content/early/2011/05/19/peds.2010-2989>.
- [5] Centers for Disease Control and Prevention. (2012). Key Findings: Autism Spectrum Disorders and Health Care Expenditures. Retrieved From: <http://www.cdc.gov/ncbddd/features/autism-keyfindings2012.html>
- [6] Common Issues Associated With Autism. Retrieved from <http://www.siblingsofautism.com>
- [7] Ecker, J., (2010). Cultural Belief Systems in Autism and the Effects on Families. Retrieved from http://www.academiccommons.columbia.edu/.../Cultural_Psych_ECKER.pdf
- [8] Families: The Impact of Autism. Retrieved from <http://www.autism.org.uk/about-autism/research/information-for-pupils-and-students/>
- [9] Hsiao, C.H., Magyar, C. (2006) The effect of socio-cultural context on conceptualizing autistic disorder in the People's Republic of China *International Journal of Psychosocial Rehabilitation*. 11 (1), 51-60
- [10] Kim, Young Shin, M.D., Ph.D.; L. Leventhal, Bennett, M.D.; Koh, Yun-Joo, Ph.D.; Fambonne, Eric, M.D.; Laska, Eugene, Ph.D.; Lim, Eun-Chung, M.A.; Cheon, Keun-Ah, M.D., Ph.D.; Kim, Soo-Jeong, M.D.; Kim, Young-Key, M.D.; Lee, Hyun Kyung, M.A.; Song, Dong-Ho, M.D.; Grinker, Roy Richard, Ph. D. (2011). Prevalence of Autism Spectrum Disorders in a Total Population Sample. *American Journal of Psychiatry*, The. 168:904-912. 10. 1176/appi.ajp.2011.10101532. Retrieved from: <http://ajp.psychiatryonline.org/article.aspx?articleid=116570>.

- [11] Jäbrink, K., & Knapp, M. (2001). The economic impact of autism in Britain. *Autism: The International Journal Of Research & Practice*, 5(1), 7.
- [12] Jacobson, J. W., Mulick, J. A., & Green, G. (1998). Cost-benefit estimates for early intensive behavioral intervention for young children with autism—general model and single state case. *Behavioral Interventions*, 13(4), 201-226.
- [13] James, Mindy; Deckner, Deborah, Dr.; Maddox, Samuel, Dr. (2012). Prospectus Thesis: Access and Utilization of Support Services by Families Affected by an Autism Spectrum Disorder.
- [14] McArdle, M., (2012). The Economic Impact of Autism on Families. Retrieved from <http://www.theatlantic.com/business/archive/2012/05/the-economic-impact-of-autism-onfamilies/257892/>
- [15] McCabe, H., & Wu, S. (2009). Helping each other, helping ourselves: A case of employment for an adult with autism in Nanjing, China. *Journal Of Vocational Rehabilitation*, 30(1), 57-66. DOI:10.3233/JVR-2009-0453
- [16] Petersen, B. E. (2012). Social Perception and Cue Utilization in Adults With ADHD. *Journal Of Social & Clinical Psychology*, 31(7), 663-689.
- [17] Plumb, J.C. (2011). The Impact of Social Support and Family Resilience on Parental Stress in Families with a Child Diagnosed with an Autism Spectrum Disorder. Retrieved from EBSCO Host.
- [18] Ravindran, N., & Myers, B. (2012). Cultural Influences on Perceptions of Health, Illness, and Disability: A Review and Focus on Autism. *Journal Of Child & Family Studies*, 21(2), 311-319. doi:10.1007/s10826-011-9477-9
- [19] Shute, N. (2010). Desperate for an Autism Cure. *Scientific American*, 303(4), 80-85.
- [20] Shyu, Y.L., Tsai, J., & Tsai, W. (2010). Helping each other, helping ourselves: A case of employment for an adult with autism in Nanjing, China.
- [21] Sociological and cultural Aspects of Autism. Retrieved from <http://www.pediaview.com/>
- [22] Solomon, A. H., & Chung, B. (2012). Understanding Autism: How Family Therapists Can Support Parents of Children with Autism Spectrum Disorders. *Family Process*, 51(2), 250-264. doi:10.1111/j.1545-5300.2012.01399.x

APPENDIX

Exhibit 1 [see ref #4]

Prevalence of Developmental Disabilities in Children Aged 3 to 17 Years, by Selected Demographic and Socioeconomic Factors, NHIS, 1997 - 2008																
Condition	Total, %	Age, % y		Race and Ethnicity, %			Gender, %		Maternal Education, %			Poverty Level,		Health Insurance Coverage, %		
		3-10.	11-17.	Non-Hispanic White	Non-Hispanic Black	Hispanic	Boys	Girls	Less Than High School	High School/Some College	College Graduate or Higher	<200%	≥200%	Private	Medicaid or CHIP	Uninsured
Any developmental disability	13.87	11.78	16.24 ^c	14.99	14.77	10.65 ^{d,e}	18.04 ^c	9.5	13.89	14.78	10.88 ^{g,h}	16.08	12.42 ^j	12.1	20.28 ^k	11.61
ADHD	6.69	4.72	8.93 ^c	7.82	6.3	3.87 ^{d,e}	9.51 ^c	3.73	5.46	7.26 ^l	5.35	7.2	6.36	6.01	9.55 ^k	4.97 ^l
Autism	0.47	0.56	0.37	0.52	0.41	0.32	0.74 ^c	0.19	0.25	0.5	0.61	0.44	0.49	0.45	0.67	0.19
Blind/unable to see at all	0.13	0.1	0.16	0.12	0.13	0.15	0.16	0.1	0.16	0.13	0.07	0.16	0.11	0.1	0.17	0.17
Cerebral palsy ^a	0.39	0.36	0.37	0.39	0.36	0.33	0.36	0.37	0.33	0.35	0.42	0.41	0.34	0.61	0.6	0.33
Moderate to profound hearing loss	0.45	0.44	0.46	0.51	0.41	0.32	0.54	0.35	0.56	0.5	0.28	0.64	0.32	0.34	0.77	0.44
Learning disabilities	7.66	5.07	9.27 ^c	7.58	7.62	5.50 ^{d,e}	8.97 ^c	5.01	8.06	7.5	4.85 ^{g,h}	8.57	6.03 ^j	5.94	10.87 ^k	6.16 ^l
Intellectual disabilities ^b	0.71	0.59	0.84	0.62	1.06	0.7	0.78	0.63	0.93	0.7	0.48	1.03	0.50 ^j	0.44	1.68 ^k	0.38 ^l
Seizures in the past 12 months	0.67	0.72	0.61	0.66	0.91	0.61	0.73	0.62	0.73	0.75	0.45	0.91	0.52	0.49	1.31 ^k	0.46 ^l
Stuttered or stammered in the past 12 months	1.6	1.99	1.15 ^c	1.27	2.63 ^f	1.96	2.25 ^a	0.91	2.57	1.59	0.96 ^{g,h}	2.4	1.07 ^j	1.08	3.09 ^k	1.64 ^l
Other developmental delay	3.65	3.86	3.41	3.97	3.62	2.64 ^d	4.64 ^c	2.61	3.19	3.91	3.32	4.39	3.16 ^j	3.03	6.06 ^k	2.42 ^l

^a We excluded cerebral palsy from the analysis for 2004 –2007 because of the high likelihood of interviewer error arising from a questionnaire change in 2004.

^b The survey question asked about mental retardation, but we refer to the condition as intellectual disability.

^c $P < .05$, ages 3–10 vs. 11–17 years.

^d $P < .05$, non-Hispanic white versus Hispanic.

^e $P < .05$, non-Hispanic black versus Hispanic.

^f $P < .05$, non-Hispanic white versus non-Hispanic black.

^g $P < .05$, less than high school versus college graduate.

^h $P < .05$, high school versus college graduate.

ⁱ $P < .05$, less than high school versus high school graduate.

^j $P < .05$, <200% versus ≥200% poverty level.

^k $P < .05$, private insurance versus Medicaid.

^l $P < .05$, Medicaid

Exhibit 2 [see ref #4]

Trends in Prevalence of Specific Developmental Disabilities in Children Aged 3 to 17 Years, NHIS, 1987 - 2008							
Disability	n (Unweighted)	All Years, %	1997 - 1999, %	2000 - 2002, %	2003 - 2005, %	2006 - 2008, %	Percent
							Change 1997 - 1999 versus 2006 - 2008
Any developmental disability	15956	13.87	12.84	13.7	13.88	15.04	17.1 ^d
ADHD	7652	6.69	5.69	6.71	6.77	7.57	33.0 ^d
Autism	537	0.47	0.19	0.35	0.59	0.74	289.5 ^d
Blind/unable to see at all	160	0.13	0.11	0.15	0.12	0.13	18.2
Cerebral palsy ^a	305	0.39	0.39	0.43	^b	^b	^b
Moderate to profound hearing loss	533	0.45	0.55	0.44	0.42	0.38	30.9
Learning disabilities	8154	7.04	6.86	7.24	6.82	7.24	5.5
Intellectual disabilities ^b	868	0.71	0.68	0.73	0.75	0.67	-1.5
Seizures in the past 12 months	792	0.67	0.66	0.65	0.66	0.72	9.1
Stuttered or stammered in the past 12 months	1924	1.6	1.63	1.4	1.69	1.68	3.1
Other developmental delay	3978	3.65	3.4	3.28	3.67	4.24	24.7 ^d

Source: Centers for Disease Control and Prevention, National Center for Health Statistics, NHIS.

^a Survey question asked about mental retardation, but we refer to the condition as intellectual disability.

^b We excluded cerebral palsy from the analysis for 2004 –2007 because of the high likelihood of interviewer error arising from a questionnaire change in 2004.

^c Percent change between 1997–1999 and 2006 –2008.

^d Test of linear trend over 4 time periods, $P < .05$.

Culture of Online Education

Joy Godin

Georgia College & State University

Abstract

As online learning rapidly becomes increasingly more popular, the understanding of the culture of learning online among educators is essential to effective delivery in distance education. This study investigates the cultural aspects of online education that may influence learning. The research questions that guided the study are: (1) What are some of the cultural characteristics of online learning? (2) How do the cultural aspects of online learning compare to those of traditional face-to-face learning? (3) How can teachers use the online culture to enhance learning? Online classroom observations and interview techniques were used to gather data. The findings suggest that the online environment is one of flexibility and self-direction. Instructors serve as facilitators of learning and should incorporate techniques that encourage community and promote engagement among students. Employing adult learning strategies and allowing students to include experiential learning and reflective practices will help to enhance learning among online students.

Introduction

Online education programs are rapidly becoming more popular in higher education institutes. The Sloan Consortium, in their 2010 annual report of online education, revealed that in 2009 student enrollment in online courses went up by nearly one million students from the previous year; this represented a 21% growth rate (Allen and Seaman, 2010). Because of this increasing demand for online courses, it is important that online instructors are aware of the paradigm shift or the change in the instructional culture of learning in this technology driven online environment (Travis and Price, 2005; Desai, Hart, and Richards, 2008). The focus of this study will be to look at some of the cultural characteristics of learning online, compare them with

those of the traditional face-to-face classroom, and examine how instructors can use the cultural changes to enhance learning in the online classroom.

Conceptual Framework

Literature in the area of culture and online instruction is sparse as researchers are just beginning to identify the need for understanding the unique instructional culture in the field of online education. Research supporting four areas of interest that relate to culture in online learning is discussed in this section. The categories explored are students' perceptions of high quality online learning programs, technology use for transforming education, the paradigm shift required for teaching online, and andragogical principles applied to online learning. The discussion will begin with the students' perceptions of high quality online learning.

Students' Perceptions of High Quality Online Learning Programs

Francis Uwagie-Ero (2007) identified the characteristics of quality that students perceive as desirable for academic success in online education. The students in the study identified characteristics that were categorized by the roles of the student, instructor and administration involved in the distance education program.

Student's Role

The study identified the characteristics of quality that learners perceived as important for students, which included the following (all but the second and third items relate directly to students):

- Strong self-discipline
- Convenient courses and programs

- Accommodation of career experiences
- Motivation
- Commitment to independent learning
- Access to high speed Internet
- Typing ability
- Ability to use the Internet comfortably

The Instructor's Role

The study also identified what students believed were important faculty characteristics, including the following:

- Understanding and flexibility
- Encouragement
- Clear expectations and due dates for assignments
- Assurance that online courses are of the same quality as face to face ones
- Helpfulness
- Sufficient time to complete assignments
- Regular feedback on and assistance with assignments

The Administration's Role

The third category of characteristics identified by the students was the role of the administration of the online program:

- Administrative and technical support system

- Accommodation of the need to support family, including sick children or parents, while in school
- Self-paced learning programs
- Extra support on a case-by-case basis
- Hiring of caring and understanding faculty and administrators, who interact well with students

The study concluded that students who perceived that they had positive quality experiences, positive individual motivation, and a positive learning environment were more likely to complete the online course or program. Uwagie-Ero (2007) suggested that these factors might help improve retention among online students.

Teaching Online Requires a Paradigm Shift

Desai, Hart, and Richards (2008) discussed how online instructors could enhance their instructional design by identifying the principles and skills needed for high quality distance education. They think that technology is the catalyst for a cultural change in the educational system. Technology has changed the way students gather information, they argue, and students are often more technologically savvy than the institutions that support them. The authors point to the fact that online learning can be asynchronous or synchronous, and that the Internet offers vast learning resources. Online learning programs are sometimes rigidly structured, and may lack the flexibility to offer self-guided study, which would allow students to exploit their abilities to learn from the Internet. For more on technology and its role in shaping instructional culture see Saltmarsh, Sutherland-Smith, and Kitto (2008).

Desai, Hart and Richards mention two further characteristics necessary to facilitate positive cultural change in online learning. One is assessment, which would be essential to ensure that students stay on track in a self-paced environment. The authors do admit that the availability of effective assessment tools is limited. The other is providing resources to build online communities. The tools available in course managements systems, such as chat rooms, bulletin boards, email, and newsgroups, can encourage cooperation among students and help create learning communities. Interacting and collaborating in such communities can result in deeper understanding of course material (2008).

Andragogical Principles applied to the Online Learning Environment

Researchers contend that the online learning environment is one that is typically preferred by adult learners (Desai et. al., 2008; Cunningham, 2010; Merriam, Caffarella, & Baugartner, 2007). Thorough knowledge of adult learning principles and models can aid online instructors in successful teaching. Malcolm Knowles is credited with formulating the adult learning theory of andragogy (Knowles, Holton, and Swanson, 2005; Merriam et. al, 2007). The researchers describe andragogy as the “art and science of helping adults learn” (p. 61). Ajay Bedi (2004) describes Malcolm Knowles’ six principles to andragogical learning, that he claims to have used as guidelines for taking an andragogical approach to teaching:

1. Instructors establish an effective learning climate.
2. Learners are involved in the mutual planning of curriculum and teaching content.
3. Learners are involved in their own needs assessment.

4. Learners are encouraged to formulate their own learning objectives and to devise their own resources and strategies to meet these objectives.
5. Learners are offered support to carry out their learning plans.
6. Learners are assisted in the evaluation of their learning.

One of Knowles' primary assumptions is that, as learners age, they become more self-directed (Merriam et. al, 2007). Cunningham (2010) describes the importance of online professors creating extremely detailed course design materials for self-directed learners. Additionally, he reports that self-directed learners want immediate feedback, and that instructors should try to communicate using asynchronous technologies that create a learning climate similar to that of a face-to-face environment. Cunningham contends that asynchronous communications result in higher quality discussions as more time permits higher-level thinking of both the instructor and the student. He also notes that seeing how learning applies in their own lives motivates self-directed learners.

Motivation for Study

Online instructors may find it challenging to overcome some of the barriers that arise in the online environment. Understanding the shift in the instructional culture of teaching and learning online, instructors improve their teaching.

Research Questions

Research Goals

The primary research goal of this study is to discover the cultural aspects of online education that may influence learning.

Research Questions

1. What are some of the cultural characteristics of online learning?
2. How do the cultural aspects of online learning compare to those of traditional face-to-face learning?
3. How can teachers use the online culture to enhance learning?

Research Environment

The research environment is an online learning program that provides core courses for students who are enrolled in affiliated universities or colleges in the system. The program studied is eCore, a purely online program of the University System of Georgia that offers the majority of core courses required for graduation.

Research Methods

The research methods in this study included online class observations, teacher interviews, and an administrator interview. The following will describe each of the methods.

Class observations

Two online eCore courses were observed in this study: American Literature II (ENGL 2132) and American Government (POLS 1101). Instructors in both courses use the Blackboard Learning System's Georgia View as the course management platform. The eCore instructors employ asynchronous teaching strategies such as discussion board postings and assignment postings as well as notes, videos, and reading assignments. The eCore program supports synchronous teaching strategies, such as virtual meetings; however, synchronous activities were not used in the two classes observed. The researcher periodically observed the course activities

and correspondences between instructors and students, and reviewed all assignments and learning activities in the course throughout one semester.

Teacher interviews

Interviews were conducted with the instructors of both courses. Each was presented via email with the following questions:

1. How did you get involved with teaching online?
2. Tell me about your teaching experiences. What was it like going from face-to-face to teaching online?
3. What do you like about teaching online?
4. What are the challenges of teaching online?
5. What are some of the differences in the learning environment in online learning as compared to face-to-face learning?
6. How do the differences improve or challenge learning?
7. Are students encouraged to use their own life experiences as they learn online in your class?
8. How does self-directed learning play a role in online learning?
9. Your class is delivered in an asynchronous manner. What are your thoughts on synchronous (ie live virtual classroom session such as a Wimba meeting) learning in the online environment?
10. How would you describe the classroom culture in an online environment as compared to the face-to-face traditional classroom environment?

Administrator interviews

Dr. Melanie Clay, the Associate Dean of USG eCore, was interviewed live one-on-one using an electronic web meeting platform, Wimba Live Classroom. Dr. Clay was asked the following questions during the interview:

1. How did you get involved with eCore?
2. Tell me about your teaching experiences. What was it like going from face-to-face to online?
3. What do you like about online learning from a student perspective?
4. What do you like about online learning from an instructor's perspective?
5. What are some of the differences in the learning environment in online learning vs. f2f learning?
6. How do the differences improve or challenge learning?
7. What are the characteristics of successful online students?
8. Are students encouraged to use their own life experiences as they learn online?
9. How does self-directed learning play a role in online learning?
10. While observing the two eCore classes I have noticed that delivery is entirely asynchronous. What are your thoughts on synchronous vs. asynchronous learning?
11. How do you believe learning should be evaluated in eCore classes?

12. I noticed that both instructors I am observing give students an opportunity to introduce themselves and tell a little about themselves. What do you think about this?
13. How are teaching and learning strategies different for online instructors and f2f instructors?
14. What impact has online learning had on how students learn?

The interview question responses from both of the instructors and the administrator were coded for common themes and then used to address the research questions of this study. The findings are reported in the results section of this paper.

Validity Issues

The instructors and courses that were observed in this study were recommended by the Dean of eCore as good examples of teaching and learning online. The administrator and instructors willingly volunteered to answer interview questions and provided thoughtful responses to the questions. All classroom observations were made online and were not intrusive in any way to learning activities of the class.

Results

The purpose of this study was to explore the cultural aspects of online education that impact learning. The results of this study are presented separately for each research question.

Research Question 1

Question 1 asked: What are some of the cultural characteristics of online learning?

The cultural characteristics of learning identified in the study were divided into two separate categories, student learning characteristics and faculty teaching characteristics. The following discussion will provide the details for each category.

Student Learning Characteristics

Students in online education program appreciate the flexibility of learning online. Dr. Melanie Clay, the Dean of eCore, completed her doctoral work entirely online. Dr. Clay stated “I like being a student in the online environment far, far better than a face-to-face environment because I can work at my own pace which is usually much faster.” She also mentioned that in the online environment there was much less wasted time.

The online learning environment requires a more self-directed learning style. Dr. Clay explained that students are in charge of their own learning. The online Political Science instructor wrote that students have to be more organized and self-disciplined. All of the interviewees believed that students have to read more in an online environment. The course observations demonstrated self-directed learning as students read and completed reflective writing tasks in a multitude of assignments in both courses observed. As Cunningham (2010) has stated, “self-directed learning is key to successful online distance education.”

The anonymity of online education gives students with disabilities or physical abnormalities an “equal playing field” according to Dr. Clay. Students show fewer inhibitions about what they say in the online environment since they do not have to say it in person, face-to-face. Likewise, many students are comfortable with the communication technologies since they are similar to those they use recreationally in social networking and blogging sites (Saltmarsh et. al., 2008). Furthermore, online education may facilitate more participation in learning for

students who move at a slower pace or have anxiety about speaking in front of their peers in a classroom (Warschauer 1995, Satar and Özdener 2008).

Faculty Teaching Characteristics

The instructors and administrator mentioned that flexibility for the instructor was also a positive characteristic in online learning. The Political Science instructor reported having “more time to reflect on the student’s comments and respond.” The lack of a time constraint gives instructors the opportunity to provide better feedback to students and incorporate current events as they happen as opposed to waiting until the next class meeting.

The American Literature eCore instructor reported that it is very important that the instructor “set the tone of the course.” He felt that the faculty member’s responses to students should be positive and encouraging. Positive interaction will result in better engagement among students. This concept of a positive environment is supported in the National Standards for Quality Online Teaching (North American Council for Online Learning, 2006) which states that teachers should “create a warm and inviting atmosphere that promotes the development of a sense of community among participants” (p. 4).

In the online environment instructors serve as facilitators of learning instead of teachers disseminating knowledge. In both classes observed the instructor would present an assignment and the students led discussions reflecting on the goals of the assignments and their experiences as they completed the assignments. In some cases there were close to 200 discussion postings for an individual assigned reading. The instructor commented on many responses and students openly and thoughtfully replied to each other’s postings. Students’ questions and responses

determine the direction of the course; therefore, students are more in charge of their own learning explained Dr. Clay.

Research Question 2

Question 2 asked: How do the cultural aspects of online learning compare to those of traditional face-to-face learning?

One of the biggest challenges that each of the eCore instructors identified in the online environment is engaging students. However, Dr. Clay did point out that not all face-to-face instructors are engaging. The challenge in the online environment is to make sure that students are actively interacting with one another. One advantage Dr. Clay mentioned to the online classroom is that there is “no back of the classroom.” One instructor mentioned that he had to put his thoughts more clearly in language as opposed to drawing on the board. He also stated that he doesn’t “tell as many stories.” The lack of face-to-face interaction was also mentioned. The instructors did not get to know their students as well. However, in both of the observed classes, the students seemed to interact very well online with the instructors and each other. Building of community is a challenge in the online environment. Dr. Clay commented that students do not participate in the “small talk” that they normally do in the traditional face-to-face classroom.

Research Question 3

Question 3 asked: How can teachers use the online culture to enhance learning?

The first suggestion to instructors in online course is to become a student in an online class. Dr. Clay claims that this is “the most important thing for an online instructor to do.” Her statement is supported in the National Standards for Quality Online Teaching (North American

Council for Online Learning, 2006) that explains that teachers should take online courses and apply the “experiences as a student to develop and implement successful strategies for online teaching.”

Teachers of online courses should adjust their teaching strategies to serve as facilitators, allowing students to direct their own learning. With this approach, students are able to learn independently, with the instructor serving as the course guide, Dr. Clay explained. Online learning provides teachers with a variety of assessment techniques including online discussions that can improve student engagement and can give students of varying learning styles opportunities to learn in different ways.

Instructors in online learning should define clear expectations for the entire course when classes begin. In both of the eCore classes observed, instructors organized their course content into learning modules and each learning module listed objectives to be covered and a list of tasks or expectations of the students for that module. Each assignment had detailed instructions and resources available to complete the assignment. All of the learning materials were presented to the students at the beginning of the course.

Online students require very detailed instructions and an abundance of learning materials to be successful. Knowles et al. (2005) describe how educational theorists believe that rich and accessible resources are critical to effective learning. For instance, the American Government professor provided links to four American documents including the Declaration of Independence and the United States Constitution while the American Literature professor gave students a very detailed listing of literary terms in the format of a glossary. These are just a couple of the many examples of the learning materials provided to the online students.

Activities that give students the opportunity to apply their own life experiences are beneficial in the online environment. An example of this was observed in the American Government course. The professor asked students to explore experiences in their daily routine and to reflect on how these experiences relate to government agencies. Students were asked to post their reflective responses to a discussion board to share with the class. The online environment gives students the opportunity to participate in more reflective learning. Discussion board postings encourage students to think about their experiences and reflect in a way they may not have in the traditional face-to-face environment. Students also learn from the reflections and discussions of their classmates.

In the online environment the instructor can take advantage of the lack of a time constraint. The Political Science instructor mentioned that she could “bring current events into the class” as they occur instead of waiting until the next class meeting when they may not be as relevant. Instructors have more time to think about their discussions and the opportunity to provide more thought-provoking feedback in the online environment.

Conclusion

As the demand for online courses steadily increases, instructors face the challenge of adapting to the new learning environment and employing practices that will engage students and improve learning. This study identified several cultural characteristics to learning online that may help instructors become effective online facilitators in the technology driven classroom. Understanding the characteristics of online learners is the first step to successful instruction. Online students tend to be self-directed and thrive on the flexibility offered in distance education. Instructors of online learning serve as facilitators of instruction allowing the students to guide

learning. The instructors should create a pleasant, open environment that encourages interaction and community building among students as student engagement is one of the biggest challenges in online education. Employing experiential learning activities followed by reflective practice is important to online student understanding. Recognizing the challenges and benefits of online education and employing practices that encourage student learning are essential to success in the online environment.

References

- Allen, E. & Seaman, J. (2010). *Class differences: online education in the United States*. (Alfred P. Sloan Foundation, 8th annual report). Retrieved from http://sloanconsortium.org/publications/survey/pdf/class_differences.pdf.
- Bedi, Ajay (2004), An adragogical approach to teaching styles, *Education for Primary Care*, 15, 93-97.
- Cunningham, J. (2010). Self-direction: a critical tool in distance learning. *Common Ground Journal*, 7(2), 89-100.
- Desai, M., Hart, J. & Richards, T. (2008). E-Learning: paradigm shift in education. *Education*, 129(2), 327-334.
- Knowles, M. S., Holton, E. F., & Swanson, R. A. (2005). *The Adult Learner – The definitive classic in Adult Education and Human Resource Development*. Burlington, Massachusetts: Elsevier.
- Merriam, S. B., Cafferella, R. S., & Baumgartner, L.M. (2007). *Learning in Adulthood – A Comprehensive Guide*. San Francisco, California: Jossey-Bass.
- North American Council for Online Learning (2006). *National Standards for Quality Online Teaching*. Retrieved from <http://www.inacol.org/research/nationalstandards/NACOL%20Standards%20Quality%20Online%20Teaching.pdf>.

- Saltmarsh, S., Sutherland-Smith, W. & Kitto, S. (2008). Technographic research in online education: context, culture and ICT consumption. *Asia-Pacific Journal of Teacher Education*, 36(3), 179-196.
- Satar, H. M and Özdener, N. 2008. The effects of synchronous CMC on speaking proficiency and anxiety: Text versus voice chat. *The Modern Language Journal* 92: 595-613.
- Travis, J.E. & Price, K.F. (2005). Instructional culture and distance learning. *Journal of Faculty Development*, 20(2), 99-104.
- Uwagie-Ero, F.V. (2007). *Connections between student perceptions of quality in online Distance education and retention* (Doctoral dissertation). University of the Pacific, Stockton, California.
- Warschauer, M. (1995). Comparing face-to-face and electronic discussion in the second language classroom. *Calico*, 13 (2, 3), 7-26.

Title: Best Practices for Developing Websites for Small Businesses/ Organizations with Uncertainty

Abstract

As web connectivity continues to grow, more organizations and businesses feel the need to have a presence on the internet to reach the largest audience possible. Often, these organizations will simply know they want a website, but have no clue what the website should look like, or even what content they would like on the site. A web developer for these clients usually has very little direction from the client, as the client has a high degree of uncertainty regarding the design of the website. In this case study, the client for Afterthecrown.com has a broad idea to allow past beauty pageant queens to share stories about their lives since being queen, but has very little direction in how to implement the idea. The object of this study is to provide best practices for future web developers in similar situations. These practices intend to provide direction during web development and increase a website development project's chance of success in these situations.

Background

A woman who has been involved with pageants such as Miss America for several years saw a recent trend surrounding pageants which concerned her. She saw television shows such as *Toddlers and Tiaras* and *Here Comes Honey Boo Boo* force little girls into living fake, dramatic, overbearing lives by the pageant scene. This woman was concerned that television shows like these were giving pageants a distorted negative reputation, and she wanted to provide a way for past pageant queens and contestants to testify about the positive impact pageants have made on their lives. She thought up an idea for a website where past queens could share updates about what is happening or has happened since being crowned queen. She didn't know what exactly this would look like, but she knew she this idea had potential. She thought that it would be cool if queens could post stories, pictures, or even videos on this site to share with others active in the pageant culture.

She asked friends around her if they knew anyone who could build a website for cheap, as this would be a side project that would be funded out of her pocket, and would not be producing profit in the early stages. One of her friend's sons was a student in college who had experience building websites through a class environment and had even built a few actual sites being used by businesses as part of class projects. After discussing, it was determined by the web designer that Ms. Matthews wanted a website, and knew what she wanted the website to do, but anything besides that was completely unplanned. She simply knew she wanted a website called Afterthecrown.com, and left the rest up to the website designer.

This scenario is actually quite common in web design. Most people know that to reach the largest audience with a message or product, the Internet is the primary means of communication. Thus, many organizations or people will want a website made without actually knowing any specifics about the final product. Most clients for a website will have no idea what actually looks good from a web design aspect, what makes a site most intuitive from a usability aspect, or what makes a site interesting from a content aspect. They will simply trust the web design team to do their jobs, and will approve or reject the product at various checkpoints. This scenario lends itself to a case study that can be used to teach others in similar situations some best practices learned over the duration of the project.

Case Description

The first task of any website development project is to establish some goals and requirements in order to achieve those goals. Goals are typically broad end results that the customer asks for or implies. In this case, the original goal of the client was to have various queens be able to post stories about their lives on this site to share with visitors or members of the site. When dealing with a vague goal, it is best to clarify any questions that the designer has about the project before designing the site. To design the functionality of the site properly, several questions needed to be answered. One question concerned who would maintain the site after a final version of the site was made live. Another question concerned the process of how posts would be controlled, who would be allowed to post, and responsiveness of client. In response to the first question, the client decided she would maintain the site after completion. For the process of controlling posts, she decided she would like potential posters to apply for a profile, she would approve the valid posters, and then the posters would be able to post under their profile.

In order to achieve the specified goals, it was determined that the website would need to use a Content Management System (CMS). A CMS allows a user to add and modify content without having to know any coding languages, which would be necessary since the client is not familiar with coding. Also, having multiple people needing to add content to the website reinforces the need for a CMS. After making the decision of whether or not a CMS was necessary, the process to select a specific CMS was started. Four initial candidates for a CMS were selected based on a requirement to be free, open-source software and to appear to have the ability to handle multiple users and various roles. These four CMS candidates were Plone, Wordpress, Drupal, and Joomla.

A table was put together to compare the basic features and qualifications of each of the 4 CMS candidates. This table can be seen on the next page as Figure 1. Based off these basic features, one of the candidates had to be dropped due to using an unfamiliar programming language known as Python. The other three candidates used PHP, a scripting language unfamiliar to the website designer. To make a better decision between the three remaining candidates, a comparison on the ease of use, features, and best use cases was made. This comparison table can be seen as Figure 2.

Based on the comparisons of the table, and previous personal experience with the 3 remaining CMS candidates, Wordpress was selected as the CMS for the site. The overwhelming reason behind the selection of wordpress was the ease of use due to the non-technical client's need to maintain the site herself upon project completion. Throughout the process of selecting a CMS, the requirements and goals were fleshed out a little more according to the type of site being created and general web design guidelines. Such goals included a user interface that is aesthetically pleasing to the intended audience, intuitive navigation to discover content, and limiting approved users to only editing content they created.

As part of this project, and as a best practice for any project, a schedule was put together for completing this project in a timely manner. This included milestone dates such as having a CMS selected, having an active Domain Name and Hosting Service to install the

CMS, providing design prototypes to client, a due date for a near-final version of the site, and a “go live” date. Also, having routine meetings with a Faculty Advisor helped the student stay accountable to the schedule and to get back on track when he fell behind schedule.

Developer Features to consider:	Plone	Wordpress	Drupal	Joomla
Programming language	Python (not familiar with)	PHP (familiar)	PHP (familiar)	PHP (familiar)
Application Server	Zope	n/a	Apache	CGI
Database	other	MySQL	MySQL	MySQL
Past experience	None	2 projects (thebeadbasket.com and www.georgiasouthernbcm.com)	1 failed attempt	Introduction in beginning class
Last Updated	5/5/2011	5/29/2012	2/16/2012	5/2/2012

Figure 1 - CMS Basic Features Comparison Table (Content from: <http://www.cmsmatrix.org>)

Content Management System	Drupal	Joomla	Wordpress
Ease of Use	Drupal requires the most technical expertise of the three CMSs. However, it also is capable of producing the most advanced sites. With each release, it is becoming easier to use. If you're unable to commit to learning the software or can't hire someone who knows it, it may not be the best choice.	Less complex than Drupal, more complex than Wordpress. Relatively uncomplicated installation and setup. With a relatively small investment of effort into understanding Joomla's structure and terminology, you have the ability to create fairly complex sites.	Technical experience is not necessary; it's intuitive and easy to get a simple site set up quickly. It's easy to paste text from a Microsoft Word document into a Wordpress site, but not into Joomla and Drupal sites.
Features	Known for its powerful taxonomy and ability to tag, categorize and organize complex content.	Designed to perform as a community platform, with strong social networking features	Ease of use is a key benefit for experts and novices alike. It's powerful enough for web developers or designers to efficiently build sites for clients; then, with minimal instruction, clients can take over the site management. Known for an extensive selection of themes. Very user-friendly with great support and tutorials, making it great for non-technical users to quickly deploy fairly simple sites.
Best Use Cases	For complex, advanced and versatile sites; for sites that require complex data organization; for community platform sites with multiple users; for online stores	Joomla allows you to build a site with more content and structure flexibility that Wordpress offers, but still with fairly easy, intuitive usage. Supports E-commerce, social networking and more.	Ideal for fairly simple sites, such as everyday blogging and news sites; and anyone looking for an easy-to-manage site. Add-ons make it easy to expand the functionality of the site.

Figure 2 - Drupal, Joomla, and Wordpress Comparison Table

(Source: http://www.rackspace.com/knowledge_center/article/cms-comparison-drupal-joomla-and-wordpress)

After selecting the CMS to be used and establishing goals and requirements for the site, several mock-up designs were created to give the client a visual source to provide feedback on. These mock-up designs were images created in Photoshop designed to give a visual reference without having to actually code or design within the Wordpress software. These designs used a

variety of color scheme combinations and layouts in order to provide a source of feedback for the client to decide what she liked or didn't like. The important thing to remember is that most of the time, a client won't be able to tell the developer what he or she wants without a starting point, which is what the mock-ups provide. At first, the client only thought of using purple for the color scheme of the website. After several variations of color schemes involving purple, the client decided she wanted to see a mock-up with a red, white, and blue color scheme (presumably since the site would feature mostly past Miss America pageant queens).

Another important step while providing design prototypes was to set up a web system that the CMS could be installed on. This meant getting the client to purchase a domain name and hosting service (usually upon the designer's suggestion), and even assisting with adjusting the settings to point the domain name registry to the hosting service that was purchased. Once the hosting space has been set up, the installation of the CMS can begin. Fortunately with wordpress and many of the other common Content Management Systems, the cPanel of the hosting service often provides an automatic installation of the CMS on the server after inputting a few key pieces of information. Even if this cPanel is not there, most CMS sites provide a step-by-step instruction guide on how to install the CMS.

Implementation of the Website

One unique challenge for a web developer using a CMS is that the backend of it requires more specialized coding knowledge. For instance, the CMS may use PHP and HTML in conjunction with a shortcode exclusive to the CMS. This means that in order to be able to develop a website properly, the developer must first learn how to use the tools he or she is using first. Some CMSs have steep learning curves, while some like wordpress can be controlled almost entirely through a relatively intuitive graphical user interface (GUI). The main functionality of wordpress is extended through "plugins", a collection of (often free) third-party programs designed to work with wordpress that can be installed from within one's installation of wordpress itself. In order to obtain the functionality desired within wordpress, a developer can combine the effects of various plugins and even edit the PHP code of the templates directly through Wordpress' code editor.

From a design aspect, putting together the look and feel of the website starts with a theme. A theme in wordpress is a collection of PHP templates and Cascading Style Sheet (CSS) files that a developer can use as a template for creating a website. Themes are useful for developers to save time from writing code from scratch and using a starting point that is relatively close to the mockup designs they have created. Often, themes will have basic options in the GUI for the developer to change basic colors and layout. While this is helpful for not having to go through the code and change the code in the editor, these theme options are often limited and are intended for a start-up blogger with little code experience.

In figure 3 below, you can see the mockup design that the client selected along with the basic theme that was selected for After The Crown. This theme was selected for its use of 2 navigation bars (one above and below the header image), it's use of featured post slider, and it's amount of available customization options from within the GUI settings.

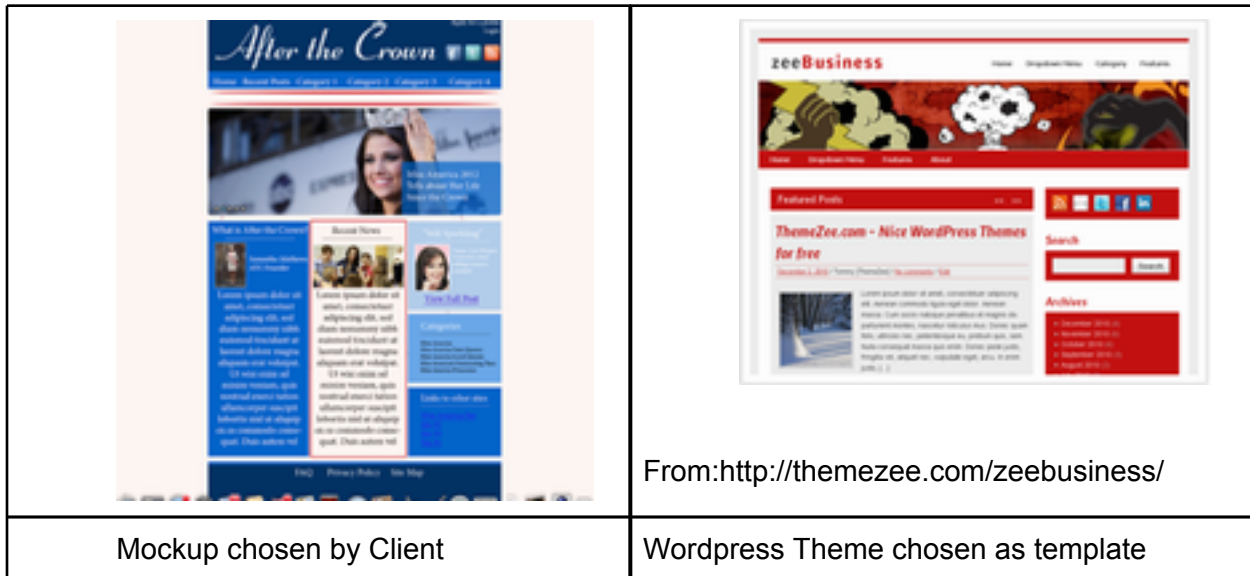


Figure 3 - Mockup & Theme comparison

After the selection of the theme, the developer then decided on implementing the functionality of the website first before implementing the design. This decision was based on that the functionality could impact the design of the site (needed functionality, links, buttons, etc. could change planned design), but after the back-end functionality was in place, the design could be used to tweak the site to be as close the original design as possible, while keeping the needed functionality in place. According to the requirements the developer designed when first planning the site, the site needed to allow users to sign up for a profile, allow the admin to approve profiles in a timely manner, and to allow users to create and edit their own posts. Also, there needed to be a logical organization to the navigation of the site, with a potential for scaling to a large amount of posters. An additional requirement was added during implementation that the approved posters not see the back-end administrative portion of the site at all. This was added by the developer to avoid confusion with end users and to keep a consistent feel throughout the whole site.

To begin implementation of the functionality of the site, two plugins were downloaded, “User Role Editor” and “Adminize”. The combination of these two plugins provided complete control of the administrator over what permissions end users were and were not entitled to. For instance, the approved users were allowed to create and edit posts, but not delete them. This was done so that any front page links to those posts would not be broken once deleted. Also, the settings were changed so the user only can see the controls she needs to use to edit or publish posts.

Then, to simulate the functionality of the pages of the site, the developer created the pages that the content would go on, and filled the pages with “dummy text”, also known as “lorem ipsum”. This is a selection of latin text used throughout publishing since the printing press to allow text to simulate the space it would fill up without having to place actual content. To try to organize the site, various categories for posts were created: “Miss Americas”, “Miss America State Queens”, “Miss America Local Queens”, and “Miss America’s Outstanding Teen”. Under these would be further subcategories as needed to organize posts. However,

Wordpress does not allow users' posts to be assigned a category by default. After researching through various websites and searching for a plugin, the developer discovered that there was no current way that a category could be assigned to a specific user. So, the developer decided on a different way of organizing the posts. Wordpress themes usually have an "author.php" file that allow all of a user's posts to be displayed on a page with the user's picture, name, and info at the top of the page. This is usually linked to a hyperlink on an author's name on an individual post, so that an end user could click on the name to view more of that author's posts. So, by creating pages for the four categories of posts, the admin could manually enter in a poster's name on the category page they fit in, hyperlink it to their author page, and organize the users on the page in whatever way seems best.

Besides implementing the organization of the posts, the major challenge would be the registration and verification of users to post on the site. After researching through several plugins and ways to provide passwords, the developer starting using a plugin named "pie register", which provided exactly the functionality the developer needed. It provided a way for users to set their own passwords (along with a password strength meter), admin verification for user registrations, automatic emails to both admin and end user, CAPTCHA (a plugin that prevents spam or bots from registering), and custom registration fields (such as pageant type, year competed in, etc.). The developer tested the registration page by making a dummy user, and received verification emails for both the admin and the applicant. Then, the developer figured out the process the admin would use to approve pending users.

At this point, the registration page was still a default wordpress registration page, which broke the consistent look and feel of the website, and clearly shows to all users that the site is running on wordpress, which doesn't keep the branding of the After the Crown site. To fix this, the developer downloaded a plugin named "theme my login", which creates a page as part of the site instead of a separate wordpress page.

When trying to login with one of the dummy user accounts, the developer needed to change one of the passwords with the admin account. When attempting to do so, several error codes were thrown by the system. To fix this problem, the developer systematically isolated the problem. First, the developer deactivated all plugins and tried updated the user password again. Once no error codes were thrown, the developer went through all of the plugins one-by-one until the one causing the error was found. After doing so, the "pie register" plugin was found to be causing the error. The developer attempted to correct the problem by tweaking the settings in the plugin, but the plugin kept causing the errors. Research on the plugin was then done by the developer, and similar issues were found by other users with the plugin. At this point, the developer decided to try to achieve similar functionality using a combination of other plugins and deactivated "pie register". The developer found that a similar functionality of user verification by the admin could be found in the "theme my login" plugin that was always being implemented, but the functionality to use the extra fields such as "Pageant type" and "Year competed in" would need an additional plugin. "Cimy User Extra Fields" was a plugin that was tested and then implemented into the system to add the extra fields into the registration and user profiles. The settings to the plugin were tweaked so that the extra fields were required for registration, could be seen in the profile, but only editable by the admin account.

Another functional addition the developer made was to have the top menu change based on whether a user was logged in or not. If not logged in, the menu would display the

options “Log In” and “Register”. Once a user was logged in, the menu would display options for “Dashboard” and “Log out”. Under the dashboard option, there would be options for creating a new post and editing the user’s own profile. These dashboard options would stay on the front end of the website, similar to how the “theme my login” kept the register/login screen as part of the same site. These functions were accomplished through the use of the plug-in “wp user front-end” and the use of custom PHP in header file of the theme. To learn how to implement the custom PHP code, some websites with tutorial to do were visited along with the support forum of the theme being used. On the support forum, the developer received advice on how to implement the PHP code in the header and how to download and install a “child theme”.

A “child theme” is used to make changes to a theme without making changes to the theme files themselves. This is done because when a theme is updated, it will rewrite all current theme files, and those changes will be lost. With a child theme, the files that are present, such as “header.php”, will override the file with the same name in the parent theme. Once the child theme was installed, the developer used the advice of the support forum to implement the code that would allow different menus to appear based on whether a user was logged in or not.

After the core functionality was established, the developer started tweaking the design of the site by using the theme option settings provided by the theme developer and adding custom CSS code. The developer used what the client had chosen for the mock-up along with a few requested changes to make a first pass at the design. Once adjusting the spacing with custom CSS, the developer decided that the header image (the After the crown logo) needed to pop more on the website. Instead of buying an image online or worrying about copyright infringement, the developer used a photo that he took himself to use in the logo. See Figure 4 for the adjusted logo.



Figure 4 - Logo alteration comparison

After adding in a star pattern in the background, as requested by the client, the site was ready for testing, adding of content, and tweaking as a result of a the testing. In Figure 5, you can see the difference between the original theme and the site at this point.

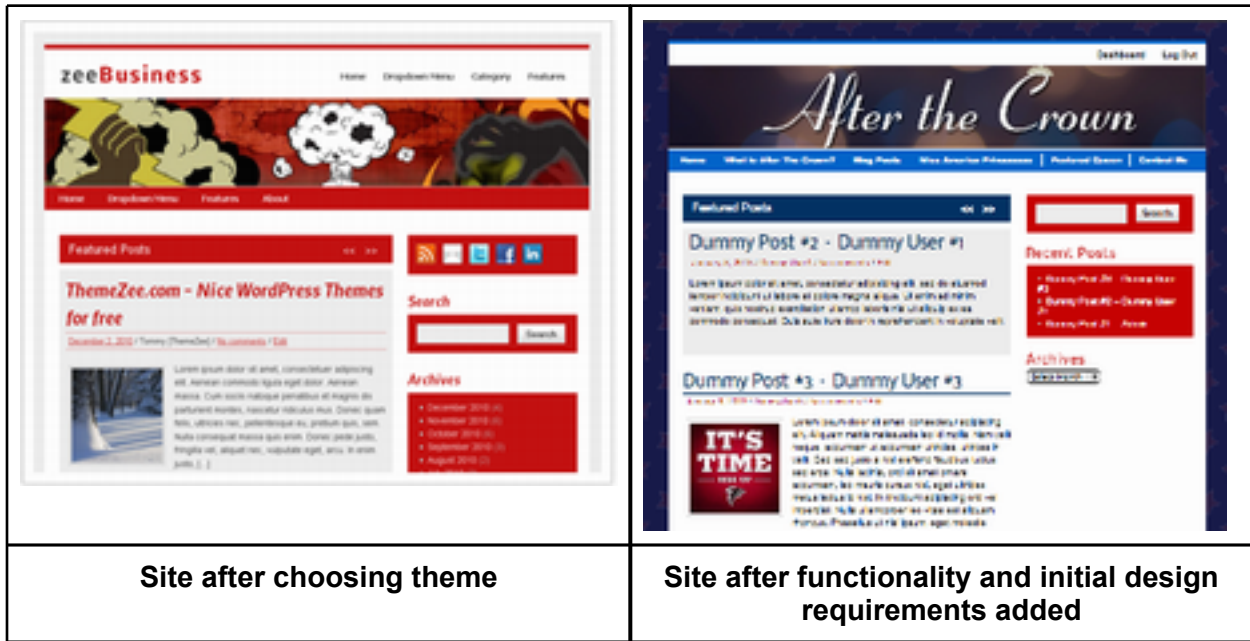


Figure 5 - Logo alteration comparison

Future Challenges

As the site adds more users and traffic, the site will have to be optimized to prevent the speed of the site from slowing down too much. The process of preparing the site for a transition from web developer maintenance to client maintenance needs to be as smooth as possible, which can only happen through the use of a well-documented set of instructions for the client to use (or to pass on to someone else) upon project completion.

Lessons learned while constructing a site

1. Communication with client is key

Clear communication with the client about they want is always a good thing. As this is their site, they will want it to be the best that it can be, and should help with providing whatever assistance they can in bringing their site to fruition.

2. Learn the tools you are working with

No matter how a site is constructed, the developer has to have a good knowledge of the tools being used in order to be successful in creating the site. Before a developer gets in over his or her head with trying to do too much, the developer should obtain a good knowledge of the tools being used, whether that is hardcoding in a text editor, using a WYSIWYG editor, or a CMS, the knowledge of how to use it of utmost importance.

3. Be resourceful with the resources out there

Constructing a site doesn't have to cost hundreds of dollars to buy templates, plugins, features, etc. Most functionality can be put together with free, open-source solutions. Much of the support can be found online on free blogs and user forums.

4. Feedback is always good, especially early

By making mockups of what a site could look like, a client can give feedback based off of the designs that are given. Without the early feedback, a design the client doesn't like could cost extra time and effort to correct design errors after the initial build rather than having a design the client likes from the beginning.

5. Be adaptable

As can be seen in this case study, the developer had to adapt when certain plans of how to organize the site or use certain functionalities would not work with the tools being used. When obstacles are faced in the design of the site, the goals should remain the same, but the path to get to those goals can be changed.

AN IMPROVED ALGORITHM FOR THE FIXED CHARGE PROBLEM

Veena Adlakha, University of Baltimore, 1420 N. Charles St., Baltimore, MD 21201,
410-837-4969, vadlakha@ubalt.edu

Krzysztof Kowalski, State of Connecticut, 121 Cimmarron Road, Middletown, CT 06457,
860-638-3972, kgwkowalski@yahoo.com

Simi Wang, University of North Carolina, Chapel Hill, NC 27599-3180, USA
919-260-1089, wangsimi88@gmail.com

ABSTRACT

We present an improved method for determining lower and upper bounds for the global solution to a fixed charge transportation problem (FCTP). The method uses square root approximations to determine lower and upper bounds for the optimal solution. The suggested procedures can be incorporated in any branch-and-bound or approximation method to enhance the convergence on the optimal solution.

Key Words: transportation problem, fixed charge, square root approximation

INTRODUCTION

In this paper we develop lower and upper bounds by adopting square root approximations of FCTP's objective function. Numerical experiments show that these approximations provide very powerful upper and lower bounds. Square root functions have been widely used in modeling and approximating other functions. The main advantage of using square root approximation is that the square root function has been widely researched and many software solvers such as KNITRO 7.0, MINOS and LGO can be used to solve such problems.

The square root approximation presented in this paper is new and superior to the linear approximation [2]. The method developed here provides a stronger initial solution and can help accurately approximate the value of the global optimal solution to FCTP without computing the exact solution. When embedded in branching method it converges on the optimal solution through finding a direction for improvement, excluding some branches and tightening more effective lower and upper bounds as the branching progresses. When embedded in tabu search method [3], a better initial lower bound will be obtained as the initial feasible solution, as compared to the linear relaxation originally used in the paper.

FIXED CHARGE TRANSPORTATION PROBLEM

Assume that there are S ($i = 1, 2, \dots, S$) suppliers and D ($j = 1, 2, \dots, D$) customers in a transportation problem. Supplier i has s_i units of supply, and customer j has a demand for d_j units. Let x_{ij} be the number of units shipped by supplier i to customer j at per unit shipping cost c_{ij} plus a fixed cost f_{ij} , assumed for opening this route. The fixed charge transportation problem (FCTP) is formulated as follows:

$$\mathbf{F:} \text{ Minimize } Z = \sum_{i=1}^S \sum_{j=1}^D (c_{ij} x_{ij} + f_{ij} y_{ij}) \quad (1)$$

$$\text{Subject to } \sum_{j=1}^D x_{ij} = s_i \quad \text{for } i = 1, 2, \dots, S, \quad (2)$$

$$\sum_{i=1}^S x_{ij} = d_j \quad \text{for } j = 1, 2, \dots, D, \quad (3)$$

$$\text{and } \sum_{i=1}^S s_i = \sum_{j=1}^D d_j$$

$$s_i, d_j, c_{ij}, f_{ij} \geq 0; \quad x_{ij} \geq 0 \quad \text{for all } (i, j); \quad y_{ij} = 0 \text{ if } x_{ij} = 0; \quad y_{ij} = 1 \text{ if } x_{ij} > 0$$

Linear Relaxation of FCTP

Balinski [2] provided a linear approximation of FCTP by relaxing the integer restriction on y_{ij} , with the property that $y_{ij} = x_{ij}/m_{ij}$ and $m_{ij} = \min(s_i, d_j)$. So, the relaxed transportation problem of an FCTP reduces to a classical TP with cost $C_{ij} = c_{ij} + f_{ij}/m_{ij}$. We refer to this problem as **B**. The optimal solution $X_B = \{x_{ij}^B\}$ to problem **B** can be modified into a feasible solution of $X_F = \{x_{ij}^B, y_{ij}^B\}$ of **B** by setting $y_{ij}^B = 1$ if $x_{ij}^B > 0$ and 0 otherwise. Let Z_F and Z_B represent objective function value for Problem F and Problem B, respectively. Balinski shows that the optimal value, $Z_B(X_B)$, provides a lower bound on the optimal value $Z_F(X_F)$ of FCTP.

A SQUARE ROOT APPROXIMATION FOR LOWER BOUND

In this section we develop a Square Root Approximation, P_L , for FCTP costs as proposed in Figure 1. The idea here is to estimate FCTP costs more closely than the linear approximation provided by Balinski, in order to improve the solution estimate for the FCTP.

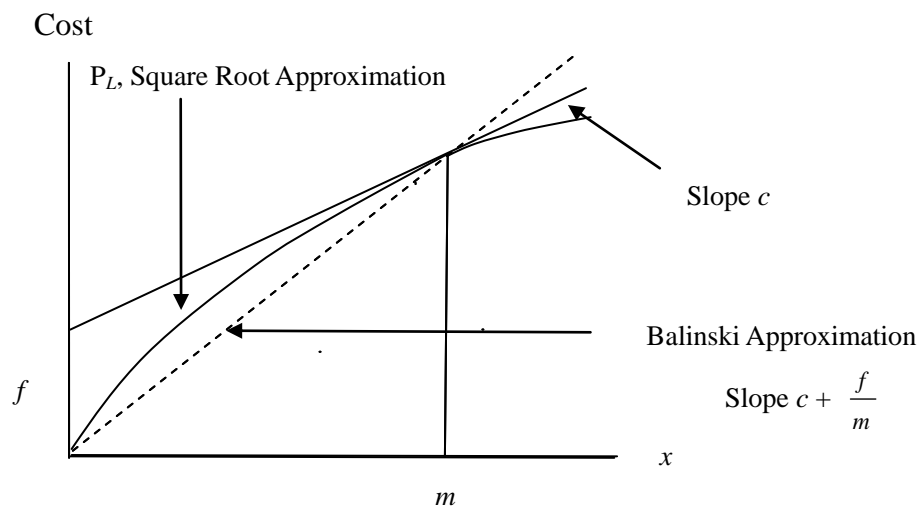


Figure 1: Square Root Approximation for Fixed-Charge Function

Define

$$P_L(x) = a\sqrt{x} + bx + k, \quad (4)$$

where

$$P_L(0) = 0, \quad (5)$$

$$P_L(m) = f + c*m, \quad (6)$$

$$P'_L(m) = c. \quad (7)$$

Equations (5) and (6) ensure that the proposed quadratic curve, $P_L(x)$ starts at the origin and equals the FC function at m . Equation (7), where P'_L denotes the derivative of P_L , ensures that $P_L(x)$ is tangential to the FC function at $x = m$. We use these equations to determine coefficients in $P_L(x)$.

Clearly $P_L(0) = 0 \Rightarrow k = 0$. Equations (6) and (7) yield

$$a\sqrt{m} + bm = f + c*m$$

and
$$\frac{a}{2\sqrt{m}} + b = c$$

Solving these two above equations, we get

$$a = \frac{2f}{\sqrt{m}}$$

and
$$b = c - \frac{f}{m}$$

Therefore
$$P_L(x) = \frac{2f}{\sqrt{m}}\sqrt{x} + \left(c - \frac{f}{m}\right)x. \quad \blacksquare$$

Now we consider the Square Root Approximation problem and P_L is defined as below,

P_L: Minimize
$$Z = \sum_{i=1}^S \sum_{j=1}^D \frac{2f_{ij}}{\sqrt{m_{ij}}}\sqrt{x_{ij}} + \left(c - \frac{f_{ij}}{m_{ij}}\right)x_{ij}. \quad (8)$$

Subject to
$$\sum_{j=1}^D x_{ij} = s_i \quad \text{for } i = 1, 2, \dots, S,$$

$$\sum_{i=1}^S x_{ij} = d_j \quad \text{for } j = 1, 2, \dots, D,$$

$$x_{ij} \geq 0 \quad \text{for all } (i, j),$$

The optimal solution $\{x'_{ij}\}$ to problem P_L can be easily modified into a feasible solution of $\{x'_{ij}, y'_{ij}\}$ of P as follows:

and
$$y'_{ij} = 0 \quad \text{if } x'_{ij} = 0,$$

$$y'_{ij} = 1 \quad \text{if } x'_{ij} > 0.$$

It immediately follows that

$$Z_B(X_B) \leq Z_{SL}(X_{SL}) \leq Z_F(X_F) \leq \sum \sum (c_{ij} x'_{ij} + f_{ij} y'_{ij}), \quad (9)$$

where X_{SL} and Z_{SL} denotes the optimal solution and the objective function value for problem P_L . Thus we have found a superior lower bound to $Z_F(X_F)$. Since the objective function of an FCTP is discrete, the lower bound $Z_{SL}(X_{SL})$ can be rounded up to the nearest interval.

SQUARE ROOT APPROXIMATION TO UPPER BOUND

Now we develop a Square Root Approximation for an upper bound, P_U , for the same FC function as proposed in Figure 2. Let Δ denote the least common denominator of all supply and demands, i.e., minimum interval.

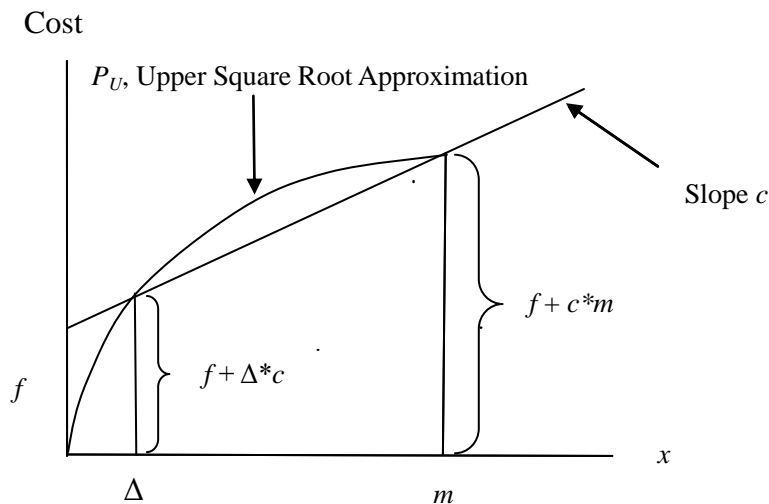


Figure 2: Upper Bound Square Root Approximation for Fixed-Charge Function

Define $P_U(x) = g\sqrt{x} + hx + q,$ (10)

where $P_U(0) = 0,$ (11)

$$P_U(\Delta) = f + c*\Delta, \quad (12)$$

$$P_U(m) = f + c*m. \quad (13)$$

We use these equations to get values of g, h, and q coefficients.

Clearly $P_U(0) = 0 \Rightarrow q = 0$. Equations (12) and (13) yield

$$g\sqrt{\Delta} + h\Delta = f + c*\Delta$$

and $g\sqrt{m} + hm = f + c*m$

Solving these two equations, we get

$$g = f \left\{ \frac{\sqrt{m} + \sqrt{\Delta}}{\sqrt{m} \sqrt{\Delta}} \right\} = f \left\{ \frac{1}{\sqrt{m}} + \frac{1}{\sqrt{\Delta}} \right\}$$

and
$$h = c - \frac{f}{\sqrt{m} \sqrt{\Delta}}$$

Therefore,
$$P_U(x) = f \left\{ \frac{1}{\sqrt{m}} + \frac{1}{\sqrt{\Delta}} \right\} \sqrt{x} - \frac{fx}{\sqrt{m} \sqrt{\Delta}} + cx \quad (14)$$

We claim that the FCTP problem \mathbf{P}_U , formulated with Square Root functions $P_U(x_{ij})$ provides an upper bound for problem \mathbf{F} . Let X_{SU} and Z_{SU} denote the optimal solution and the objective function value for problem \mathbf{P}_U . Finding tight lower and upper bounds has much value in optimization literature. The bounds obtained from problems \mathbf{P}_L and \mathbf{P}_U as developed here can be used in tandem with any established branch-and-bound or iterative algorithm to obtain superior initial or starting conditions.

RECOMMENDATIONS FOR FCTP SOLUTION

We suggest the following procedure for solving the FCTP using a square root approximation.

Step 1: Formulate the square root problems \mathbf{P}_L and \mathbf{P}_U for the FCTP matrix.

Step 2: Solve problems \mathbf{P}_L and \mathbf{P}_U to obtain Z_{SL} and Z_{SU} , respectively.

Step 3: Identify FCTP solutions X_{SL} and X_{SU} .

Step 4: Calculate $Z_{SL}(X_{SL})$ and $Z_{SU}(X_{SU})$ values.

Step 5: Let $Z(\mathbf{F}) = \min \{Z_{SL}(X_{SL}), Z_{SU}(X_{SU})\}$ and note down the corresponding solution as X_F .

Step 6: Calculate the percentage error using the lower bound as $\{Z(\mathbf{F}) - Z(\mathbf{P}_L)\} / Z(\mathbf{F})$.

Note that clearly $Z(\mathbf{P}_L) < Z^*(\mathbf{F}) \leq Z(\mathbf{F})$. The square root approximation provided the optimal solution for all of sample problems we considered. Based on this experience, we can be assured that $Z(\mathbf{F})$ generally would yield an optimal or close to optimal solution. However, if the margin of error obtained in Step 6 is not acceptable, then one needs to pursue further to verify the optimality of $Z(\mathbf{F})$, or to search for the optimal solution. One could use solution X_F as the initial distributions and combine with any branching algorithm (e.g., Adlakha [1]) or tabu search algorithm [3]. Both of these procedures start with linear approximation as the initial solution. Proceeding further, one can use those solutions as initial solution in any other method that requires an initial feasible solution.

CONCLUSION

This paper introduces a approximation to solve FCTP. We demonstrated that this approximation provides better solution than the Balinski approximation, thus delivers a better initial solution. The experimental results with three classical problems revealed that our algorithm is much superior to the Balinski method. One could use the Square Root heuristic solution with any established algorithm that requires an initial feasible solution.

REFERENCES

- [1] Adlakha, V., Kowalski, K. and Lev, B. (2010), A Branching Method for the Fixed Charge Transportation Problem. *OMEGA-Int J Manage S* **38**, 393–397.
- [2] Balinski, M.L. (1961), Fixed Cost Transportation Problems. *Naval Research Logistics Quarterly* **8**, 41-54.
- [3] Sun, M., Aronson, J.E., McKeown, P.G. and Drinka, D. (1998). A Tabu Search Heuristic Procedure for the Fixed Charge Transportation Problem. *Eur J Oper Res* **106**, 441-456.

TRENDS IN SERVICE QUEUING RESEARCH

Rhonda L. Hensley, School of Business and Economics, North Carolina A&T State University,
Greensboro, NC 27411, (336)285-3360, hensleyr@ncat.edu

Joanne S. Utley, School of Business and Economics, North Carolina A&T State University,
Greensboro, NC 27411, (336)285-3390, sulekj@ncat.edu

ABSTRACT

This paper reviews field-based research on service queuing published after 2004. The paper identifies five studies that focused on service queues and describes the queuing context of the field studies. Several trends in service queuing research were identified. These included the use of abstract, complex variables related to waiting time, the inclusion of contextual variables in the field research and the trend away from publication in broad-coverage operations and marketing journals toward more specialized service journals.

INTRODUCTION

When a service customer feels trapped in a waiting line, time slows as irritation with the delay grows. Past research in the services management literature has clearly established that long service waits are detrimental to customer satisfaction [5, 6, 17, 26, 14, 21, 1]. Despite the ever increasing role of technology in service delivery, the problem of waiting in queues has not gone away. In fact, a service customer has more opportunities than ever to become mired in a service queue. Consequently, state of the art research on the management of service queues merits increased attention and critical review.

Existing literature reviews of service queue management have become somewhat dated and therefore no longer reflect the current state of research. For instance, Durrande-Moreau's [9] comprehensive review of theoretical and conceptual papers was published over 10 years ago. Durrande-Moreau's [9] paper does not review any studies of virtual waits. Neither does Hensley and Sulek's [12] review of field-based queuing studies. In contrast, Ryan and Valverde [24] limited their review of service queues to empirical studies of on-line waiting. Ryan and Valverde [24] concluded that the existing research was characterized by "overwhelming use of experiments" involving students, "conflicting outcomes" and a "lack of practical implications" [24, p. 202].

This paper will address the need for a critical review of recent field-based studies of both physical and virtual service queues. The authors will review the field-based research that has been published in refereed journals since 2004, the date of the last similar review. By focusing solely on field-based studies, this paper will report on and analyze the state of queue management in actual service contexts.

This paper is organized as follows. The following section provides an overview of the recent research on service waits and identifies the field studies to be included in the review. Section three describes the queuing contexts of these field studies. Section four reports the findings of

the review. The final section discusses trends in the field-based research and offers suggestions for future research.

RESEARCH OVERVIEW

The authors conducted an on-line library search to identify peer-reviewed studies of service queue management that were published since 2004. An initial set of 22 research studies was identified. Eight of the 22 papers were removed from further consideration because they were not field-based studies [25, 15, 30, 19, 16, 20, 28, 11]. Two additional studies proved to be conceptual papers with no data collection and were also excluded [4, 32]. Finally, six papers were eliminated because the focus of those papers was not really waiting. For instance, Dean [7] examined perceptions of organizational understanding and commitment to customers in relation to predictions of service. Rose, Meuter and Curran [23] examined attitudes towards online retailers by looking at estimated delay and the assessment of retailer control. Hui, Tse and Zhou [15] published a study that examined delays in service. Weijters, Rangarajan, Falk and Schillewaert [29] studied the use of hand-held scanners in grocery stores. The focus of that study was on the perceived usefulness of the technology related to customer attitudes toward technology. Colwell, Aung, Kanetkar and Holden [3] conducted a study in which they examined the use of self-service technologies as they affected service convenience. Rajamma, Paswan and Hossain [22] had students and others complete an online survey of perceived transaction convenience related to online shopping cart abandonment.

The five papers remaining from the original set of 22 papers will be the subject of this review [1, 13, 18, 31, 27] (see Table 1). The next section of this paper summarizes the queuing context for each of these five studies.

THE FIELD-BASED STUDIES

Table 1 illustrates that the queuing contexts for the five field-based studies involved a variety of research settings. These settings included a radiological outpatient center [1], a full service restaurant [13], a drivers' license and registration center [18], a supermarket [27] and a call center for a national corporation [31].

Froehle's [10] categorization of customer contact was used to classify each queuing context as either a face-to-face setting or as a technology-mediated environment. Four of the five studies used face-to-face contact. Only Whiting and Donthu's [31] study was conducted in a technology mediated environment.

The wait stage framework devised by Dube-Rioux, Schmitt and Leclerc [8] was used to identify the types of waits (pre-process, in process and post-process) occurring in each queuing context. Three of the studies focused on only one wait, either pre-process or post-process [1, 18, 27]. The other two studies spanned the waits. Whiting and Donthu [31] examined both pre-process and in-process waits in a virtual environment while Hensley and Sulek [13] looked at the effects of waits at all three wait stages.

TABLE 1
EMPIRICAL STUDIES

Author/Year	Journal	Service Setting	Point of Service Process Studied	Type of Interaction
Bielen and Demoulin/2007 [1]	<i>Managing Service Quality</i>	Radiological Outpatient Department	Pre-process	Face-to-face
Hensley and Sulek/2007 [13]	<i>Managing Service Quality</i>	Restaurant	Pre-process In-process Post-process	Face-to-face
McDonnell/2007 [18]	<i>/International Journal of Bank Marketing</i>	Drivers' license and registration center	Pre-process	Face-to-face
Van Riel, Semeijn, Ribbink and Bomert-Peters/2012 [27]	<i>Journal of Service Management</i>	Supermarket	Post-process	Face-to-face
Whiting and Donthu/2009 [31]	<i>Journal of Services Marketing</i>	National Corporation	Pre-process In-process	Virtual

Four of the five studies were published in journals with services as a focus, *Managing Service Quality*, *Journal of Service Management* and *Journal of Services Marketing*. The final paper was published in the *International Journal of Bank Marketing*.

RESEARCH FINDINGS

Study Information

Study samples sized ranged from a low of 150 to a high of 946 (see Table 2). All were adequate to allow for a variety of statistical analyses. These analyses included correlation analysis, analysis of variance, factor analysis, multiple analysis of variance, regression analysis and forms of structural equation modeling. The papers were all structured so that the significant findings ranged from a low of two to a high of seven.

Three papers examined the effects of wait time satisfaction on overall satisfaction with the service [1, 13, 27]. Bielen and Demoulin [1] limited their research to the initial wait while Van Riel, Semeijn, Ribbink and Bomert-Peters [27] examined the post-process waits. Hensley and Sulek [13] examined wait time satisfaction at all three stages. All three studies examined variables related to the initial waiting environment. Bielen and Demoulin [1] and Van Riel, Semeijn, Ribbink and Bomert-Peters [27] used a single variable – waiting time satisfaction and wait area attractiveness, respectively, while Hensley and Sulek [13] used two variables, host staff politeness and wait area comfort.

Two of the studies seemed to look less at perceived waits and focus more on wait related variables such as the need for time structure [18] and estimation error – defined as the actual wait time minus perceived wait time [31].

Two of the studies included some measure of negative affect and measured the relationship between negative affect and the wait [18, 27]. In both these studies negative emotional affect is then shown to affect overall satisfaction with the service.

Dependent Variables Studied

Eight dependent variables were identified (see Table 3). Two of these variables (service satisfaction and wait time satisfaction) can be considered customer satisfaction measures. One variable corresponded to word of mouth testimonials (willingness to recommend the service to friends). Two of the dependent variables dealt with return visits (likelihood of bringing friends to the service business and repatronage). Only one variable involved the emotional state of the customer (negative affect). Two dependent variables dealt with wait time (perceived wait duration and estimation error of the wait).

As Table 3 shows, these variables were classified by the stage of the process in which they were measured. Satisfaction with service was studied most often and in both pre-process and post-process stages. To a lesser extent, willingness to recommend the service to friends and negative affect were also studied in both the pre-process stage and the post-process stage. Wait time satisfaction was investigated only in the pre-process stage while likelihood of bringing friends, repatronage and wait time duration were examined only in the post-process stage.

TABLE 2
STUDY INFORMATION

Author/Year	Sample Size	Statistical Analysis	Variables	Findings
Bielen and Demoulin/2007 [1]	946	Factor analysis Regression Analysis	<ul style="list-style-type: none"> ○ Satisfaction with service (d) ○ Satisfaction with waiting time (d) ○ Willing to recommend (d) ○ Perceived waiting time ○ Satisfaction with information provided for delay ○ Satisfaction with waiting environment 	<ul style="list-style-type: none"> ○ Perceived waiting time affects waiting time satisfaction ○ Satisfaction with information provided for delay affects waiting time satisfaction ○ Satisfaction with waiting environment affects waiting time satisfaction ○ Waiting time satisfaction affects satisfaction with service ○ Perceived waiting time influences satisfaction with the service and waiting time satisfaction ○ Waiting time satisfaction is a moderating variable in the relationship between satisfaction with the service and willingness to recommend (loyalty)
Hensley and Sulek/2007 [13]	132	Correlation Analysis Regression Analysis	<ul style="list-style-type: none"> ○ Overall satisfaction (d) ○ Likelihood of recommending (d) ○ Likelihood of bring friends (d) ○ Repatronage (d) ○ Wait time for seating ○ Wait time for food ○ Wait time for check ○ Host staff politeness ○ Food quality ○ Server attentiveness ○ Wait area comfort 	<ul style="list-style-type: none"> ○ Wait time for seating, wait time for food, wait area comfort, host staff politeness and food quality affect overall satisfaction ○ Wait time for seating, wait area comfort, host staff politeness and food quality affect likelihood of recommending the restaurant ○ Wait time for seating, wait area comfort and food quality affect likelihood of bringing friends ○ Wait area comfort, food quality and server attentiveness affect repatronage

**TABLE 2, CONTINUED
STUDY INFORMATION**

Author/Year	Sample Size	Statistical Analysis	Variables	Findings
McDonnell/2007 [18]	607	Multivariate Analysis of Variance Structural Equation Modeling	<ul style="list-style-type: none"> ○ Negative affect (d) ○ Service evaluation (d) ○ Time structure (need for time management) ○ Discomfort ○ Scent ○ Music 	<ul style="list-style-type: none"> ○ Need for time management is related to negative affect ○ Negative affect related to service evaluation ○ Need for time management is related to service evaluation and level of discomfort is a moderator variable ○ Scent improves service evaluation ○ Music improves service evaluation
Van Riel, Semeijn, Ribbink and Bomert-Peters/2012 [27]	150	Principal component factor analysis EFA Confirmatory factor analysis Analysis of Variance Partial Least Squares Path Modeling	<ul style="list-style-type: none"> ○ Negative emotional response (d) ○ Satisfaction (d) ○ Perceived wait duration (d) ○ Attribution to the store (store control over wait) ○ Distraction ○ Perceived social injustice ○ Perceived value of purchase ○ Waiting area attractiveness 	<ul style="list-style-type: none"> ○ Negative emotional response influences satisfaction ○ Perceived wait duration influences negative emotional response ○ Attribution to the store influences negative emotional response ○ Distraction influences negative emotional response ○ Perceived social injustice influences perceived wait duration ○ Perceived value of purchase negatively influences perceived wait duration ○ Waiting area attractiveness influences perceived wait duration
Whiting and Donthu/2009 [31]	211	Correlation Analysis Analysis of Variance	<ul style="list-style-type: none"> ○ Estimation error (Actual wait time – perceived wait time) (d) ○ Gender ○ Presence of music 	<ul style="list-style-type: none"> ○ Music influences estimation error ○ Gender influences estimation error (females have higher scores)

TABLE 3
DEPENDANT VARIABLES CLASSIFIED BY WAIT STAGE

Dependent Variable	Wait Studied		
	Pre-Process	In-Process	Post-Process
Service Satisfaction	2		2
Wait Time Satisfaction	1		
Willingness to Recommend	1		1
Likelihood to Bring Friends			1
Repatronage			1
Negative Affect	1		1
Perceived Wait Duration			1
Estimation Error of Wait	1	1	

Independent Variables Studied

Twenty-seven independent variables identified. These were sorted using Chase and Bowen's [2] framework for service delivery. According to this framework, three major components – people, technology and systems - comprise the service delivery system and thus play an integral role in managing all aspects of service – including the service waits (See Table 4). Most of the independent variables were focused on systems (10/27 = 37%); however, the other two categories contained almost as many variables (eight variables focused on people and nine studies focused on technology).

The 27 independent variables seemed to be predominantly perceptual measures in which the respondents had provided some measure using a Likert scale. Several of the variables were related to the presence of some attribute such as gender, scent or music.

Point of Process

The independent variables were further classified according to the wait stage studied: pre-process, in-process or post-process (see Table 4). It is interesting to note that most of the variables studied involved pre-process waits (14/27 = 51.85%). In contrast, the number of independent variables corresponding to post-process waits was the smallest of the three stages (8/27 = 29.6%).

Major Results

Each of the five studies reported significant findings involving customer satisfaction. Bielen and Demoulin [1] found that customer satisfaction was influenced by waiting time satisfaction. Bielen and Demoulin [1] further found that waiting time satisfaction was affected by perceived waiting time, satisfaction with explanations for delays and the waiting environment. Hensley and Sulek [13] also found that wait time satisfaction influenced customer satisfaction with service delivery as did wait area comfort, employee politeness and the quality of the core service product. In addition they reported that satisfaction with wait time affected the likelihood of bringing friends to the service and the likelihood of recommending the service to others. McDonnell [18] found that music and scent can reduce rage and increase satisfaction for

TABLE 4
INDEPENDENT VARIABLES CLASSIFIED BY CHASE AND BOWEN [2] MODEL

Classification	Wait Stage	Independent Variables Studied
People	Pre-process	Satisfaction with service Host staff politeness Negative affect Time structure (need for time management) Gender
	In-process	Server attentiveness Gender
	Post-process	Negative emotional response
Systems	Pre-process	Satisfaction with waiting time Perceived wait time Satisfaction with information provided for delay Wait time for seating
	In-process	Wait time for food Food quality
	Post-process	Wait time for check Perceived wait duration Perceived social injustice Perceived value of purchase
Technology	Pre-process	Satisfaction with waiting environment Wait area comfort Discomfort Scent Music
	In-process	Music
	Post-process	Attribution to the store (store control over wait) Distraction Waiting area attractiveness

customers waiting in a queue. Van Riel, Semeijn, Ribbink and Bomert-Peters[27] demonstrated that a negative response to waiting can decrease overall customer satisfaction and further found that store image affects negative response. Finally, Whiting and Donthu [31] reported that customers with high estimation errors on time they spent waiting tended to experience lower satisfaction; moreover, information on the waiting time helped to reduce customer estimation error.

DISCUSSION

This paper reviewed the field based studies of service queue management that have appeared in the service management literature since 2004, the year of the last similar study. The analysis showed that some avenues of research in service queue management continue to be explored. In addition, some new trends appear to be developing.

Like many of the service queuing studies done before 2004, the recent field-based studies focused on the importance of waiting in determining overall customer satisfaction with a service. Given the increasing time pressure most customers face, this result is not surprising. One anticipates that researchers will continue to study the relationship between waiting time and customer satisfaction. Similarly, the review of the post-2004 papers suggests that customer satisfaction with waiting will continue to be studied as one of the determinants of overall customer satisfaction.

However, in contrast with a number of the pre-2004 studies, the most recent papers seem to be moving away from an emphasis on actual or perceived waiting times to more abstract, complex measurements such as perceived wait duration or the perceived need for time management. This trend may signal that the measurement of actual wait times or perceived wait times provides less of the needed insight for effective service queue management than more complex measures.

Another apparent trend suggested by the post-2004 studies is that good service queue management depends not just on time measurement but also on a set of contextual variables. For instance, variables dealing with customers' physical comfort and sensory experiences (e.g., seating comfort, music, scent) have been shown to have a significant effect on a customer's reaction to the queuing process.

A final trend deals with the types of journals that have been publishing the most recent studies of service queue management. It appears that empirical research on service waits has moved from broad-coverage operations and marketing journals to more specialized services journals. This transition is appropriate because encourages a much sharper focus on the service management implications of effective queue management.

Although only one of the studies reviewed in this paper dealt with technology-mediated queues, one would like to anticipate more research on virtual settings. A number of studies of technology-mediated queues were eliminated from this review paper because they were experimental in nature. (Eight of the initial 22 studies were removed primarily because they used simulation or experiments). This suggests that gathering data about virtual queues in field-based settings may prove difficult in practice.

The results of this review suggest that some new trends are developing in the management of service queues. Due to the limited number of studies reviewed here, additional field-based research will need to be undertaken to confirm if these apparent trends are continuing. As more of these studies are completed, it will be interesting to see if the number of physical queuing contexts that are examined still exceeds the number of virtual queues that are investigated.

REFERENCES

- [1] Bielen, F. & Demoulin, N., Waiting time influence on the satisfaction-loyalty relationship in services, *Managing Service Quality*, 2007,17(2), 174-193.
- [2] Chase, R.B. & Bowen, D.E.,Service quality and the service delivery system. in Brown, S.W., Gummersson, E., Edvardsson, B. & Gustavasson, B. (Eds.), *Service Quality: MultiDisciplinary and Multi-National Perspectives*, Lexington MA: Lexington Books, 1991, 157-178.
- [3] Colwell, S.R., Aung, M., Kanetkar, V. & Holden, A.L., Toward a measure of service convenience: multiple-item scale development and empirical test, *Journal of Services Marketing*, 2008, 22(2), 160-169.
- [4] Dabholkar, P. & Sheng, X., Perceived download waiting in using web sites: a conceptual framework with mediating and moderating effects, *Journal of Marketing Theory and Practice*, 2008, 16(3), 259-269.
- [5] Davis, M.M. & Maggard, M.J., An analysis of customer satisfaction with waiting times in a two-stage service process, *Journal of Operations Management*, 1990, 9(3), 324-334.
- [6] Davis, M.M. & Vollmann, T.E., A framework for relating waiting time and customer satisfaction in a service operation, *The Journal of Services Marketing*, 1990, 4(1), 61-69.
- [7] Dean, A.M., Rethinking customer expectations of service quality: are call centers different? *The Journal of Services Marketing*, 2004, 18(1), 60-77.
- [8] Dube-Rioux, L., Schmit, B.H. & Leclerc, F., Customers' reactions to waiting: when delays affect the perception of service quality, *Advances in Consumer Research*, 1989, 16, 59-63.
- [9] Durrande-Moreau, A., Waiting for service: Ten years of empirical research, *International Journal of Service Industry Management*, 1999, 10(2), 171-189.
- [10] Froehle, C.M., Service personnel, technology, and their interaction in influencing customer satisfaction, *Decision Sciences*, 2006, 37(1), 5-38.
- [11] Giebelhausen, M.D., Robinson, S.G. & Cronin, J.J., Worth waiting for: increasing satisfaction by making consumers wait, *Journal of the Academy of Marketing Science*, 2011, 39, 889-905.
- [12] Hensley, R.L. & Sulek, J.M., A survey of field-based queuing studies: current research and suggestions for future studies, *Proceedings of the National Southeast Region Decision Sciences*, Charleston, SC, 2004, pp. 189-191.
- [13] Hensley, R.L. & Sulek, J.M., Customer satisfaction with waits in multi-stage services, *Managing Service Quality*, 2007, 17(2), 152-173.
- [14] Hui, M.K. & Tse, D.K., What to tell consumers in waits of different lengths: an integrative model of service evaluation, *Journal of Marketing*, 1996, 60, 81-90.
- [15] Hui, M.K., Tse, A.C. & Zhou, L., Interaction between two types of information on reactions to delays, *Marketing Letters*, 2006, 17, 151-162.
- [16] Hwang, J. & Lambert, C.U., The interaction of major resources and their influence on waiting times in a multi-stage restaurant, *International Journal of Hospitality Management*, 2008, 27, 541-551.
- [17] Katz, K.L., Larson, B.M. & Larson, R.C., Prescription for the waiting-in-line blues: entertain, enlighten, and engage, *Sloan Management Review*, 1991, 33(2), 44-53.
- [18] McDonnell, J., Music, scent and time preferences for waiting lines, *International Journal of Bank Marketing*, 2007.25(4), 223-237.

- [19] Munichor, N. & Rafaeli, A., Number of apologies? Customer reactions to telephone waiting time fillers, *Journal of Applied Psychology*, 2007, 92(2), 511-518.
- [20] Peevers, G., McInnes, F., Morton, H., Matthews, A. and Jack, M.A., The mediating effects of brand music and waiting time updates on customers' satisfaction with a telephone service when put on-hold, *International Journal of Bank Marketing*, 2009, 27(3), 202-217.
- [21] Puyn, A. & Smidts, A., Effects of waiting on the satisfaction with the service beyond objective time measures, *International Journal of Research in Marketing*, 1998, 15, 321-334.
- [22] Rajamma, R.K., Paswan, A.K. & Hossain, M.M., Why do shoppers abandon shopping cart? Perceived waiting time, risk, and transaction inconvenience, *Journal of Product & Brand Management*, 2009, 18(3), 188-197.
- [23] Rose, G.M., Meuter, M.L. & Curran, J.M., On-line waiting: the role of download time and other important predictors on attitude toward e-retailers, *Psychology & Marketing*, 2005, 22(2), 127-151.
- [24] Ryan, G. & Valverde, M., Waiting online: a review and research agenda, *Internet Research*, 2003, 12(3), 195-205.
- [25] Ryan, G. & Valverde, M., Waiting for service on the internet: defining the phenomenon and identifying the situations, *Internet Research*, 2005, 15(2), 220-240.
- [26] Taylor, S., Waiting for service: the relationship between delays and evaluations of service, *Journal of Marketing*, 1994, 58, 56-69.
- [27] Van Riel, A.C.R., Semeijn, J., Ribbink, D. & Bomert-Peters, Y., Waiting for service at the checkout: negative emotional responses, store image and overall satisfaction, *Journal of Service Management*, 2012, 23(2), 144-169.
- [28] Voorhees, C.M., Baker, J., Bourdeau, B.L., Brocato, D. & Cronin, J.J., It depends: moderating the relationships among perceived waiting time, anger, and regret, *Journal of Service Research*, 2009, 2(2), 138-155.
- [29] Weijters, B., Rangarajan, D., Falk, T. & Schillewaert, N., Determinants and outcomes of customers' use of self-service technology in a retail setting, *Journal of Service Research*, 2007, 10(1), 3-21.
- [30] Whiting, A. & Donthu, N., Managing voice-to-voice encounters: reducing the agony of being put on hold, *Journal of Service Research*, 2006, 8(3), 234-244.
- [31] Whiting, A. & Donthu, N., Closing the gap between perceived and actual waiting times in a call center: results from a field study, *Journal of Services Marketing*, 2009, 23(5), 279-288.
- [32] Zourrig, H & Chebat, J.C., Waiting in a queue with strangers and acquaintances: an integrative model of customer-to-customer interactions effect on waiting time evaluation, *International Journal of Quality and Service Science*, 2009, 1(2), 145-159.

GLOBAL SUPPLY TRENDS AND U.S. INFRASTRUCTURE FOR INTERMODAL FREIGHT MOVEMENT

*Richard W. Monroe, Department of Technology Systems
College of Technology and Computer Science, East Carolina University
Greenville, NC 27858 Email: MonroeR@ecu.edu*

ABSTRACT

Supply chains form an extensive worldwide network for the manufacture and distribution of a wide range of products in the global business environment today. Given the geographical dispersion of manufacturers, distributors and customers the movement of products through the network is heavily dependent on the transportation modes of water and air. Freight origination requires trucking to deliver cargo to the seaports and airports. Delivering to the final customer requires trucking separately or rail and truck in some combination to move cargo from the ports to the intended destination. This paper looks at recent trends in worldwide cargo movement and the relation to U.S. infrastructure capacity. The paper highlights the need to address capacity issues and will lay the groundwork for future research.

Introduction

Many estimates suggest that “roughly 23 percent of world trade by value occurs between countries that share a land border” (Hummels, 2007). Data from the U.S. and Latin America indicate that trade between neighboring countries “is dominated by surface modes like truck, rail, and pipeline” with a small percentage of shipments traveling by air or ocean (Hummels, 2007). Overall, that leaves 77 percent of world trade which is shipped by other modes between trading partners that do not share a land border. Transportation for this portion of world trade requires higher usage of ocean and air shipments and the requisite intermodal connections to make final connections.

Containerized shipping by ocean has grown in recent decades as global trade has become somewhat easier for imports and exports alike. Container movement from the ports requires rail and truck with high volume capability from the larger ports.

Air cargo has become a routine element in the supply chain for certain products which are produced in strategically advantageous locations in the world and then distributed around the globe. Merchandise or components with light weight and condensed space requirements lend themselves to air shipments. Perishability is another characteristic for many unique product categories which require air shipment to reach the market in a timely manner. For the purposes of this paper the focus will be ocean, ground and rail transportation. Air cargo will be addressed in a future research effort.

In order to move materials and products through a global supply chain network with originating points in the Far East and destinations located in North America, Europe and other regions, a multitude of handoffs are required (Russell and Saldanha, 2003). Many of the handoffs involve switching transportation modes and the various logistics elements must function effectively to achieve an acceptable level of delivery performance. This just one indication of how the critical elements of intermodal shipping can have dramatic impacts on supply chain performance.

To move the freight to the marketplace after it enters through U.S seaports, rail and truck become the modes of choice. Intermodal transfers may occur near the port in some cases but more inland facilities are in use or under development to move the freight some distance away from the port. The use of rail to accomplish these moves provides several benefits including the alleviation of congestion on port city roadways, the reduction of emissions when compared to truck usage and reduced transportation cost.

Table 1 contains statistics for the Intermodal volume for the most recent years with complete data available. The data is broken into two categories for Container on Flatcar (COFC) and Trailer on Flatcar (TOFC):

Table 1. Rail Intermodal Statistics for U.S.

RAIL INTERMODAL ACTIVITY	2006	2007	2008	2009	2010	2011
Containers (COFC)	11,801,146	11,933,486	11,599,096	10,065,795	11,726,040	12,377,743
Trailers (TOFC)	2,432,928	2,145,466	2,060,399	1,604,555	1,664,064	1,693,782
Total Rail Intermodal Volume	14,234,074	14,078,952	13,659,495	11,670,350	13,390,104	14,071,525

Source: Intermodal Industry Statistics (2011,2012): http://www.intermodal.org/statistics_files/stats1.shtml

From Table 1 we can see a drop in container volume in 2009 due to the economic downturn worldwide. The data also clearly shows the dominance of containers as the preferred shipping method for intermodal freight. For 2011, rail intermodal moves reached a total of 14,071,525, which is a 4.9% increase compared to 2010 total volumes (IANA, 2012). These numbers indicate that recent volume is near the same level that it was in 2007 before the economic downturn.

To indicate the growing significance of intermodal freight consider the following:

- “Intermodal is growing faster than any other [single] mode of transportation”
- “trucks are still the single most-used mode to move freight, especially for distances less than 500 miles” but intermodal is used for a majority of trips beyond 500 miles (FHWA, 2010).

The projection for continued growth of intermodal is described in the following statement:

- Intermodal is credited with moving “18 percent of the value of freight transportation in 2007 and is forecast to grow to nearly 27 percent by 2040” (FHWA, 2010).

While the growth is very gradual, the upward trend is significant in the way that the transportation industry will be affected. Growth in these numbers translates to less demand for truck transportation as rail takes over more of the container moves.

Other statistics for the last 50 years indicate that intermodal has increased by more than 20 times when comparing 2011 with 1961 (IANA, 2012). More recently, since 1991, intermodal volume has more than doubled (IANA, 2012).

Looking at individual transportation companies the importance of intermodal becomes very clear. J.B. Hunt Transport (JBHT) has seen the straight truckload (TL) segment of their business drop off significantly over the last several years. In the third quarter (Q3) of 2012, TL contributed only 9 percent of JBHT’s total revenue. As the business has adapted to the changing environment, intermodal has grown

and contributed 62 percent of JBHT’s total revenue in Q3 of 2012 according to a report from SCDigest (Nov. 7, 2012).

Another example, Knight Transportation, reported an increase of 46 percent in its intermodal business segment for Q3 of 2012 (SCDigest, 2012). Swift Transportation also reported continuing growth in its intermodal business with an increase of 41.5 percent in Q3 of 2012 compared to the same period a year ago (SCDigest, 2012).

International Trade Statistics

The continued growth of international trade is the most compelling reason for international logistics or global supply chains. With that in mind, it is important to consider the magnitude of international trade and the major trading partners for the U.S.

The top U.S. trading partners are Canada, China and Mexico which means that two of the top three do share a land border with the U.S. (Freight Facts and Figures, 2010). Despite the high rankings of our neighbors to the north and south, the amount of merchandise entering/exiting through the U.S. coastlines is very significant. In fact, the Atlantic Coast accounts for the largest total of imports and exports handled when compared to the land borders and the other coastlines (U.S. Department of Commerce, Census Bureau, 2011). The volume handled by east coast ports can be attributed to the significant number of trading partners from Europe, Africa, South America, and Central America as well as a portion of the freight moving from Asia through the current Panama Canal or other routes. The top 10 trading partners are listed in Table 2:

Table 2 Top Trading Partners with U.S.

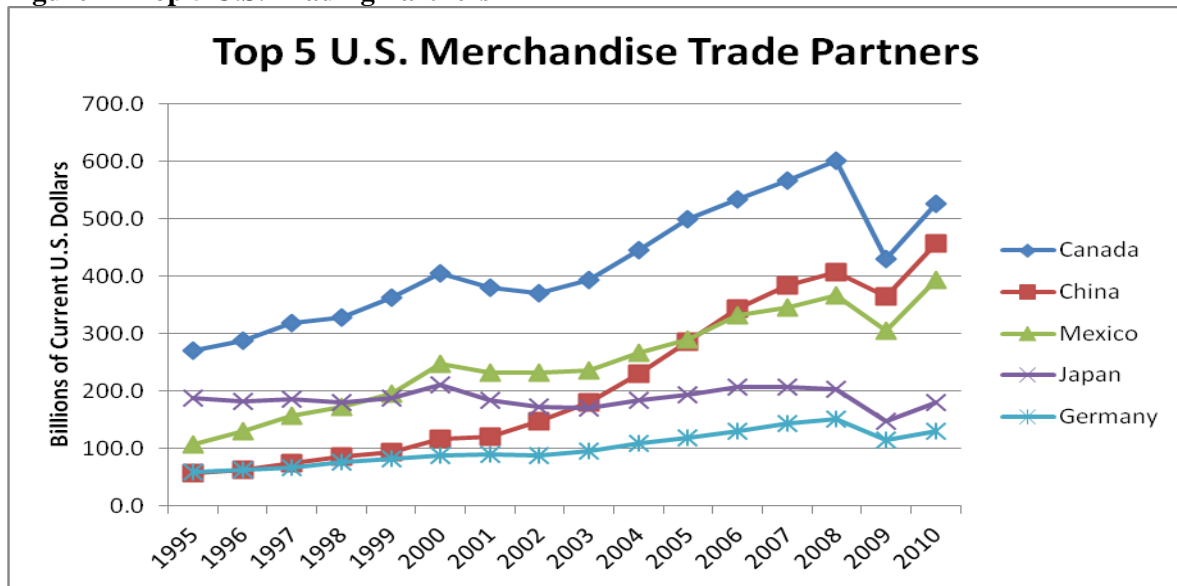
Rank	COUNTRY	MERCHANDISE TRADE WITH U.S. FOR 2010
1	CANADA	\$ 526.8 Billion
2	CHINA	456.8 Billion
3	MEXICO	393.4 Billion
4	JAPAN	181.0 Billion
5	GERMANY	130.6 Billion
6	UNITED KINGDOM	98.2 Billion
7	SOUTH KOREA	87.7 Billion
8	FRANCE	65.3 Billion
9	TAIWAN	61.9 Billion
10	BRAZIL	59.4 Billion

Source: Freight Facts and Figures (2010)

From this data note that Canada and Mexico combine to be more than double the amount of trade that the U.S. conducted with China in 2010. By combining the nine countries among the top ten other than China we find that amount of trade is 3.5 times the amount of trade that the U.S. conducted with China.

The trends for the top 5 trading partners for the U.S. are shown in following graph in Figure 1:

Figure 1 Top 5 U.S. Trading Partners



Source: Freight Facts and Figures (2010)

As we move to more specific entry points, the top 50 freight gateways account for 78 percent of the total U.S. merchandise trade based on recent statistics (RITA, U.S. DOT, 2009). Of these gateways, 25 out of the top 50 are seaports, 13 are land-based entry points and 12 are airports (RITA, U.S. DOT, 2009). This again highlights the significance of the coastlines as freight gateways.

For this paper, a representative sample of eight (8) seaports was selected from among the Top 50 Freight Gateways. Los Angeles, New York and Long Beach are included to show their top performing numbers. The main focus is on four east coast ports and one gulf coast port as shown in Table 3 for 2008 Results:

Table 3 Selected U.S. Ports, Total Merchandise (Billions of U.S. Dollars)

Rank	Port	Total	Exports	Imports
1	Los Angeles	243.9	34.8	209.1
2	New York/New Jersey	185.4	50.6	134.8
4	Houston	147.7	68.8	78.9
8	Long Beach	91.5	31.6	59.9
12	Charleston, SC	62.3	22.3	40.1
13	Savannah, GA	59.0	22.8	36.1
14	Norfolk, VA	54.0	23.9	30.0
37	Miami	22.0	11.0	11.0
	SUB-TOTAL	865.8	265.8	599.9
	Top 50 gateways	2,651	1,006	1,645
Sample	As a Percent of the Top 50	32.7 %	26.4 %	36.5 %
Sample	As a Percent of U.S. Total (approx.)	25.5 %	20.5 %	28.6 %

Source: Top 50 Freight Gateways, RITA (US DOT), 2009 (for year 2008)

Note: Only seaports are included – air and land gateways are not included

The growth of intermodal shipments in the last twenty years can be attributed to a set of factors with some complex interactions at work. Some of the factors to consider include:

- The growth of outsourcing
- The growth of “diverse” supply chains
- New technology developments, in particular the Internet (Leinbach and Capineri, 2007).

These global supply chain trends continue to place increasing demands on the infrastructure and the resources involved in intermodal shipments. The listed factors have impacted intermodal shipping and commerce in general in the U.S. in different ways in connection with random events such as Hurricane Katrina in 2005 (Pettit et al., 2010) and the longshoremen dock strikes at Los Angeles and Long Beach in 2002 (Lee, 2004).

The impact has exposed some of the shortcomings or constraints that exist in transportation systems. Some of the issues that have surfaced include:

- Inadequate rail service availability
- Seaport congestion
- Stress on international gateways
- Concerns about security (Leinbach and Capineri, 2007).

The above statements relate to freight movement in general but the focus will narrow to address intermodal throughout the remainder of the paper.

Problem Statement

From the above trends and through additional observations from other sources (to be added) a problem statement can be developed as follows:

The U.S. does not have an ‘intermodal system’ that is truly integrated to optimize intermodal freight movement performance. What the U.S. does have is “an aggregation of multiple private and public modes,” each of which is focused only within its own individual area of specialization and with no real collaboration and no cross-enterprise communication throughout the entire network (Vickerman, 2006).

This paper will begin to identify the main issues that need to be addressed in order to move towards an integrated intermodal system within the U.S.

Another important observation is that Intermodal issues have received limited attention in North America while European researchers have published more frequently (e.g. Leinbach & Capineri, 2007). The combination of the Problem Statement and the lack of research publications makes intermodal shipping an interesting topic to investigate. The Problem Statement has guided this paper as a foundation has been developed for future research. The following sections will continue to provide examples of the discontinuities that exist across the Intermodal “system”.

Ports

Infrastructure and service providers are two main considerations at the Port. As of 2010, 13 different East and Gulf Coast Ports had projects in various stages of planning, feasibility study or other type of evaluation. Nine East Coast Ports signed an agreement with the Panama Canal Authority (PCA) in 2002 which included many features to share information and collaborate on marketing efforts (PCA, 2006). Very recently, the CEO of the PCA, Mr. Aleman suggested that only three major Ports on the East Coast would benefit from the new third channel of the Panama Canal.

Charleston, South Carolina is the only Port on the East Coast with approved permits and construction underway on a *new* container terminal (South Carolina Ports, 2012). When completed, the new terminal assets will expand Charleston's capacity by 50 percent (South Carolina Ports, 2012). The construction project includes \$12.2 million for environmental safeguards to mitigate potential impacts in the immediate area of the new terminal (South Carolina Ports, 2012). The state's Department of Transportation (SCDOT) is undertaking similar mitigation efforts along the access road to the terminal (South Carolina Ports, 2012).

Hampton Roads, Virginia (Norfolk, Newport News and Portsmouth) is the only Port terminal system on the East Coast with 50 feet water depth throughout the entire channel in the Elizabeth River all the way to quayside (Port of Virginia, 2010). Channel maintenance is assured thanks to the presence of the Norfolk Naval Base located nearby to the Norfolk International Terminal (NIT). Norfolk has several phases of expansion in various stages of planning at this time. One plan will expand the capacity at NIT North by 34% (Port of Virginia, 2012).

APM Terminals has a 1 million TEU capacity and is operating well below that level. So there is a capacity buffer available at the Portsmouth site. Rail service is also available at the APM Terminals along with a second CSX terminal nearby (Port of Virginia, 2012).

A fourth terminal location is Craney Island which is permitted and construction has begun there. This site will have an additional 2.5 million TEU capacity and will feature "an on-terminal intermodal rail loading facility" (Port of Virginia, 2012). Completion of Craney Island Terminal is expected by 2017 (Port of Virginia, 2012).

In June, 2012 the President announced Fast Track projects which included many of the improvements at Miami, Savannah, Charleston and New York/New Jersey (Leach, 2012). Fast Track is primarily focused on shortening the time for feasibility studies and the time for approval processes for the preliminary studies. Fast Track does not include funding for actual dredging or other infrastructure improvements being proposed.

The potential Panama Canal Effect is a major concern when evaluating the current East Coast and Gulf Coast Ports. Taking the volume for the five leading West Coast Ports: LA, Long Beach, Oakland, Seattle and Tacoma gives us a volume of 14,203,619 twenty-foot equivalent units (TEUs) in 2011. If there is a 10 percent shift of West Coast volume to the East Coast then that is nearly equivalent to another port the size of Norfolk's 2011 TEU container volume. If there is a 20 percent shift from the West Coast to the East Coast, then that volume would require a port that can handle 25 percent more than Savannah's 2011 TEU container volume

The most recent four years of shipments in TEUs through the top 12 U.S. Ports are shown in Table 4 for reference.

In Table 5 a summary is provided for the Draymen available and the type of service they provide to each of the Ports. Definitions for "drayage" and "draymen" can be found in the Appendix of this paper. For these eight ports (seven major ports and one mid-sized port) the Totals are as follows: With Transportation service for both Port & Rail there are 527 companies (duplicates are counted when serving multiple locations); with Transportation service for Port only there are 119 companies; and with Transportation service for Rail only there are 21 companies.

Table 4 Top U.S. Ports for Intermodal Container Traffic (TEUs)

Ranking	Ports	2011	2010	2009	2008
1	Los Angeles	6,034,474	5,572,051	5,028,998	5,670,897
2	Long Beach	4,338,847	4,466,946	3,765,560	4,611,671
3	New York	4,302,237	4,093,693	3,587,740	3,992,258
4	Savannah	2,281,273	2,171,325	1,914,751	2,115,986
5	Oakland	1,562,281	1,527,352	1,398,420	1,394,684
6	Norfolk	1,479,076	1,439,011	1,375,632	1,591,566
7	Houston	1,448,313	1,370,953	1,256,049	1,370,759
8	Seattle	1,379,104	1,417,597	1,072,838	1,082,573
9	Charleston, SC	1,141,320	1,069,602	954,836	1,330,919
10	Tacoma	888,913	836,401	873,708	1,129,301
11	Miami	743,087	683,459	625,716	669,199
12	Jacksonville	739,379	706,416	636,150	618,670

Source: IANA, 2012: <https://www.intermodal.org/statistics_files/stats4.shtml>

Table 5 Draymen Serving Selected Ports and Terminals

Port	Service Type	Number of Companies
Los Angeles/Long Beach	Port & Rail	99
Los Angeles/Long Beach	Port	25
Los Angeles/Long Beach	Rail	12
New York/NJ	Port & Rail	112
New York/NJ	Port	19
New York/NJ	Rail	4
Savannah, GA	Port & Rail	75
Savannah, GA	Port	23
Savannah, GA	Rail	0
Charleston, SC	Port & Rail	59
Charleston, SC	Port	13
Charleston, SC	Rail	0
Miami/Ft. Lauderdale	Port & Rail	33
Miami/Ft. Lauderdale	Port	4
Miami/Ft. Lauderdale	Rail	3
Norfolk, VA	Port & Rail	68
Norfolk, VA	Port	10
Norfolk, VA	Rail	0
Wilmington, NC	Port & Rail	0
Wilmington, NC	Port	13
Wilmington, NC	Rail	0
Houston	Port & Rail	68
Houston	Port	12
Houston	Rail	2

Source: www.dravage.com

Railroads

For the “selected Ports” used above there are five (5) Class I railroads that are associated with freight movement for those locations. Most of the larger Ports do have reasonably good access for two (2) of the Class I railroads but that access is not always on the site of the Port. Many of the Ports do not have Rail at the Port but a few are working to correct that situation to make rail intermodal moves more convenient. Eliminating the need for trucks to move from the Port to an Intermodal Terminal for transfer to rail can relieve congestion on port city roadways and provide an incremental improvement for the carbon footprint for the shipping companies.

Norfolk Southern (NS) and CSX provide rail service nearby to the Ports in Hampton Roads, Virginia. The APM Terminal is located a short distance from the CSX terminal in Portsmouth, Virginia. NS and CSX are the only Class I Railroads connecting to the major Ports on the East Coast. In Houston, both Burlington Northern Santa Fe (BNSF) and Union Pacific (UP) provide Class I rail service. The presence of the rail companies can be seen in the Intermodal Terminal information in the following section.

One of the main motivations for companies to utilize Intermodal Rail is the huge environmental advantage that rail offers when compared to trucks. In 1980 rail was able to haul one ton of freight on one gallon of diesel fuel for a distance of 235 miles (Overview of U.S. Freight Railroads, 2008). Today rail has the capability to haul one ton of freight on one gallon of diesel fuel for a distance of 500 miles (BNSF Fact Sheet, 2012).

Intermodal Terminals

Connectivity between rail and truck is a crucial point in the Intermodal network. [Quote of losses – time, etc.] With Intermodal it is desirable to have the train travel a substantial distance (as little as 200 mile OR more than 500 miles) away from the seaport to reach a Intermodal terminal. At that point railcars with containers may be switched to different rail routes or the containers may be off-loaded to truck for surface transportation delivery. To provide examples of major Intermodal terminals, many of which are associated with some of the eight ports discussed above, the following locations were selected:

- Atlanta, Georgia
- Charleston, South Carolina
- Charlotte, North Carolina
- Dallas/Ft. Worth, Texas
- Front Royal, Virginia
- Greensboro, North Carolina
- Houston, Texas
- Miami/Ft. Lauderdale, Florida
- Norfolk, Virginia

These locations were chosen based on close proximity to or direct connection to one of the seaports among the selected ports used in this paper. According to data taken from “The Drayage Directory”, the following numbers are representative of the inland intermodal locations selected and four seaport cities shown here in Table 6:

Table 6 Intermodal Terminal Numbers and Locations for Selected Sites

City	Intermodal Terminals	Terminal Names and Locations	Draymen
Atlanta, GA	5	BNSF-Atlanta CSX-Fairburn CSX-Hulsey NS-Austell NS-Inman	62
Charleston, SC	5	APM Terminal-Charleston CSX-Meeting Street Road North Charleston Terminal NS-North Charleston Wando Welch Terminal (WWT)	72
Charlotte, NC	2	CSX-Hovis Road NS-Breward Street	32
Dallas/Ft. Worth, TX	4	BNSF-Alliance KCS-Dallas UP-Dallas Intermodal Terminal UP-Mesquite	61
Front Royal, VA	1	Virginia Inland Port (VIP - served by NS)	2
Greensboro, NC	1	NS-Merritt Drive	7
Houston, TX	9	APM Terminal-Houston BNSF-Houston (Pearland) KCS-Rosenberg Port of Freeport, TX Port of Houston-Bayport Container Terminal Port of Houston-Jacinto Port International UP-Barbours Cut UP-Englewood Yard UP-Settagast Yard	82
Miami/Ft. Lauderdale, FL	7	CSX-Miami FEC-Ft. Lauderdale FEC-Miami NS-Miami Florida International Terminal Port Everglades South Florida Container Terminal (SFCT)	40
Norfolk, VA	4	CSX-Portsmouth APM Terminal-Portsmouth Norfolk International Terminals (NIT) NS-Norfolk International	79

Source: www.dravage.com

Note: Company abbreviations used in the above table are – A.P. Moeller (APM); Burlington Northern Santa Fe railroad (BNSF); CSX Transportation or railroad (CSX); Florida East Coast Railway (FEC); Kansas City Southern railroad (KCS); Norfolk-Southern railroad (NS) and Union Pacific railroad (UP)

Addressing Capacity and Improving Infrastructure

Ports are in the process of addressing capacity, accessibility and a variety of other issues that must be addressed as Ports expand. Ports are lagging behind somewhat which is partially due to the extended time required to gain approvals, receive adequate funding and then complete feasibility studies. The Fast-Track projects signed by the President in July, 2012 provide an indication of the lateness for these projects (Leach, 2012). The approved projects also provide evidence for the most likely beneficiaries after the completion of the third channel of the Panama Canal and the completion of the respective Port's infrastructure including channel depth.

Rail has benefited from the TIGER Grants in recent years and many improvements to railways and other infrastructure have been made to allow passage of double-stacked containers on specific routes. Freight Rail received approximately \$340 Million for improvement projects out of \$1.5 Billion dollars earmarked for national transportation projects of national importance (CSX National Gateway Project, 2010).

The Intermodal Terminals are a different situation. Private developers such as CenterPoint Properties, the developer of CenterPoint Intermodal Center in Joliet, Illinois, are involved in transportation hubs, warehousing, and a variety of other developments at numerous locations (CenterPoint, 2012). Private funding was also the driving factor at the Alliance Park in Texas with Hillwood Properties, A Perot Company, as the developer (Lyne, 2004). Joliet and Alliance are huge Intermodal and logistics complexes. There are no comparable sites of that size near the Southeast Ports. The Virginia Inland Port is a relatively small facility by comparison and a new inland port in Cordele, Georgia is also much smaller than Joliet or Alliance. Another issue is the fact that real estate developers are not experts in transportation or intermodal specifically. This makes it critically important that major transportation industry partners (e.g. Class I Railroads) and properly credentialed consultants have to be part of the development team for these developments.

Addressing Integration

Integration is a major challenge when attempting to address Intermodal performance. The number of parties involved at each node or task – the Port, the Draymen, the Intermodal terminals, the private and public stakeholders – seems to create a list that has no end. Integrating a complex network which includes full time participants, part-time participants and a variety of occasional participants may be the greatest hurdle facing the Intermodal Shipping segment.

Condition of railways, bridges and tunnels continues to be a major concern as the infrastructure continues to age. Existing facilities may not be as accessible as they should be. Existing rail lines sometimes pass through small towns or metropolitan regions with extremely low speed limits which hamper delivery performance. Rail access at the Port is the ideal situation and represents a more integrated Intermodal system to minimize cost and eliminate extra handling. Some Ports actually de-activated Rail at the Port many years ago thinking that was the right thing to do.

Company Examples

One company example that seems to be developing a business model with a well-designed Intermodal system is ContainerPort Group. The following quote from their website describes the company's approach:

“Our primary services to the global shipping industry include intermodal container drayage, terminal and rail operations, warehousing and logistics, container, chassis and trailer maintenance and repair, and

container and equipment sales. Our team of over 475 employees and fleet of over 700 contracted drivers, combined with our full service product capabilities and exemplary reputation, makes CPG your complete intermodal resource” (www.containerport.com)

C.H. Robinson is another company with a major stake in Intermodal shipping. The following quote describes some of the features of the company’s Intermodal services:

“You can count on our award-winning, dependable Intermodal service and our powerful relationships with all the Class I railroads to ensure that you’ll obtain the equipment you need, when you need it. ... We know how to reduce or eliminate unplanned costs for better control. And with end-to-end visibility to your freight via Navisphere online access, you can give your customers peace of mind, too” (Intermodal – C.H. Robinson, 2012).

These two examples represent the growing number of companies with a keen interest in the Intermodal shipping segment. The importance to companies like J.B. Hunt, Knight Transportation and Swift Transportation will magnify the focus and heighten the efforts to improve Intermodal performance along several dimensions.

Summary

Clearly Intermodal performance is emerging as a significant issue in freight movement today.

“Intermodal ... creates efficiencies in your supply chain by providing more equipment options, greener miles, and often, a lower priced alternative to truck transportation” (Intermodal – C.H. Robinson, 2012). The potential benefits that Intermodal can contribute to greener supply chains by satisfying environmental compliance measures are the main justification for more Intermodal usage.

Two major issues were discussed briefly in this paper. Capacity is directly related to infrastructure and the need for new and improved infrastructure is a major factor which needs to be investigated and addressed at the local, state and federal levels. Intermodal system integration is another topic which represents a major challenge for industry participants to confront as Intermodal growth continues.

This paper has presented a number of foundation concepts, supporting statistics and example companies to indicate the growing importance of Intermodal shipping. Published research on Intermodal topics is very limited, so this paper is an attempt to begin to fill that gap. Most of all this paper provides a foundation for future research. The problem statement presented here and other implicit research questions offer a very wide range of research topics to investigate.

REFERENCES

- BNSF Railway Fact Sheet. 2012. http://www.bnsf.com/about-bnsf/pdf/fact_sheet.pdf
- CenterPoint Properties. (2012): www.centerpoint-prop.com
- ContainerPort Group. (2012): www.containerport.com
- CSX National Gateway Project. (2010):
<http://www.cte.ncsu.edu/EEConference/sessions/documents/38-1_Brinker.pdf>
- FHWA. (2010). Press Release, "DOT Releases New Freight Transportation Data," U.S. Department of Transportation, Federal Highway Administration, Office of Public Affairs, Washington, DC. FHWA 62-10, November 3, 2010.
- Freight Facts and Figures (2010): Top 25 Trading Partners of the United States in Merchandise Trade: 1995-2010
<http://ops.fhwa.dot.gov/freight/freight_analysis/nat_freight_stats/docs/10factsfigures/table2_7.htm>
<http://www.ops.fhwa.dot.gov/freight/freight_analysis/nat_freight_stats/docs/11factsfigures/table2_7hist.htm>
- Hummels, David. (2007). Transportation Costs and International Trade in the Second Era of Globalization. *The Journal of Economic Perspectives*, Vol. 21, No. 3, pp. 131-154.
- Intermodal Association of North America (IANA), (2012): www.intermodal.org
- https://www.intermodal.org/statistics_files/stats1.shtml
 - https://www.intermodal.org/statistics_files/stats2.shtml
 - https://www.intermodal.org/statistics_files/stats3.shtml
 - https://www.intermodal.org/statistics_files/stats4.shtml
 - https://www.intermodal.org/statistics_files/stats6.shtml
 - https://www.intermodal.org/statistics_files/stats22.shtml
 - https://www.intermodal.org/statistics_files/stats33.shtml
 - http://www.intermodal.org/statistics_files/Glossary.shtml
- Intermodal – C.H. Robinson. (2012)
<<http://www.chrobinson.com/en/us/Freight-Services/Intermodal-Rail/Intermodal/>>
- Leach, Peter. (2012). Obama Fast-Tracks Reviews of East Coast Port Projects. *The Journal of Commerce*, July 19, 2012. Downloaded from: http://www.joc.com/international-trade-news/infrastructure-news/obama-fast-tracks-reviews-east-coast-port-projects_20120719.html
- Leinbach, Thomas R. and Capineri, Cristina. (2007). The global economy and freight transport flows. In *Globalized Freight Transport*, edited by Leinbach and Capineri. Edward Elgar Publishing Inc.: Cheltenham, UK and Northampton, MA, USA, pp. 1-14.
- Lyne, Jack. (2004). Massive & Multimodal: 1,671-Acre Alliance Texas Expansion Could Create 10,000 Jobs. *The Site Selection Online Insider*, November 29, 2004.
<http://www.siteselection.com/ssinsider/pwatch/pw041129.htm>

Panama Canal Authority. (2006). Proposal for the Expansion of the Panama Canal: Third Set of Locks Project, Panama Canal Authority, April 24, 2006.

Pettit, T.J., J. Kiksel, and K.L. Croxton. (2010). "Ensuring supply chain resilience: Development of a conceptual framework," *Journal of Business Logistics*, Vol. 31, No. 1, pp. 1-21.

Overview of U.S. Freight Railroads. (2008) Overview of U.S. Freight Railroads, Association of American Railroads. Downloaded from:
<http://www.aar.org/PubCommon/Documents/AboutTheIndustry/Overview.pdf>

Research and Innovation Technology Administration (RITA). U.S. Department of Transportation. (2009). "America's Freight Transportation Gateways."

Russell, Dawn M. and Saldanha, John P. (2003). Five tenets of security-aware logistics and supply chain operations. *Transportation Journal*, Summer, Volume 42, Issue 4.

South Carolina Ports. (2012) New Terminal. Downloaded December 30, 2012 from:
<<http://www.port-of-charleston.com/Cargo/ReadytoGrow/newterminal.asp>>

SCDigest's On-Target E-Magazine, (Nov. 7, 2012):
<<http://www.scdigest.com/ONTARGET/12-11-07-2.PHP?cid=6412&ctype=content>>

The Port of Virginia, (2010) and (2012):
<http://www.hreda.com/knowledge-center/transportation/the-port-of-virginia>

Vickerman, John. (2006). CBER World Congress Presentation. North American Trade & Transportation Trends, San Francisco

Appendix - Terminology

Drayage

The movement of a container or trailer to or from the railroad intermodal terminal to or from the customer's facility for loading or unloading.

Drayman

A person employed to pick up or drop off a container or trailer at an intermodal terminal.

Intermodal

Transport of freight by two or modes of transportation. Examples are: ship-rail, rail-truck.

Intermodal Terminal

A railroad facility designed for the loading and unloading of containers and trailers to and from flat cars for movement on the railroad and subsequent movement on the street or highway.

Source: http://www.intermodal.org/statistics_files/Glossary.shtml

Optimization and Simulation Modeling of Disaster Relief Supply Chain: A Literature Review

Keli Feng, Department of Business Administration, South Carolina State University, 300 College Street NE, Orangeburg, SC 29117, (803) 533-3689, kfeng1@scsu.edu

Emmanuel Bizimana, South Carolina State University, 300 College Street NE, Orangeburg, SC 29117, ebiziman@scsu.edu

Deedee D. Agu, South Carolina State University, 300 College Street NE, Orangeburg, SC 29117, dagu@scsu.edu

Tana T. Isaac, South Carolina State University, 300 College Street NE, Orangeburg, SC 29117, tisaac1@scsu.edu

Abstract:

Recent natural and man-made disasters underscore the need of a resilient and agile disaster relief supply chain to mitigate the damages and save people's lives. Optimization and simulation modeling have become powerful and useful tools to help decision makers tackle problems related to disaster relief supply chain. This paper reviews optimization and simulation models used in the field of disaster relief supply chain. We review the literature of the facility location optimization problems of disaster relief supply chain under different types of disastrous events. We review the literature of simulation models on supply chain design and disaster relief distribution operations. Finally, we propose two future research directions for disaster relief supply chain modeling.

Keywords:

Disaster Relief Supply Chain, Optimization, Simulation, Modeling

1. Introduction

Recent natural and man-made disasters such as Hurricane Katrina in 2005, Hurricane Rita in 2005, Hurricane Gustav in 2008, flooding in North Dakota in 2009, earthquake in Haiti in 2010, and nuclear disaster caused by massive earthquake and tsunami in Japan in 2011 underscore the need of a resilient and agile disaster relief supply chain to mitigate the damages and save people's lives. An ineffective disaster relief supply chain may cause death, sickness, epidemics, and social turmoil. For instant, Hurricane Katrina in 2005 makes 1,300 death tolls and \$200 billion of damages. According to some researchers' studies [1], more than half of the planet's 20 costliest catastrophes have occurred since 1970 and natural disasters are increasing in frequency and intensity in the last ten years due to several reasons such as quickly growing population, larger concentration in high-risk areas, and increasing social and economic interdependency. Figure 1 (a) shows the worldwide trend of the number of natural disasters and man-made disasters; Figure 1 (b) indicates the trend of the number of declared disasters by FEMA in the U.S. The data in Figure 1 illustrates why the demand for disaster relief supply chain is increasing and indicates that developing a better disaster relief supply chain is essential and immediately needed.

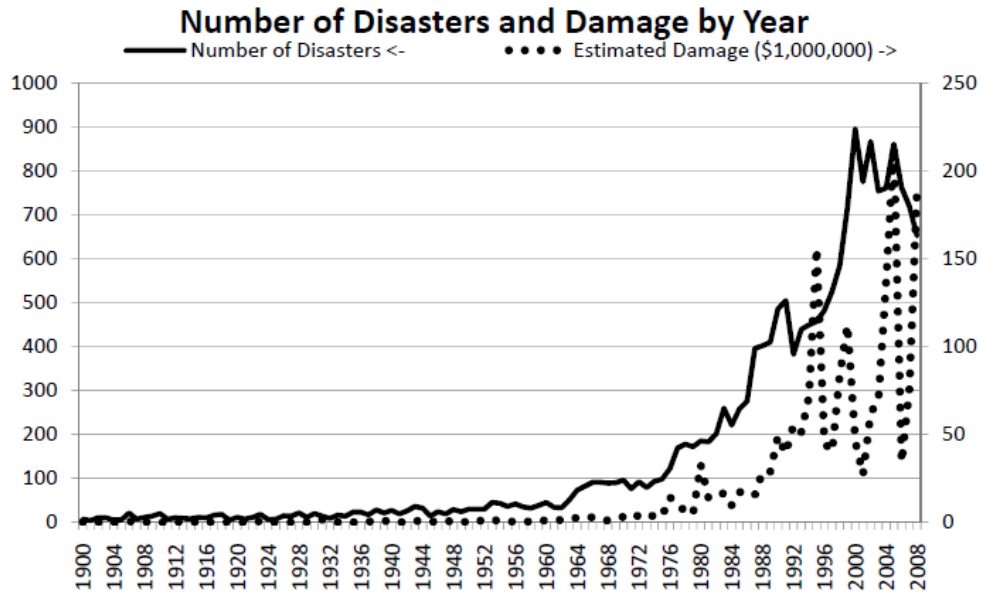


Figure 1 (a) International Disasters Trend.
 (Source: <http://www.emdat.be/database>)

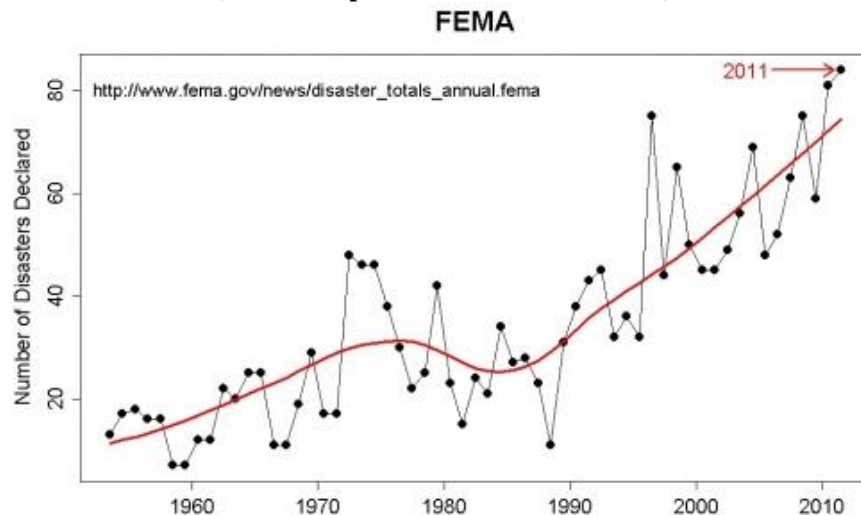


Figure 1(b) U.S. Disasters Trend

A disaster relief supply chain starts from suppliers of federal and local government or private donors to regional distribution warehouses, to local warehouses, finally to the disaster recovery centers (DRC) as illustrated in Figure 2. The disaster relief supply chain is different from traditional commercial supply chains from different aspects such as a huge surge of sudden demand, damaged transportation network, demand

uncertainty of victims, crippled communication infrastructure, short lead times, and many other uncertainties. Nevertheless, there are lessons that can be borrowed from the well-studied commercial supply chains and vice versa.

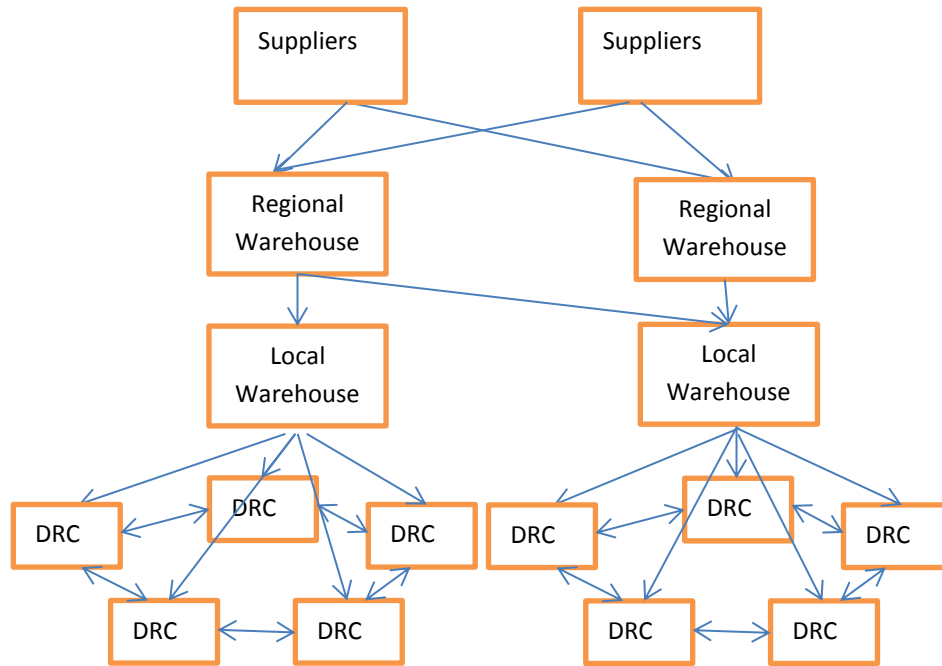


Figure 2 Disaster Relief Supply Chain

Several academic research studies were conducted to investigate different aspects of disaster relief supply chain management. Lodree Jr. and Taskin [2] proposed an insurance risk management framework for decision makers to quantify the risks and benefits associate with stocking decision for disaster relief efforts or supply chain disruption. Maon et al [3] developed a theoretical model for developing supply chain in disaster relief operations through cross-sector socially oriented collaboration. Falasca et al [4] developed a decision support framework for assessing supply chain resilience to disasters. In addition, there are some articles focusing on humanitarian supply chains [5,6,7,8,9]. Disaster relief supply chains can be treated as a subset of humanitarian supply

chains. However, most of the aforementioned researches study the disaster relief supply chain in a qualitative manner. To better understand how to apply the quantitative modeling methodologies to the disaster relief supply chain, we will conduct literature review on the disaster relief supply chain modeling in this paper.

Based on the review of existing studies, we have identified the two focus areas related to disaster relief supply chain modeling: 1) Optimal facility location modeling for disaster relief supply chain; and 2) Simulation modeling for the disaster relief supply chain. The following sections provide an expanded literature review on the two focus areas.

2. Facility Location Optimization Modeling for Disaster Relief Supply Chain

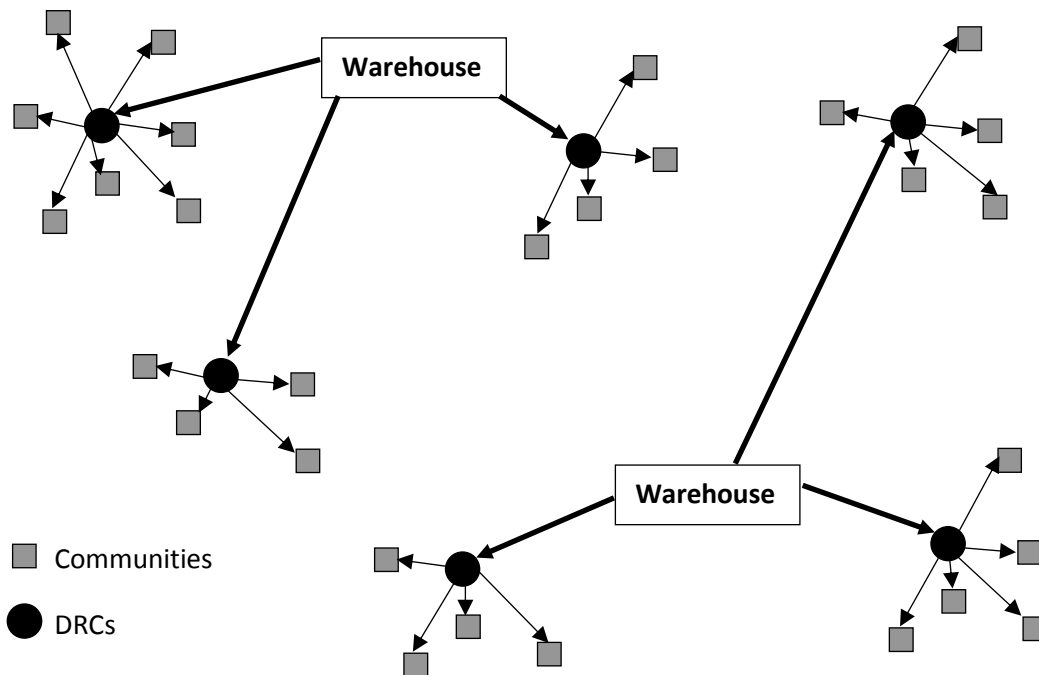


Figure 3 Distribution Network for Disaster Relief Supply Chain

When natural disasters occur, an efficient disaster relief supply chain plays a critical role in quickly distributing relief supplies to the affected area for rapid recovery. In the distribution network shown in Figure 3, warehouses distribute relief supplies to Disaster

Recovery Centers (DRC); DRCs supply the relief supplies for the affected Communities; and Communities can also obtain relief supplies directly from warehouses. A DRC is a readily accessible facility or mobile office where disaster victims can obtain relief goods and assistance. Warehouses are usually built with extreme care and their failure probabilities during disastrous events are negligible. However, DRCs are subject to disruptions caused by disastrous events and fail with various probabilities. This is because secondary disasters such as tsunamis, floods, and nuclear accidents may happen after the original disasters such as earthquakes, hurricanes, and tornados. Thus, the disruptions of disaster relief distribution facilities should be taken into account. To better serve the disaster victims and minimize the corresponding operational and logistic costs, it is important to seek the optimal locations of the DRCs and warehouses.

Facility location problems have been extensively studied for decades. A good reference of facility location modeling can be founded in Daskin (1995)'s book [10]. However, the traditional deterministic facility location models, such as set-covering models, p-center models, p-median models, and fixed charge facility location problems, are not applicable for this problem because it involves a significant amount of demand uncertainties and supply disruptions. Snyder [11] conducted a comprehensive review on facility location under uncertainty, mainly focusing on stochastic and robust facility location models. Recently, a number of researchers, such as Wagner et al. [12]; Murali et al. [13]; Caro et al. [14], studied various problems related to facility location under demand uncertainty in business settings. In this paper, we mainly focus on the facility location studies on demand uncertainty caused by disastrous events.

Dekle et al. [15] developed a set-covering model and a two-stage approach to identify the optimal DRC sites. Their main objective was to minimize the total number of DRCs, subject to each county's residents being within certain distance of the nearest DRC. They found that their model provided significant improvements to the original FEMA location criteria, while maintaining acceptable travel distances to the nearest DRC. Horner and Downs [16] conducted a similar study to optimize DRCs locations given the positions of disaster relief supply warehouses. Given the number and locations of initial warehouses, the authors formulated the problem as a multi-objective integer programming model. The first objective was to minimize the transportation costs of servicing DRCs from warehouse locations; and the second one was to minimize transportation costs between DRCs and neighborhoods in need of relief goods.

Snyder and Daskin [17] developed a reliable facility location model for choosing facility locations to minimize cost while also taking into account the expected transportation cost after failures of facilities. The objective of their paper is to choose facility locations that are both inexpensive under traditional objective functions and also reliable. The reliability approach is new in the facility location literature. They formulated the reliability models based on both the p-median and the incapacitated fixed-charge location problem. The developed model is solved by a Lagrangian relaxation algorithm. Berman et al. [18] also developed a reliable facility location model based on the p-median problem. In their research, each facility is assigned a failure probability. The objective is to minimize the expected weighted transportation cost and the expected penalty for certain customers not being served. They found the optimal location patterns are seen to be strongly dependent on the probability of facility failure, with facilities becoming more centralized, or even co-

located, as the failure probability grows. The developed model has a nonlinear objective function and is difficult to solve by exact algorithms. These authors thus proposed several exact and heuristic solutions approached for this problem.

Hassin et al. [19] investigate a facility location problem considering the failures of network edges. Their goal is to maximize the expected demand that can be served after disastrous events. In their study, it is assumed that a demand node can be served by a facility if it is within a certain distance of the entity in the network that survived disaster. The failures of network edges are assumed to be dependent on each other. These authors formulate the problem as an exact dynamic programming model and develop an exact greedy algorithm to solve it. Eiselt et al. [20] also propose a reliable model for optimally locating p facilities in a network that takes into account the potential failures of road network links and nodes. These authors develop a low-order polynomial algorithm to solve the proposed facility location model.

Li and Ouyang [21] examined a continuous reliable uncapacitated fixed charge location (RUFL) problem where facilities are subject to spatially correlated disruptions that occur with location-dependent probabilities (due to reasons such as natural or man-made disasters). A continuum approximation approach is adopted to solve the developed model. The authors consider two methods to model the spatial correlation of disruptions, including positively correlated Beta-Binomial facility failure. Cui et al. [22] also study the RUFL problem and proposed a compact mixed integer program (MIP) formulation and a continuum approximation model to minimize initial setup costs and expected transportation costs in normal and failure scenarios. Similar to Snyder and Daskin [17], Cui et al. [22] assigned each customer to multiple levels to ensure the robustness of the final facility

location design. They also develop a custom-designed Lagrangian relaxation algorithm to solve the proposed MIP model. Murali et al. [23] considered a capacitated facility location problem to maximize relief coverage, taking into account a distance-dependent coverage function and demand uncertainty. They formulated this problem as a maximal covering location problem and developed a locate-allocate heuristic to solve the problem.

Some researchers focused on the efficiency and robustness design of disaster relief supply chain. Shukla et al. [24] proposed a design framework that addresses the facility and link failure explicitly by accounting for their impact on network's performance measures of efficiency and robustness. They used a scenario planning approach and formulated a mixed integer linear program model with the objective of maximizing both efficiency and robustness. It also evaluated the trade-offs between efficiency and robustness. Hong et al. [25] proposed and compared two robust models, Robust Integer Facility Location (RIFL) and Robust Continuous Facility Location (RCFL) models, for the same supply chain network settings as Shukla et al. [24] studied. They found that the total logistic cost and robustness level of the RCFL outperforms those of other models while the performance of RIFL and RIFL is mixed between the cost and robustness index.

In this section, we mainly reviewed the articles that directly related to the facility location problem under demand uncertainty caused by disastrous events. The literature review in this section may not be exhaustive, but it presents readers a snapshot about the facility location modeling for disaster relief supply chain.

3. Simulation Modeling of Disaster Relief Supply Chain

According to Green and Kolesar [26], a simulation model for disaster relief is the foundation on which new policies and tactics can be developed and evaluated. In order to develop decision-making tools for disaster relief supply chain, simulation can be an excellent tool for understanding the impact of disasters, disaster relief operations, and the consequences of alternative policies. Simulation models also serve as a test bed as real-life experimentation of analytical tools with actual disaster situations would be too difficult and risky.

Various simulation models have been developed for disaster relief supply chain in response to different types of disasters. Several researchers used simulation models to design and evaluate disaster relief supply chains. Bravata et al. [27] develop simulation models to study strategies for stockpiling and dispensing for anthrax bioterrorism and modeled regional and local supply chain for antibiotics and medicinal supplies to estimate mortality. They concluded that the critical determination of mortality following anthrax bioterrorism is the local dispensing capacity (throughput rate). Wein and Liu [28] developed a supply chain model of milk to analyze the impact of a bioterrorism attack of botulinum toxin, which has a potential death rate of 50% with a chance of 400,000 people contaminated. They recommended investment in prevention through enhanced security, in the heat pasteurization process and in-process testing for toxins. Lee et al [29] developed a simulation modeling framework to simulate the disaster relief supply chain and distribution operations especially for hurricane disaster. The model can evaluate a wide range of disaster scenarios, assess existing disaster response plans and policies, and identify better approaches for government agencies and first responders to prepare for and respond to disasters.

For distribution operations of disaster relief goods, Hupert et al. [30] used discrete event simulation models to determine staffing levels for entry screening, triage, medical evaluation, and drug dispensing stations in a hypothetical antibiotic distribution center operating in low medium, and high disease prevalence bioterrorism response scenarios. They concluded that simulation modeling is an useful tool in developing the public health infrastructure for bioterrorism response. Aaby et al. [31] developed discrete-event simulation models and capacity-planning and queueing-system models to improve clinical distribution of medications and vaccines in event of outbreak of contagious diseases. They validated these models using data that they collected during full-scale simulations of disease outbreak. Whitworth [32] used discrete-event simulation to help one community develop its plan for responding to an anthrax attack. The model determined how many DRCs the community would need, how to staff them, and how to manage client traffic and parking. Lee et al. [33] described RealOpt, a simulation and decision-support system for planning large-scale emergency dispensing clinics to respond to biological threats and infectious-disease outbreaks. The system allows public-health administrators to investigate clinic-design and staffing scenarios quickly. Lee [34] developed a simulation model that includes shipment of emergency medical supplies to DRCs from a city-owned warehouse in addition to DRC operational model. He reported that cross shipping of vaccines or antibiotics among DRCs can improve the coverage when the overall supply is limited or when there is an imbalance between supply and demand at DRCs. These models only focus on the DRC operations without modeling the relief goods distribution for the whole disaster relief supply chain.

4. Summary and future research

The paper reviews optimization and simulation models used in the field of disaster relief supply chain. For the optimization models, we primarily focus on the literature of the facility location of disaster relief distribution warehouses and disaster relief centers under different types of disastrous events. For the simulation models, we mainly concentrate on the literature of simulation models on supply chain design and disaster relief distribution operations. Based on the review, we identify two possible future research directions for the field of disaster relief supply chain. First, a comprehensive joint model of optimization and simulation model for the disaster relief supply chain is absent. This calls for development a comprehensive model to optimize and simulate the disaster relief supply chain. Second, most cited researches focused on the disaster relief in urban areas and rural areas were historically overlooked. A comprehensive model is needed for rural communities to better prepare for potential natural or man-made disasters and to improve their disaster resilience.

Reference:

- ¹ Michel-Kerjan, Erwann, and Slovic, Paul. A More Dangerous World: Why We Misunderstand Risk, *Newsweek*. March 1, 2010.
- ² Lodree Jr, E. J. and Taskin, S. An Insurance Risk Management Framework for Disaster Relief and Supply Chain Disruption Inventory Planning, *Journal of the Operational Research Society*, Vol. 59, 2008, pp. 674–684
- ³ Maon, Francois, Lindgreen, Adam, and Van Hamme. Developing Supply Chains In Disaster Relief Operations Through Cross-Sector Socially Oriented Collaborations: A Theoretical Model. *Supply Chain Management: An International Journal*, Vol. 14, No. 2, 2009, pp.149 - 164
- ⁴ Falasca, Mauro, Zobel, Christopher W., and Cook, Deborah. A Decision Support Framework to Assess Supply Chain Resilience. *Proceedings of the 5th International ISCRAM Conference – Washington, DC, USA, May 2008*
- ⁵ Van Wassenhove, L N. Humanitarian Aid Logistics: Supply Chain Management in High Gear. *Journal of the Operational Research Society*, Vol. 57, 2006, pp. 475–489.
- ⁶ Kovács, Gyöngyi and Spens, Karen M. Humanitarian Logistics In Disaster Relief Operations, *International Journal of Physical Distribution & Logistics Management*, Vol. 37 No: 2, 2007, pp.99 – 114.
- ⁷ Beamon, Benita M. and Kotleba, Stephen A. Inventory Modeling for Complex Emergencies in Humanitarian relief operations. *International Journal of Logistics Research and Applications*. Vol. 9, No 1, 2006
- ⁸ Pettit, Stephen and Beresford, Anthony. Critical Success Factors In The Context Of Humanitarian Aid Supply Chains, *International Journal of Physical Distribution & Logistics Management*, Vol. 39, No. 6, 2009, pp.450 – 468
- ⁹ Kovács, Gyöngyi and Spens, Karen. Identifying Challenges In Humanitarian Logistics, *International Journal of Physical Distribution & Logistics Management*, Vol. 39, No. 6, 2009, pp.506 - 528
- ¹⁰ Daskin, M.S. *Network and Discrete Location: Models, Algorithms, and Applications*. John Wiley, New York, 1995.
- ¹¹ Snyder, L.V. Facility Location under Uncertainty: A Review. *IIE Transactions*, Vol. 38, No. 7, 2006, pp. 547-564
- ¹² Wagner, M.R., J. Bhadury, S. Peng. Risk Management in Uncapacitated Facility Location Models with Random Demands. *Computers and Operations Research*, Vol. 36, No. 4, 2009, pp. 1002-1011.

-
- ¹³ Murali, P., F. Ordonez, and M.M. Dessouky. Facility Location under Demand Uncertainty: Response to a Large-scale Bio-terror attack. *Socio-Economic Planning Sciences*, Vol. 46, No. 1, 2012, pp. 78-87.
- ¹⁴ Caro, F., K. Rajaram, J. Wollenweber. *Process Location and Product Distribution with Uncertain Yields*. *Operations Research*, 2012.
- ¹⁵ Dekle, J., Lavieri, M.S., Martin, E., Emir-Farinas, H., and Francis, R. A Florida County Locates Disaster Recovery Centers. *Interfaces*, Vol. 35, No. 2, 2005, pp. 133-139.
- ¹⁶ Horner, M.W., and Downs, J. A. Testing A Flexible Geographic Information System-Based Network Flow Model for Routing Hurricane Disaster Relief Goods. *Transportation Research Record*, No. 2022, 2007, pp. 47-54.
- ¹⁷ Snyder, L.V., and M.S. Daskin. Reliability Models for Facility Location: the Expected Failure Cost Case. *Transportation Science*, Vol. 39, No. 3, 2005, pp. 400-416.
- ¹⁸ Berman, O., D. Krass, and M.B.C. Menezes. Facility Reliability Issues in Network p-Median Problems: Strategic Centralization and Co-Location Effects. *Operations Research*. Vol. 55, No. 2, 2007, pp.332-350.
- ¹⁹ Hassin, R., Ravi, R., & Salman, F.S. Facility location on a network with unreliable links, Working paper. Retrieved October 24, 2012, from <http://www.di.unipi.it/di/groups/optimize/Events/proceedings/M/B/4/MB4-4.pdf>.
- ²⁰ Eiselt, H.A., Gendreau, M., & Laporte, G. Optimal location of facilities on a network with an unreliable node or link. *Information Processing Letters*, Vol. 58, No. 2, 1996, pp.71-74.
- ²¹ Li, X., & Ouyang, Y. (2010). A continuum approximation approach to reliable facility location design under correlated probabilistic disruptions, Vol. 44, No. 4, 2010, pp.535-548.
- ²² Cui, T.Y., Ouyang, Y., & Shen, Z.J. Reliable facility locations design under the risk of disruptions. *Operations Research*, Vol. 58, No. 4, 2010, pp. 998-1011.
- ²³ Pavankumar Murali, Fernando Ord óñez, Maged M. Dessouky, Facility location under demand uncertainty: Response to a large-scale bio-terror attack, *Socio-Economic Planing Sciences*, Vol. 46, No. 1, 2012, pp. 78-87.
- ²⁴ Shukla, A., Lalit V. A. and Venkatasubramanian, V., “Optimizing efficiency-robustness trade-offs in supply chain design under uncertainty due to disruptions”, Vol. 41 No. 6, 2011, pp. 624-645.

-
- ²⁵ Hong, J., Xie, Y., & Jeong, K., “Development and evaluation of an integrated emergency response facility location model”, *Journal of Industrial Engineering Management*, Vol. 5, No. 1, 2012, pp. 4 – 21.
- ²⁶ Green, L., and P. Kilesar, Improving Emergency Responsiveness with Management Science, *Management Science*, Vol. 50, No. 8, 2004, pp.1001-1014.
- ²⁷ Bravata, D.M., Zaric, G.S., Holty, J-E.C., Brandeau, M.L., Wilhelm, E.R., McDonald, K.M., and D.K. Owens. Reduc-ing Mortality from Anthrax Bioterrorism: Costs and Benefits of Alternative Strategies for Stockpiling and Dispensing Medical and Pharmaceutical Supplies, *Biosecurity and Bioterrorism, Biodefense Strategy, Practice and Science*, Vol. 4, 2006, pp. 244-262.
- ²⁸ Wein, L. M., and Y. Liu. Analyzing a Bioterror Attack on the Food Supply: The Case of Botulium in Milk. *Proceedings of the National Academy of Sciences* Vol. 102, 2005, pp. 9984-9989.
- ²⁹ Lee , Yong M., Ghosh, Soumyadip, and Ettl, Markus. Simulating Distribution of Emergency Relief Supplies for Disaster Response Operations. *Proceedings of the 2009 Winter Simulation Conference*, 2009
- ³⁰ Hupert, E. G., I. Mushlin, and M. A. Callahan., Modeling the Public Health Response to Bioterrorism: Using Discrete Event Simulation to Design Antibiotic Distribution Center, *Medical Decision Making*, Vol.22, No. 5, 2002, pp. 17-25.
- ³¹ Aaby, K., J. Hermann, C. Jordan, M. Treadwell., and K. Wood., Montgomery County’s Public Health Service Uses Operations Research to Plan Emergency Mass Dispensing and Vaccination Clinics, *Interfaces*, Vol. 36, No. 6, 2006, pp. 567-579.
- ³² Whitworth, M. H., Designing the Response to an Anthrax Attack, *Interfaces*, Vol. 36, No. 6, 2006, pp. 562-568.
- ³³ Lee, E. K., S. Maheshwary, J. Mason, and W. Glissom., Large-Scale Dispensing for Emergency Response to Bioterrorism and Infectious-Disease Outbreak, *Interfaces*, Vol. 36, No. 6, 2006, pp. 591-607.
- ³⁴ Lee, Y.M. Analyzing Dispensing Plan for Emergency Medical Supplies in the Event of Bioterrorism, *The Proceedings of the 2008 Winter Simulation Conference*, 2008

SEQUENCING RELIABILITY INITIATIVES IN SERVICES

Joanne S. Utley, School of Business and Economics, North Carolina A&T State University,
Greensboro, NC 27411, (336)285-3390, sulekj@ncat.edu

Rhonda L. Hensley, School of Business and Economics, North Carolina A&T State University,
Greensboro, NC 27411, (336)285-3360, hensleyr@ncat.edu

Kathryn Dobie, School of Business and Economics, North Carolina A&T State University,
Greensboro, NC 27411, (336)285-3298, kaydobie@ncat.edu

ABSTRACT

This study examines a systems-based approach to improving service reliability. Three key concepts are introduced: 1) visualization of the entire system as a network of inter-connected subsystems and components, 2) measurement and maintenance activities that support reliable service delivery and 3) a fault detection methodology to help minimize the effect of individual service failures. The proposed framework is studied using municipal water system survey data. Water systems are categorized according to their score on a Guttman planning scale [3]. Analysis of variance shows that water systems that do more planning outperform those who do less planning.

INTRODUCTION

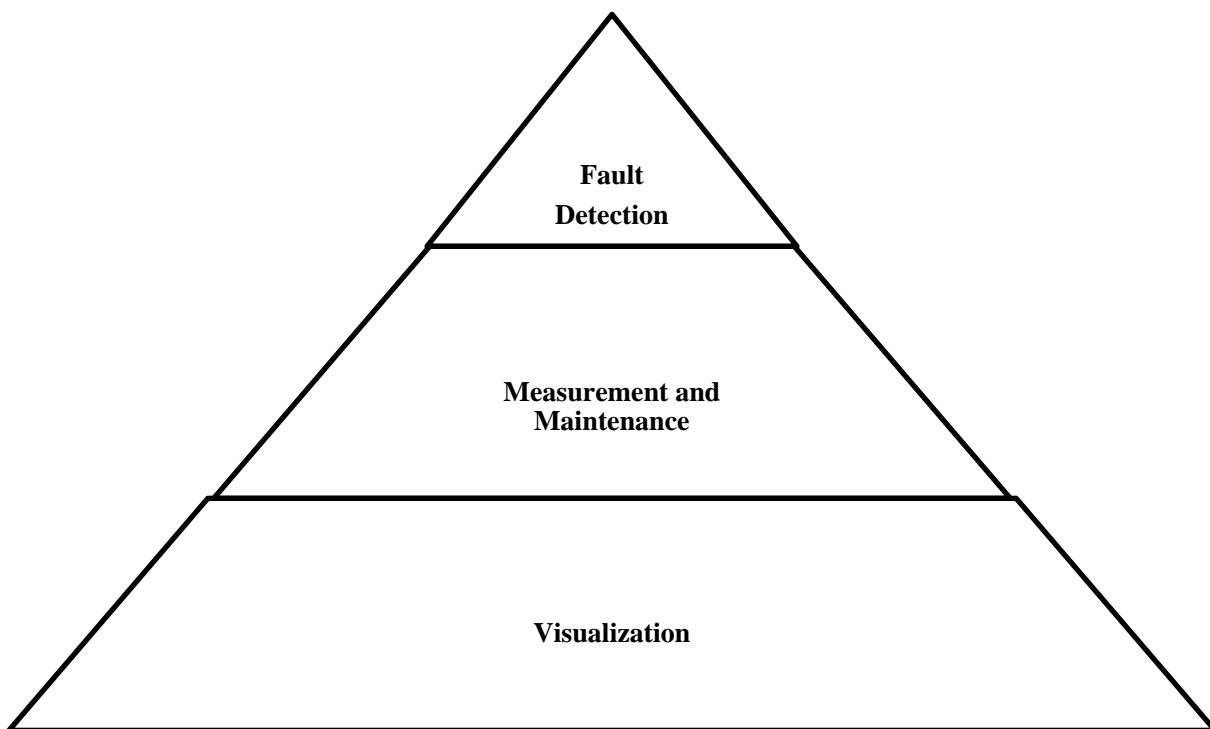
As service operations continue to grow in size and complexity, reliability initiatives will play an increasing important role in improving company performance. Service managers should no longer consider reliability management as simply a technical matter but rather as a strategic issue that affects key organizational metrics like productivity, cost, quality, customer retention and profitability [7, 11].

Given the current strategic implications of reliability in service operations, some researchers have begun to redefine the concept reliability. Once viewed as merely a component of quality, reliability has recently been characterized as an extension of quality. For instance, Sun, Xi, Du and Ju [14, p. 152] argued that reliability can be thought of as “quality over time” while Madu [6, p. 698] has asserted that “Quality and reliability are synonymous. A system cannot be reliable if it does not have high quality. Likewise a system cannot be of high quality if it is not reliable.” Despite this redefinition of reliability, relatively few studies in the service management literature have focused on reliability improvement techniques [4]. Moreover, these studies dealt mainly with technical tools for analyzing service failure at the sub-system level while neglecting the system-wide effects of reliability problems [11]. Since these system-wide effects may be potentially devastating for a service company, a systems-based approach to undertaking reliability improvement initiatives could prove useful to service managers. This study will propose such an approach and will illustrate how it can be used to sequence reliability improvements in service contexts. Data from actual service operations are used to establish a sequencing plan. In addition, efficiency data from the same operations are analyzed to investigate the effect of the sequencing plan on service performance. As discussed in the next section, the sequencing approach reflects three natural levels of reliability planning.

RELIABILITY PLANNING

A systems-based approach to improving service reliability involves three key concepts: 1) visualization of the entire system as a network of many inter-connected subsystems and components, 2) measurement and maintenance activities that support reliable service delivery and 3) a fault detection methodology to help minimize the effect of individual service failures on overall system performance. These key concepts form three natural levels in the reliability sequencing framework shown in Figure 1.

**FIGURE 1
RELIABILITY SEQUENCE**



As Figure 1 illustrates, system visualization forms the base of the sequencing framework. While most past research on reliability has focused exclusively on subsystem reliability, relatively few studies have advocated a system-wide approach to reliability [2, 4, 11]. A system-wide approach is essential to improving reliability because a lack of systems thinking frequently generates service errors [5]. In contrast with the many techniques used to analyze error at the component level, system visualization allows the service manager to consider the reliability of the system as a whole while simultaneously accounting for the effects of subsystem/component reliability on system performance [11]. System visualization can take varying forms in practice. For instance, in a high contact service system, service blueprinting can tie together the multiple phases the customer experiences during service delivery [10]. In a low contact service system such as a public utility, system visualization might entail a network diagram of the physical components of the service system and their inter-relationships.

The second level of the framework depicted in Figure 1 involves measurement. As in the case of service quality, it is difficult to analyze and improve reliability without meaningful metrics, [8, 13]. These metrics should align with the performance issues the company wishes to investigate. The exact form of the metrics(s) will depend on the service context. For instance, reliability metrics developed for health care services will differ substantially from reliability measures used in the restaurant industry. Once appropriate metrics are devised the service will need to maintain the technology and equipment used in the measurement process. Maintainability is critical to reliability management for two reasons: 1) it reduces the probability that the measurement process is generating inaccurate data and 2) it helps to prevent disruptions to the measurement process due to technical failure [7].

The top level of the framework shown in Figure 1 deals with fault/error detection. Reliability management at this level requires closer analysis of the subsystems/components that were identified at the system visualization level [4]. The primary purpose of the fault detection level is to specify and enact reliability tests tailored to the specific system component(s) under consideration. Results from these tests should help the manager keep problems at the component level from spreading to system level performance problems [11].

While the three levels of the framework presented in Figure 1 represent natural stages in a reliability planning process, they do not by themselves guide managers through the maze of potential reliability initiatives that are possible within a specific industry. Needed is a straightforward methodology by which managers can utilize industry specific knowledge to sequence reliability improvements. Such a methodology is presented in the next section.

SEQUENCING METHODOLOGY

Sequencing reliability initiatives is a special case of the more general problem of developing a scale to order a set of binary questions. Guttman [3] addressed this general problem by devising a scaling methodology based on an analysis of patterns in question responses [1]. Guttman's approach is not only useful for positioning the binary questions on a single dimension but it also supports prediction of any outside variables affected by items on the scale [3, p. 148].

While Guttman scaling has been used primarily in social psychology and education research, there are some instances of its use in business contexts [1]. For instance, an early application by Stagner, Chalmers and Derber [12] described the development of a ten-item Guttman scale to measure management attitude toward unions (0.085 error rate) and a nine-item scale to measure union attitude toward management (0.098 error rate).

Later business applications included both scale development and performance predictions based on scale scores. For example, Wood and LaForge [15, 16] devised and used a Guttman scale to measure comprehensiveness of planning efforts at large U.S. banks. They identified a six-item Guttman scale which was then compared to growth in net income and return on investment. Their results showed that comprehensive planners (those with high scores on the planning scale) out-performed banks that had less comprehensive planning processes in place. Robinson and Pearce used the Wood and LaForge scale in a study of manufacturing firms and found that "firms

which engaged in a high-to-moderate level of sophistication in planning and were committed to a consistent and effective strategic orientation ranked in the highest performing group” [9, p. 56]. Wood, Minor and Hensley [17] created a planning scale for operational level planning in large U.S. banks. The five-item scale was compared to performance and showed that comprehensive planners out-performed those banks that did less comprehensive planning.

CASE APPLICATION

The application context involved a set of municipal water systems operating within a single state in Southeast United States. Drought conditions – in some cases severe- occurred frequently in this state, particularly in its western counties. Thus, reliable water delivery and operating efficiency were crucial for this set of water systems. A total of 535 distinct water systems in the geographic area were surveyed. Surveys were initially completed by the manager of the water system and were then checked and revised, if necessary, by an engineering company hired to conduct the study. The survey instrument was comprehensive in that it asked respondents to report operational performance metrics as well as complete a set of binary questions dealing their adoption of various reliability initiatives. Twenty-one respondents were omitted because they gave all “no” answers to the binary questions. One additional survey did not contain any answers to the binary questions and was also dropped from further evaluation. This resulted in a usable sample size of 513.

The responses to the binary questions were analyzed with Guttman’s scaling methodology to determine the natural ordering for reliability initiatives in this service context. The specific steps in the scaling process are illustrated in the following subsection.

Guttman Scaling Process

Application of the Guttman scaling methodology consisted of a series of steps which are described below and summarized in Figure 2.

Step 1: Summation of the “yes” answers for each binary question under consideration for the scale.

A total of seven binary questions on reliability initiatives were considered for inclusion in the scale (see Table 1). Each of these initiatives is used in practice for improving reliability in water delivery. The number of “yes” answers was totaled for each question.

Step 2: Ranking the binary questions by the number of “yes” answers found in step 1.

Table 1 shows that question 6 (Is the system mapped?) received the highest number of “yes” answers. In answering “yes” to this question, the manager meant that he or she knew where the water lines ran and how they were connected. Question 5 (Are all valves, hydrants and meters located?) received the second highest number of “yes” responses. At first glance this seems to be the same question as the sixth question that asked about mapping. In practice, respondents apparently make a distinction between mapping the water lines and knowing where other contact points in the system are located. The third most frequent yes answer occurred for question 3 (Is a meter replacement system in place?). Question 2 (Is a valve exercise program in place?) and question 1 (Is a leak detection program in place?) both addressed the issue of using regular

programs to measure system performance and received the 4th and 5th most responses, respectively. Finally, question 7 (Is the system mapped in GIS format?) and question 4 (Has a

FIGURE 2
GUTTMAN SCALING PROCESS

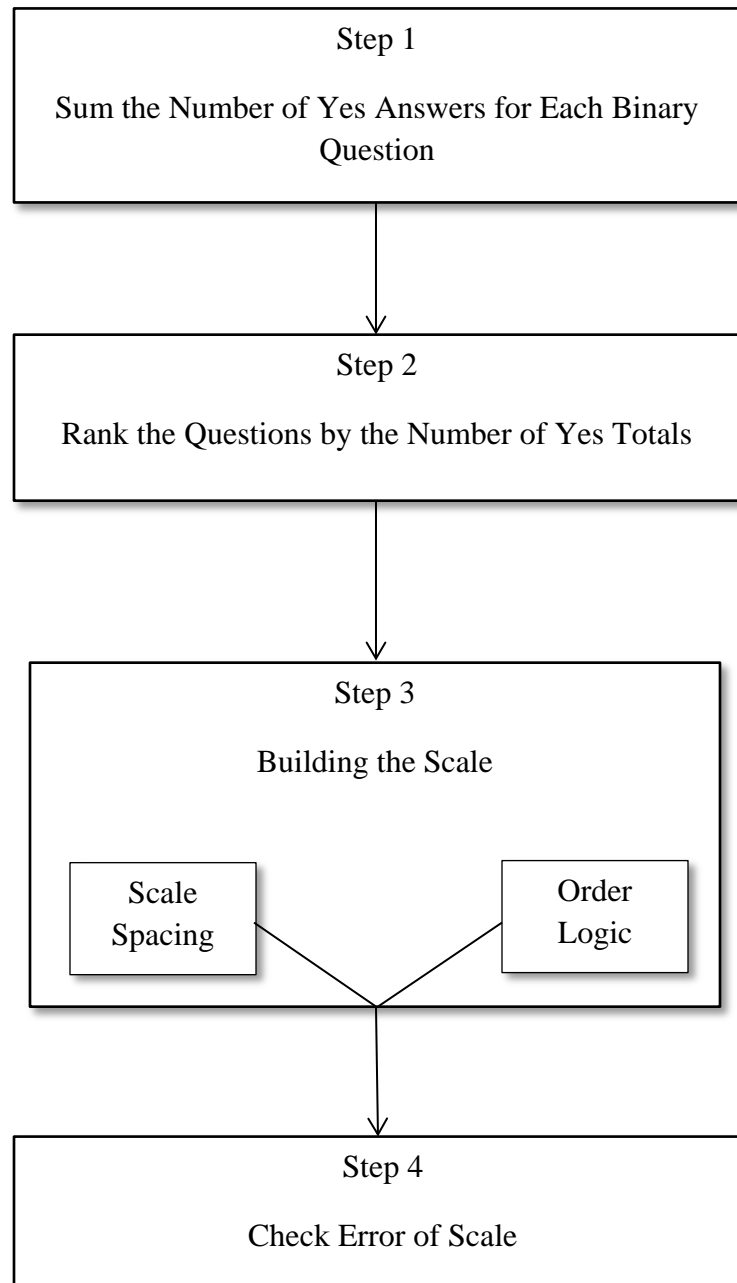


TABLE 1
BINARY QUESTIONS CONSIDERED FOR INCLUSION IN THE GUTTMAN SCALE

Question Number	Question	Total Yes Answers	Distance from Previous Question
6	Is the system mapped?	478	--
5	Are all valves, hydrants and meters located?	397	81
3	Is a meter replacement program in place?	334	63
2	Is a valve exercise program in place?	228	106
1	Is a leak detection program in place?	166	62
7	Is the system map in a GIS format?	143	23
4	Has a leak detection study been done in the past five years?	133	10

leak detection study been done in the last 4 years?) received the 6th and 7th most responses, respectively.

Step 3: Structuring the scale

Once the binary questions have been ranked by number of “yes” responses, it is important to calculate the difference in “yes” totals for each pair of adjacent questions (Table 1). This provides a check on the spacing of adjacent items considered for the scale. If adjacent items have “yes” totals that are numerically close, then the analyst should consider dropping one of the adjacent items from the final scale. In addition, the analyst should check for the overall order logic of the proposed scale. As Stagner, Chalmers and Derber observe, “ideally, in Guttman scaling, the marginal entries should be widely and fairly uniformly spread; i.e., there should be a range from an item answered favorably by almost everyone to one which is answered unfavorably by most of the population, and items well spaced between these two” [12, p. 298]. Application of this rule reduced the number of questions to six – with question 2 omitted. After considering the order logic, it was decided to also drop question 7 because it did not seem to fit with the focus of the other questions. The resulting 5-level scale is shown in Table 2.

TABLE 2
FINAL GUTTMAN SCALE

Scale Score	Question
1	Is the water system mapped?
2	Are all valves, hydrants and meters located?
3	Is a meter replacement program in place?
4	Is a leak detection program in place?
5	Has a leak detection study been done in the past five years?

Step 4: Checking scale error.

Since no scale is perfect, error must be measured [3]. Guttman proposed using a coefficient of reproducibility which he defined as “the empirical relative frequency with which values of the attributes do correspond to intervals of a scale variable” [3, p. 150]. This is a measure of “the number of responses correctly located as favorable or unfavorable divided by the total number of responses” [12, p.297]. Guttman states that an acceptable scale is one that is 85 percent perfect (i.e. 15% error rate) [3].

The number of errors was counted for each level of the scale shown in Table 3. A total of 203 errors occurred in the scale (see Table 3). The total possible number of errors is 2565 (513 respondents x 5 questions). The error rate is 0.079 (203 divided by 2565), well below the 15% error rate proposed by Guttman [3].

**TABLE 3
TOTAL ERRORS BY GUTTMAN SCALE SCORE**

Scale Score	Total Errors
1	19
2	47
3	82
4	55
5	0
Total	203

Given the low error rate of the 5-level scale, the scale provides a natural sequencing for reliability initiatives for this set of water systems. In addition, this scale can be used to analyze outcome variables of interest to the water systems. An example of how the scale supports this analysis process is described in the following subsection.

Analysis of Performance

One important performance measure for water systems is the Percent Water Loss metric. This metric is an efficiency measure based on ratio of annual water loss to total annual usage. The ratio approach controls for the size of the water system. The formula for Percent Water Loss is given below.

$$\text{Percent Water Loss} = \left(\frac{(\text{Average Monthly Unaccounted}) \times 12}{\text{Total Annual Water Usage}} \right) \times 100 \quad (1)$$

The Guttman scale shown in Table 2 was used to compare the Percent Water Loss for systems positioned at the low end of the scale (i.e., exhibited rudimentary reliability planning) and systems positioned at the upper end of the scale (i.e., exhibited more comprehensive reliability planning).

The analysis began with the reduction of the usable sample to the 305 systems that answered survey questions related to average monthly unaccounted water use and total annual water usage. These 305 respondents were divided into 4 groups: (1) those who were doing no reliability

planning and thus scored zero on the Guttman scale, (2) those who scored a 1 or 2 on the scale and this exhibited a low level of reliability planning, (3) those who scored a 3 on the scale and were there defined as being at the medium planning level and (4) those who scored either a 4 or 5 and thus exhibited a high degree of reliability planning (Table 4). For purposes of further analysis, respondents who scored zero were omitted.

**TABLE 4
GROUPINGS**

Group	Degree of Reliability Planning	Guttman Scale Score
1	Low	1,2
2	Medium	3
3	High	4,5

Data analysis was conducted using SPSS. Descriptive statistics showed that the mean scores for the annual water loss percent ranged from a high of 20.5% for the respondents having a low degree of reliability planning to a low of 10.9% for those having a high degree of reliability planning (Table 5).

**TABLE 5
DESCRIPTIVE STATISTICS**

Group	Sample Size	Mean	Standard Deviation
Low	84	.205251	.2830532
Medium	67	.116428	.1061095
High	135	.108577	.0982748

T-tests were run in order to compare the mean annual water loss percent for the three groups (see Table 6). Results showed that the low planners are significantly different from both the medium planners ($p = 0.045$) and the high planners ($p = 0.026$).

**TABLE 6
T-TEST RESULTS¹**

Groups Compared		T Statistic	p-value
Low	Medium	2.030	0.045 ¹
	High	2.267	0.026 ¹
Medium	High	0.521	0.603

¹Significant at $p \leq 0.05$

DISCUSSION

This study proposed a systems-based approach to undertaking reliability initiatives. The approach identified three natural levels to sequencing reliability initiatives: 1) system visualization, 2) measurement and maintenance and 3) fault detection. Guttman scaling was applied to survey results from a case application involving 535 water systems to determine if industry specific data reflected these three natural planning levels.

Scaling results from the case application supported the systems-based sequencing approach. The two lowest levels on the Guttman scale did correspond to system visualization. In this application visualization included water system mapping (level 1 on the Guttman scale) and location of all valves, hydrants and meters (level 2 on the Guttman scale). The middle level on the Guttman scale (a meter replacement program in place) corresponded to the measurement/maintenance level in the sequencing framework. Finally, the 4th and 5th levels on the Guttman scale (leak detection program in place and leak detection study done in the last 5 years, respectively) mirrored the fault detection level or highest level in the sequencing approach.

The scaling results were then used to categorize the respondents by the extent to which they adopted the reliability initiatives in the Guttman scale. Systems with minimal adoption (i.e., initiatives adopted related only to system visualization) were found to be significantly less efficient in water usage (as measured by the Percent Water Loss metric) than those positioned at both the middle level (measurement) or the top level of the sequencing framework (fault detection level). This finding suggests that the water systems positioned at the low end of the scale should consider the potential improvements in performance that can accrue with the adoption of higher level reliability initiatives.

Although the results from the case application suggest that the system-based framework can help a service manager sequence reliability initiatives, there are a few limitations in the current study that must be addressed in future research. First, this research context dealt with water systems; it does not predict how well the framework and Guttman scaling methodology would work in other contexts. Thus, it is important to replicate the findings in other types of services, particularly those that are high contact services. Second, the survey instrument used in this study dealt with performance and planning issues in water systems and thus is not adaptable to other types of services. This implies that much start up effort will be required to devise a suitable survey for another type of service. Consequently, further research will be needed to understand the types of initiatives and performance metrics applicable in different types of services. Finally, the scaling methodology utilized a rather large sample size. In some service contexts it may be a challenging task to acquire sufficient data across a large number of *distinct* service systems. However, it is possible that the methodology could be adapted to investigate subsystems or operations within a particular service context. While these limitations will need to be addressed in future research efforts, the current study does offer a general approach to sequencing reliability initiatives, classifying respondents by means of Guttman scale results and examining the impact of scale position on performance metrics that are tailored to the particular research context.

REFERENCES

- [1] Abdi, H., Guttman Scaling, in Neil Salkind (Ed.), *Encyclopedia of Research Design*, Thousand Oaks, CA: Sage, available online at www.utdallas.edu/~herve/abdi-GuttmanScaling2010-pretty.pdf, 2010, 1-5.
- [2] Gorkemli, L. & Ulusoy, S.K., Fuzzy Bayesian reliability and availability analysis of production systems, *Computers & Industrial Engineering*, 2010, 59(4), 690-696.
- [3] Guttman, L., A basis for scaling qualitative data, *American Sociological Review*, 1944, 9(2), 139-150.
- [4] Hensley, R.L. & Utley, J.S., Using reliability tools in service operations, *International Journal of Quality and Reliability Management*, 2011, 28(5), 587-598.
- [5] Kuei, C-H. & Madu, C.N., Customer-centric six sigma quality and reliability management, *International Journal of Quality and Reliability Management*, 2003, 20(8/9), 954-964.
- [6] Madu, C.N., Reliability and quality interface, *International Journal of Quality and Reliability Management*, 1999, 16(7), 691-698.
- [7] Madu, C.N., Strategic value of reliability and maintainability management, *International Journal of Quality and Reliability Management*, 2005, 22(3), 317-328.
- [8] Palm, A.C., Rodriguez, R.N., Spiring, F.A. & Wheeler, D.J., Some perspectives and challenges for control chart methods, *Journal of Quality Technology*, 1997, 29(2), 122-127.
- [9] Robinson, R.B. & Pearce, J.A., Planned patterns of strategic behavior and their relationship to business-unit performance, *Strategic Management Journal*, 1988, 9(1), 43-60.
- [10] Shostack, G.L., Designing services that deliver, *Harvard Business Review*, 1984, 61(1), 133-139.
- [11] Song, B., Lee, C. & Park, Y., Assessing the risks of service failures based on ripple effects: a Bayesian network approach, *International Journal of Production Economics*, 2012, forthcoming: doi:10.1016/j.ijpe.2011.12.010.
- [12] Stagner, R., Chalmers, W.E. & Derber, M., Guttman-type scales for union and management attitudes toward each other, *Journal of Applied Psychology*, 1958, 42(5), 293-300.
- [13] Sulek, J., Statistical quality control in services, *International Journal of Services Technology and Management*, 2004, 5(5/6), 522-531.
- [14] Sun, J., Xi, L., Du, S. & Ju, B., Reliability modeling and analysis of serial-parallel hybrid multi-operational manufacturing system considering dimensional quality, tool degradation and system configuration, *International Journal of Production Economics*, 2008, 114(1), 149-64.
- [15] Wood, D.R. & LaForge, R.L., The impact of comprehensive planning on financial performance, *Academy of Management Journal*, 1979, 22 (3), 516-526.
- [16] Wood, D.R. & LaForge, R.L., Toward the development of a planning scale: an example from the banking industry, *Strategic Management Journal*, 1981, 2(2), 209-216.
- [17] Wood, D.R., Minor, E.D. & Hensley, R.L., Evaluating operations center planning, *Bankers Magazine*, 1995, 178(1), 14-16.

CATEGORIZING OM-RELATED JOURNALS USING CITATIONS

Joan M. Donohue, Department of Management Science, University of South Carolina,
Columbia, SC 29208, (803) 777-5924, donohue@moore.sc.edu

Timothy D. Fry, Department of Management Science, University of South Carolina,
Columbia, SC 29208, (803) 777-2785, timfry@moore.sc.edu

INTRODUCTION

In a 2011 *Omega*, Meredith, Steward, and Lewis [1] contribute to the important issue of categorizing and then ranking journals that publish Operations Management (OM) research. The authors surveyed 206 AACSB-accredited business schools, asking them to provide their official in-house journal lists for evaluating faculty publications. Using their survey results, a metric was calculated and used to provide rankings of journals dedicated to publishing strictly OM research. The survey identified 71 journals being used to evaluate OM faculty at AACSB schools. The authors then categorized 30 of the journals as “OM-dedicated,” 33 as “Reference,” and 8 as “Interdisciplinary.” Only the 30 OM-dedicated journals were ranked in their published research. We feel that this approach falls short in identifying a set of highly regarded journals for OM faculty facing tenure and promotion decisions. Additionally, we question the authors’ categorization of journals. Some of their OM-dedicated journals are classified as trade magazines by Ulrich’s Periodical Directory [2] (see Table 1) and, further, we feel that some of these journals are not strictly dedicated to publishing OM research. The authors used a subjective approach to categorize journals as one of the following 3 types:

1. OM-dedicated
2. Reference

3. Interdisciplinary.

The resulting journal categorizations for the 71 journals are shown in Table 1. The authors note that they relied on five potential sources of evidence to help categorize the journals:

- a) The specific aims and scope stated by the journal.
- b) The type of society (e.g., engineering, economics, operations research, production research) if the journal is sponsored by such an institution.
- c) The variety of membership groups within the society, if society sponsored.
- d) The diversity of articles actually published in the journal.
- e) Holsapple and Lee-Post's [3] categorization, if the journal appeared on their list.

In their 2010 *Omega* article, Holsapple and Lee-Post [3] evaluated OM journals by examining the publishing behavior (from 1980 through 2006) of 90 full-time, tenured OM researchers at 31 top-rated universities. There were 27 journals that had at least 10 articles published by one of the 90 benchmark OM researchers. The authors categorized those 27 journals into one of the following categories or subcategories:

1. devoted to OM topics
2. publish articles from multiple disciplines (including OM)
3. devoted to reference disciplines (e.g., industrial engineering, information systems, quantitative methods).

The journal categorizations reported by Holsapple and Lee-Post [3] are shown in Table 1. Only 26 of the 27 journals they classified are shown in the table because the *Academy of Management Review* was not included in the Meredith, Steward and Lewis [1] study. It can be seen that Holsapple and Lee-Post's study included only 10 of the 30 journals deemed

OM-dedicated by Meredith, Steward, and Lewis [1] , 11 of the 33 Reference journals, and 5 of the 8 Interdisciplinary journals.

Another recent article that categorized OM journals was published by Petersen, Aase, and Heiser [4] in 2011. These authors evaluated 32 journals that publish OM research by counting citations to those journals by three major OM journals (*Journal of Operations Management, Production and Operations Management, and International Journal of Production and Operations Management*). The authors classified their 32 journals according to five research domains:

1. OM – journals that are highly relevant to operations and technology management.
2. OR/MS – journals that publish highly rigorous modeling research, quantitative logistics, applications of OR, or operational issues that have a much broader scope than OM.
3. GM – general management journals.
4. IE/ENG journals – industrial engineering and other engineering journals.
5. Sector/Miscellaneous – journals that publish quality issues related to OM and IE, service industry and marketing research, and other miscellaneous research related to OM.

The journal categorizations reported by Petersen, Aase, and Heiser [4] are also shown in Table 1. Only 27 of the 32 journals they classified are shown in the table because the *Academy of Management Journal, Academy of Management Review, International Journal of Quality and Reliability Management, International Transactions in Operations Research, and the Journal of Industrial Engineering* were not included in the Meredith, Steward and Lewis [1] study. It can be seen that these authors only included 8 of the 30 journals deemed OM-dedicated by Meredith, Steward, and Lewis [1], 13 of the 33 Reference journals, and 6 of

the 8 Interdisciplinary journals. There are 19 journals in common across all 3 studies of which 6 are OM-dedicated, 9 are Reference, and 4 are Interdisciplinary.

PROPOSED RESEARCH

We propose a method that uses citation data to categorize journals. This is an objective approach as opposed to the subjective approaches used in [1], [3], and [4]. Citation data is available on-line from Thomson Reuter's JCR (Journal Citation Reports) [5] for 58 of the 71 journals included in the Meredith, Steward, and Lewis [1] study. Table 1 indicates which journals are included in the JCR database and in which section (Sciences or Social Sciences). Concerning the 13 journals not included in the JCR database, 3 are no longer published. For the remaining 10 journals, we will either omit them from this study or collect the data manually. Also, a number of journals have incomplete citation data for the 7 year time period:

Business Horizons was added in 2010.

International Journal of Logistics Management was added in 2011.

International Journal of Physical Distrib. & Logistics Management was added in 2010.

International Transactions in Operational Research was added in 2011.

Journal of Business Logistics was added in 2010.

Journal of Purchasing and Supply Management was added in 2011.

Journal of Supply Chain Management was added in 2010.

Manufacturing and Service Operations Management was added in 2008.

The data we are collecting consists of every citation (the journal or book cited) in every article for each of the journals over the 7 year time period. Eventually we would like to look at changes over time but for the purposes of the conference, we will focus on the year 2011 (the latest available in the JCR). We will then tabulate the percentage of each

journal's citations to the various sources. We believe that the citations to other journals are indicative of the type of journal doing the citing. For example, we assume that OM journals will cite mostly OM journals whereas engineering journals will cite mostly engineering journals. Therefore, we believe that our proposed "objective" method will be better suited for discerning whether journals are truly OM-dedicated when compared to the "subjective" approaches used in the earlier studies [1], [3], and [4]. To our knowledge, a citation approach has never been used to classify and categorize OM journals. We hypothesize that there will be a clustering of journals based on the percentage of citations to related journals. This clustering may lead to an analytical approach for determining the focus of academic journals, which may or may not agree with subjective categorization approaches and/or with the mission statements of the journals

REFERENCES

- [1] Meredith, Jack R., Michelle D. Steward, Bruce R. Lewis, Knowledge dissemination in operations management: Published perceptions versus academic reality, *Omega*, Volume 39, Issue 4, August 2011, Pages 435-446.
- [2] Ulrich's Periodicals Directory On-Line, R.R. Bowker LLC, New Providence, NJ, 2012. Retrieved October 2012 from <http://www.ulrichsweb.com>.
- [3] Holsapple, Clyde W. and Anita Lee-Post, Behavior-based analysis of knowledge dissemination channels in operations management, *Omega*, Volume 38, Issues 3-4, June-August 2010, Pages 167-178.
- [4] Petersen, Charles G., Gerald R. Aase, Daniel R. Heiser, Journal ranking analyses of operations management research, *International Journal of Operations & Production Management*, Volume 31, Issue 4, 2011, Pages 405-422.
- [5] Thomson Reuters, Journal Citation Reports ISI Web of Knowledge, JCR Science and Social Science Editions, 2005-2011. Retrieved October 2012 from http://wokinfo.com/products_tools/analytical/jcr/.

Table 1. Journals Categorized as OM-Dedicated, Reference, and Interdisciplinary by Meredith, Steward and Lewis [1]

	Journal	Meredith [1] Categorization	Holsapple [3] Categorization	Petersen [4] Categorization	Ulrich's [2] Content & Serial Types	JCR [5] Section (if included)*
1	FSMJ <i>International Journal of Flexible Manufacturing Systems (a)</i>	OM-dedicated	OM/Engineering		Academic/Scholarly Journal	Science
2	IJLM <i>International Journal of Logistics Management</i>	OM-dedicated			Academic/Scholarly Journal	2011-Social Sciences
3	IJOPM <i>International Journal of Operations and Production Management</i>	OM-dedicated	OM	OM	Academic/Scholarly Journal	Social Sciences
4	IJOQM <i>International Journal of Operations and Quantitative Management</i>	OM-dedicated			Academic/Scholarly Journal	
5	IJPDLM <i>International Journal of Physical Distribution and Logistics Management</i>	OM-dedicated			Academic/Scholarly Journal	2010-Social Sciences
6	IJPR <i>International Journal of Production Research</i>	OM-dedicated	OM	OM	Academic/Scholarly Journal	Science
7	- <i>International Journal of Purchasing and Materials Management (b)</i>	OM-dedicated	OM			
8	JSM <i>International Journal of Service Industry Management (c)</i>	OM-dedicated		Sector/Misc.	Academic/Scholarly Journal	Social Sciences
9	JBL <i>Journal of Business Logistics</i>	OM-dedicated			Academic/Scholarly Journal	2010-Social Sciences
10	- <i>Journal of Manufacturing and Operations Management (d)</i>	OM-dedicated				
11	JOM <i>Journal of Operations Management</i>	OM-dedicated	OM	OM	Academic/Scholarly Journal	Social Sciences
12	JPSM <i>Journal of Purchasing and Supply Management</i>	OM-dedicated			Academic/Scholarly Journal	2011-Social Sciences
13	JQT <i>Journal of Quality Technology</i>	OM-dedicated			Academic/Scholarly Journal	Science
14	JSCH <i>Journal of Scheduling</i>	OM-dedicated			Academic/Scholarly Journal	Science
15	JSCM <i>Journal of Supply Chain Management</i>	OM-dedicated		OM	Academic/Scholarly Journal	2010-Social Sciences
16	LTR <i>Logistics and Transportation Review</i>	OM-dedicated			Academic/Scholarly Journal	
17	MSOM <i>Manufacturing and Service Operations Management</i>	OM-dedicated	OM		Academic/Scholarly Journal	2008-Social Sciences
18	- <i>Manufacturing Review (e)</i>	OM-dedicated				
19	PIMJ <i>Production and Inventory Management Journal</i>	OM-dedicated	OM	OM	Academic/Scholarly Journal	
20	- <i>Production and Inventory Management Review (f)</i>	OM-dedicated				
21	POM <i>Production and Operations Management</i>	OM-dedicated	OM	OM	Academic/Scholarly Journal	Science
22	PPC <i>Production Planning and Control</i>	OM-dedicated			Academic/Scholarly Journal	Science
23	QM <i>Quality Magazine</i>	OM-dedicated			Trade Magazine	
24	QMJ <i>Quality Management Journal</i>	OM-dedicated	OM	Sector/Misc.	Academic/Scholarly Journal	
25	QP <i>Quality Progress</i>	OM-dedicated			Trade Magazine	
26	SIJ <i>Service Industries Journal</i>	OM-dedicated			Academic/Scholarly Journal	Social Sciences
27	SCMR <i>Supply Chain Management Review</i>	OM-dedicated			Trade Magazine	
28	SCMIJ <i>Supply Chain Management: An International Journal</i>	OM-dedicated			Academic/Scholarly Journal	Social Sciences
29	TQMJ <i>TQM Magazine</i>	OM-dedicated			Academic/Scholarly Journal	
30	TS <i>Transportation Science</i>	OM-dedicated	OM		Academic/Scholarly Journal	Social Sciences

Table 1. Journals Categorized as OM-Dedicated, Reference, and Interdisciplinary by Meredith, Steward and Lewis [1] (continued)

	Journal	Meredith [1] Categorization	Holsapple [3] Categorization	Petersen [4] Categorization	Ulrich's [2] Content & Serial Types	JCR [5] Section (if included)*
31	AJMMS <i>American Journal of Mathematical and Management Sciences</i>	Reference			Academic/Scholarly Journal	
32	AOR <i>Annals of Operations Research</i>	Reference	Quant Methods		Academic/Scholarly Journal	Science
33	CACM <i>Communications of the ACM</i>	Reference			Consumer Magazine	Science
34	CIE <i>Computers and Industrial Engineering</i>	Reference	Engineering	IE/ENG	Academic/Scholarly Journal	Science
35	COR <i>Computers and Operations Research</i>	Reference	Information Sys.	OR/MS	Academic/Scholarly Journal	Science
36	EMJ <i>Engineering Management Journal</i>	Reference			Academic/Scholarly Magazine	Science
37	EJOR <i>European Journal of Operational Research</i>	Reference	Multiple	OR/MS	Academic/Scholarly Journal	Science
38	IEEE-TEM <i>IEEE Transactions on Engineering Management</i>	Reference	Engineering		Academic/Scholarly Journal	Science
39	IEEE-TR <i>IEEE Transactions on Reliability</i>	Reference			Academic/Scholarly Journal	Science
40	IEEE-SMC <i>IEEE Transactions on Systems, Man, Cybernetics</i>	Reference			Academic/Scholarly Journal	Science
41	IIE <i>IIE Transactions</i>	Reference	Engineering	IE/ENG	Academic/Scholarly Journal	Science
42	IE <i>Industrial Engineering (g)</i>	Reference		IE/ENG	Trade Magazine	Science
43	IJC <i>INFORMS Journal on Computing</i>	Reference			Academic/Scholarly Journal	Science
44	IJPE <i>International Journal of Production Economics</i>	Reference	OM	OM	Academic/Scholarly Journal	Science
45	ITOR <i>International Transactions in Operational Research</i>	Reference			Academic/Scholarly Journal	2011-Social Sciences
46	JGO <i>Journal of Global Optimization</i>	Reference			Academic/Scholarly Journal	Science
47	JH <i>Journal of Heuristics</i>	Reference			Academic/Scholarly Journal	Science
48	JMGT <i>Journal of Management</i>	Reference			Academic/Scholarly Journal	Social Sciences
49	JMS <i>Journal of Manufacturing Systems</i>	Reference		IE/ENG	Academic/Scholarly Journal	Science
50	JACM <i>Journal of the ACM</i>	Reference			Academic/Scholarly Journal	Science
51	JASA <i>Journal of the American Statistical Association</i>	Reference			Academic/Scholarly Journal	Science
52	JORS <i>Journal of the Operations Research Society</i>	Reference	Quant Methods	OR/MS	Academic/Scholarly Journal	Social Sciences
53	MCM <i>Mathematical and Computer Modelling</i>	Reference			Academic/Scholarly Journal	Science
54	MP <i>Mathematical Programming</i>	Reference			Academic/Scholarly Journal	Science
55	MOR <i>Mathematics of Operations Research</i>	Reference		OR/MS	Academic/Scholarly Journal	Science
56	NRL <i>Naval Research Logistics</i>	Reference	Quant Methods	OR/MS	Academic/Scholarly Journal	Science
57	NETW <i>Networks</i>	Reference			Academic/Scholarly Journal	Science
58	OR <i>Operations Research</i>	Reference	Quant Methods	OR/MS	Academic/Scholarly Journal	Science
59	ORL <i>Operations Research Letters</i>	Reference	Quant Methods	OR/MS	Academic/Scholarly Journal	Science
60	SIAM <i>SIAM Review</i>	Reference			Academic/Scholarly Journal	Science
61	SIMUL <i>Simulation</i>	Reference			Academic/Scholarly Journal	Science
62	SMJ <i>Strategic Management Journal</i>	Reference		GM	Academic/Scholarly Journal	Social Sciences
63	TECHNO <i>Technometrics</i>	Reference			Academic/Scholarly Journal	Science

Table 1. Journals Categorized as OM-Dedicated, Reference, and Interdisciplinary by Meredith, Steward and Lewis [1] (continued)

	Journal	Meredith [1] Categorization	Holsapple [3] Categorization	Petersen [4] Categorization	Ulrich's [2] Content & Serial Types	JCR [5] Section (if included)*
64	BH <i>Business Horizons</i>	Interdisciplinary	Multiple		Trade Magazine	2010-Social Sciences
65	CMR <i>California Management Review</i>	Interdisciplinary			Academic/Scholarly Journal	Social Sciences
66	DS <i>Decision Sciences</i>	Interdisciplinary	Multiple	OR/MS	Academic/Scholarly Journal	Social Sciences
67	HBR <i>Harvard Business Review</i>	Interdisciplinary		GM	Trade Magazine	Social Sciences
68	INT <i>Interfaces</i>	Interdisciplinary	Multiple	OR/MS	Academic/Scholarly Journal	Social Sciences
69	MS <i>Management Science</i>	Interdisciplinary	Multiple	OR/MS	Academic/Scholarly Journal	Social Sciences
70	OMG <i>OMEGA - International Journal of Management Science</i>	Interdisciplinary	Multiple	OR/MS	Academic/Scholarly Journal	Social Sciences
71	SMR <i>Sloan Management Review</i>	Interdisciplinary		GM	Academic/Scholarly Journal	Social Sciences
	(a) Currently published as <i>Flexible Services and Manufacturing Journal</i>					
	(b) Currently published as the <i>Journal of Supply Chain Management</i>					
	(c) Currently published as the <i>Journal of Service Management</i>					
	(d) No longer published; rolled into the <i>International Journal of Production Economics</i>					
	(e) Ceased publication in 1995					
	(f) Ceased publication in 1991					
	(g) Currently published as <i>Industrial Engineer</i>					
	* Starting year (if not 2005) in JCR [5]					

Exploring the Role of Electronic Media for Class Instruction

Session Chair:

Robert Andrews

Virginia Commonwealth University
Richmond, VA

Presenters:

Barbara Price

Georgia Southern University
Statesboro, GA

David Levine

Baruch College (C U N Y)
New York, NY

David Stephan

Flushing, NY

Abstract:

Can electronic media improve instruction and learning outcomes? Session features two technologies: using an online homework manager versus a traditional homework assignment process and a pre-recorded video-mediated lesson paired with a “live” classroom lesson on the same topic. What can be learned from experiments comparing traditional instruction to instruction that uses new media and technology? Are there specific lessons to learn for each different use of electronic media and technology? What changes in instruction are necessary to make best use of electronic media? Is using electronic media more or less effective than traditional means? Is a mixture of traditional and new media-based methods better than using only one of these methods?

Publisher and Faculty Dialogue on Improving Instructional Materials

Session Chair:

Robert Andrews

Virginia Commonwealth University
Richmond, VA

Presenters:

Franny Kelly

John Wiley & Sons
Hoboken, NJ

Stepanian, Marianne

Erin Lane

Pearson Education
Boston, MA

Abstract:

Dialogue between faculty and publisher representatives from Pearson and Wiley to discuss ways for faculty and publishers to work together with a goal of improving the type and quality of the instructional materials available to promote student learning. It is an opportunity for faculty to let the publisher representatives know what courseware and resources would facilitate their role as an instructor and/or facilitate student learning.

Including Analytics in the Curriculum

Session Chair:

Robert Andrews

Virginia Commonwealth University
Richmond, VA

Presenters:

Kirk Karwan

Furman University
Greenville, SC

Kellie Keeling

University of Denver
Denver, CO

Barry Wray

University of North Carolina – Wilmington
Wilmington, NC

Abstract:

Many studies predict a shortage of people with analytics skills to be able meet the future demand for graduates who can effectively obtain and analyze data for the purpose of improved decision making. Session leaders will share their experiences about efforts to bring business analytics into the curriculum at their institutions. These experiences include creating a new analytics course and/or new track/major. These experiences are at both the undergraduate and master's levels.

Exploring Ways to Ask Effective Questions and Engage Students

Session Chair:

Robert Andrews

Virginia Commonwealth University
Richmond, VA

Presenters:

Chris Lowery

Georgia College & State University
Milledgeville, GA

Joan Donohue

University of South Carolina
Columbia, SC

Robert A. Stine

University of Pennsylvania
Philadelphia, PA

Abstract:

The instructor has the task of managing the class learning environment and must perform multiple roles that include delivering academic content, motivating students, guiding individual learning and measuring student learning. Session will discuss use of a project/case, flipping/inverting the classroom for class meetings, asking questions to effectively promote learning and asking questions to effectively measure student learning.

Innovation for Introducing Statistics to Business Students: Focus on Data and Analytics

Session Chair:

Robert Andrews
Virginia Commonwealth University
Richmond, VA

Presenters:

Noreen Sharpe
Georgetown University
Washington, DC

David Levine
Baruch College (C U N Y)
New York, NY

Abstract:

This session presents two proposals for an introductory statistics class to prepare students for a future with an abundance of data and a reliance on data driven decision making. The first "Patterns and Trends: What Data Really Reveal" is a course that assumes no prerequisites and uses readings from popular media. The second explains how Business Analytics and Big Data can be integrated into a one semester introductory undergraduate business statistics course and the tradeoffs that are involved with their inclusion including the topics that need to be deemphasized or eliminated. Time will be allotted for audience reaction to these proposals.

Exploring the Role of Resampling/Bootstrapping for Understanding Statistical Inference

Session Chair:

Robert Andrews
Virginia Commonwealth University
Richmond, VA

Presenter:

Richard DeVeaux
Williams College
Williamstown, MA

Abstract:

For students, understanding variability associated with a sample statistic and using it for inference by creating a confidence interval or statistically testing a stated hypothesis is typically difficult. This session will not advocate that bootstrapping or resampling methods replace classical inference methods but starts with a simple introduction and examines how these methods may be useful for instruction. The statistical software packages JMP, R, SPSS and StatCrunch currently provide some Bootstrap options so these methods are becoming more available. Come and learn about these methods and decide if they may be of value for instructing your students.