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# **ACADEMY OF EDUCATIONAL LEADERSHIP JOURNAL**

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## TABLE OF CONTENTS

EDITORIAL REVIEW BOARD.....	III
LETTER FROM THE EDITORS.....	VII
DEVELOPMENT AND VALIDATION OF PROFICIENCY TEST FOR UNDERGRADUATE STUDENTS .....	1
Rodiel C. Ferrer, De La Salle University, Manila, Philippines	
Glenda J. Ferrer, University of Rizal System, Philippines	
STUDENT PERFORMANCE ON THE CALIFORNIA CRITICAL THINKING SKILLS TEST .....	25
Neil Terry, West Texas A&M University	
Brittney Ervin, West Texas A&M University	
STUDENT PREPARATION AND PERSONALITY TRAITS IN THE JOB MARKET .....	35
Mike C. Zaccardi, Fidelity Capital	
Chelsea M. Howard, The Energy Authority	
Oliver Schnusenberg, The University of North Florida	
TIME COMPRESSED DELIVERY FOR QUANTITATIVE COLLEGE COURSES: THE KEY TO STUDENT SUCCESS.....	55
Timothy I. Anderson, University High School	
Randy J. Anderson, California State University, Fresno	
ASSESSING STUDENT PERFORMANCE AND ATTITUDES BASED ON COMMON LEARNING GOALS AND ALTERNATIVE PEDAGOGIES: THE CASE OF PRINCIPLES OF FINANCIAL ACCOUNTING .....	63
Curtis L. DeBerg, California State University, Chico	
Kenneth J. Chapman, California State University, Chico	
A QUALITATIVE ANALYSIS OF COLLEGE STUDENTS' PERCEPTIONS OF ACADEMIC INTEGRITY ON CAMPUS.....	81
Maneesh Thakkar, Radford University	
Suri Weisfeld-Spolter, Nova Southeastern University	

USING TRACKING DATA FOR CONTINUOUS MONITORING IN MANAGEMENT DISTANCE LEARNING COURSES .....	89
Songtao Mo, Purdue University Calumet	
Lin Zhao, Purdue University Calumet	
STUDENT PREFERENCES FOR EDUCATIONAL MATERIALS: OLD MEETS NEW .....	99
Sherry Robinson, Penn State University/Buskerud University College	
Hans Anton Stubberud, Buskerud University College	
LINKING STUDENT EFFORT TO SATISFACTION: THE IMPORTANCE F FACULTY SUPPORT IN CREATING A GAIN-LOSS FRAME .....	111
Joann E. Fredrickson, Bemidji State University	

## LETTER FROM THE EDITORS

Welcome to the *Academy of Educational Leadership Journal*. The editorial content of this journal is under the control of the Allied Academies, Inc., a non profit association of scholars whose purpose is to encourage and support the advancement and exchange of knowledge, understanding and teaching throughout the world. The mission of the *AELJ* is to publish theoretical, empirical, practical or pedagogic manuscripts in education. Its objective is to expand the boundaries of the literature by supporting the exchange of ideas and insights which further the understanding of education.

The articles contained in this volume have been double blind refereed. The acceptance rate for manuscripts in this issue, 25%, conforms to our editorial policies.

We intend to foster a supportive, mentoring effort on the part of the referees which will result in encouraging and supporting writers. We welcome different viewpoints because in differences we find learning; in differences we develop understanding; in differences we gain knowledge and in differences we develop the discipline into a more comprehensive, less esoteric, and dynamic metier.

Information about the *Journal* and the Allied Academies is published on our web site. In addition, we keep the web site updated with the latest activities of the organization. Please visit our site and know that we welcome hearing from you at any time.

Michael Shurden  
and  
Nancy Niles  
Editors





# DEVELOPMENT AND VALIDATION OF PROFICIENCY TEST FOR UNDERGRADUATE STUDENTS

**Rodiel C. Ferrer, De La Salle University, Manila, Philippines**  
**Glenda J. Ferrer, University of Rizal System, Philippines**

## ABSTRACT

*The expected output of the study is a computerized proficiency test for the third year undergraduate students whose major is Information Technology. It covered the ten major IT subjects taken by the students in the first and second years of their course. The subjects integrated in the computerized proficiency test were: Introduction to Information and Communications Technology, Program Logic Formulation with Programming I, Word processing, Spreadsheet, Computer Organization and Architecture, Operating System, Graphics Presentation and HTML, Data Communication and Networking, Database Programming, and Basic Electronics and PC Troubleshooting. The written exams constructed by the IT professors/instructors, syllabi, internet websites, computer books, and system software were the bases of test contents.*

*The researchers developed a valid computerized proficiency test that will be able to quantify the proficiency of the college students in terms of information technology. Specifically, it sought to determine the index of validity of the computerized proficiency test for the IT college students and to measure if there a significant difference in the level of proficiency of the respondents with respect to the above-mentioned skills in terms of sex, academic performance in English and academic performance in Mathematics.*

*Findings showed that the students' performance in English and Mathematics are contributory to their proficiency in the computerized test. The academic performance in English and Mathematics has bearing in their proficiency in the computerized test. Information Technology curriculum involves programming subjects. Programming subjects involve mathematical operations; therefore, IT course requires proficiency in Mathematics. Also, to be able to comprehend the construction of the problem in computer, proficiency in English is also needed.*

**Keywords:** *Development and Validation, Proficiency test, Information Technology and Programming Subjects.*

## INTRODUCTION

### Background of the Study

The pace of change brought about by new technologies has had a significant effect on the way people live, work, and play worldwide. New and emerging technologies challenge the traditional process of teaching and learning, and the way education is managed. Information technology (IT), while an important area of study in its own right, is having a major impact across all curriculum areas. Easy worldwide communication provides instant access to a vast array of data, challenging assimilation and assessment skills. Rapid communication, plus increased access to IT in the home, at work, and in educational establishments, could mean that learning becomes a truly lifelong activity—an activity in which the pace of technological change forces constant evaluation of the learning process itself.

As part of the IT curriculum, learners are encouraged to regard computers as tools to be used in all aspects of their studies. In particular, they need to make use of the new multimedia technologies to communicate ideas, describe projects, and order information in their work. This requires them to select the medium best suited to conveying their message, to structure information in a hierarchical manner, and to link together information to produce a multidimensional document.

President Clinton declared that in teaching there should be an emphasis on high performance. He announced new public investment to support technology with the aim of increasing the productivity of teaching and learning in schools (Microsoft Encarta, 1993-2004).

Higher education constitutes an extremely significant institution in socio-economic development. This is because colleges and universities provide the base from where “technological society” takes off and develops. They are also the most powerful source of intellectual energy that shape a nation’s culture and ideology (Valisno, 2000).

As stated in Section 1 of Batas Pambansa Blg. 232, otherwise known as the Education Act of 1982,

*“the government promulgated that higher education be geared towards the provision of better quality education”* (Patron, 2000).

The Commission on Higher Education ensures the attainment of empowered and globally competitive Filipinos through provision of undergraduate and graduate education competitive with international standards of quality and excellence (Vega, 2005).

As mentioned by Albert, there have been concerns that the high rate of access to higher education may have given rise to a proliferation of college graduates. Recent studies show that for the past several years, only 15% of the current jobs in the labor force actually require higher

education, and there is no compelling reason to believe that this figure will change in the foreseeable future. The oversupply of college graduates is further complicated by complaints from industry regarding a mismatch of schooling content with job requirements and the recognition of the academic sector that high school graduates are often ill prepared for college.

Towards becoming a premier technology-driven higher education institution by the year 2015, University of Rizal System (URS) is committed to producing competent and value-laden graduates through responsive instruction, research, extension, and production services in the Region.

Every year the university produces several graduates which will be future employees of our country. Through which the university has greater contribution in developing the competencies and skills of the students. The University should have its own means to determine if the students have met the learning required in their field of specialization. To diagnose the student's ability, this can be done through a test. Specifically, a proficiency test for college students.

The proficiency test measures the cognition level on how far the students have understood the subjects they have taken. The proficiency test determines the topics that the students have learned and also the difficulty of the subject.

The believed that computer related courses require analytical skills to be able to solve a certain problem in computer. Programming ability is acquired once a person knows how to analyze a problem and construct program using any of the high level languages in programming. Comprehension of the syntaxes and semantics is pertinent in understanding software. There should be in-depth skills in utilizing the syntax and semantics logically.

In view of that, it was decided to develop a valid computerized proficiency test that will be able to quantify the proficiency of the college students in terms of information technology. A system software is created that will help identify the strengths and weaknesses of the students in terms of the curriculum content of the course. The computerized proficiency test determines how knowledgeable the students are with regard to their field of specialization. The software comprises the qualities of a good package. Moreover, checking of results will be done automatically.

### **SCOPE AND LIMITATION OF THE STUDY**

This study focused on the development and construction of computerized proficiency test for the third year college students of the University of Rizal System. It is a proficiency test in Information Technology. The computerized test is designed for the third year students engaged in Information Technology courses. The Three-Year Computer Management Technology third year students were the respondents of the study. Total enumeration sampling was applied in selecting the respondents. Also, the study entails the creation of computerized proficiency test in

Information Technology. The computerization of the test was developed using the Microsoft Visual Basic version 6.0. The contents of the proficiency test were based on the major IT subjects taken by the students in the first and second year of their studies. There were ten (10) IT subjects and these were Introduction to Information and Communications Technology, Program Logic Formulation with Programming 1, Wordprocessing, Spreadsheet, Computer Organization and Architecture, Operating System, Graphics, Graphics Presentation and HTML, Data Communication and Networking, Database (Programming 2) and Basic Electronics and PC troubleshooting. Item analysis was employed to assess the indices of difficulty and discrimination of the test items. The IT instructors and students were sought to evaluate the acceptability of the created computerized proficiency test. The developed computerized proficiency test is composed of 200 test items.

### **STATEMENT OF THE PROBLEM**

The major objective of this study is to develop a valid computerized proficiency test for the IT college students of the University of Rizal System.

Specifically, it sought to answer the following questions:

1. What are the indices of difficulty and discrimination of the test?
2. What is the profile of the respondents in terms of:
  - 2.1. sex;
  - 2.2. academic performance in English; and
  - 2.3. academic performance in Math?
3. What is the level of proficiency of the respondents as revealed by the result of the computerized test with respect to:
  - 3.1. Introduction to Information and Communications Technology;
  - 3.2. Program Logic Formulation with Programming 1;
  - 3.3. Wordprocessing;
  - 3.4. Spreadsheet;
  - 3.5. Computer Organization and Architecture;
  - 3.6. Operating System;
  - 3.7. Graphics Presentation and HTML;
  - 3.8. Data Communication and Networking;
  - 3.9. Database Programming; and
  - 3.10. Basic Electronics and PC Troubleshooting?
4. Is there a significant difference in the level of proficiency of the respondents with respect to the above-mentioned skills in terms of:
  - 4.1. sex;

- 4.2. academic performance in English; and
- 4.3. academic performance in Mathematics?
5. How are the scores in the proficiency test correlates with the respondents' performance in computer subjects?
6. How do the teacher-respondents and student-users assess the acceptability of the computerized proficiency test with respect to:
  - 6.1. accuracy;
  - 6.2. applicability;
  - 6.3. user-friendly;
  - 6.4. workability;
  - 6.5. completeness;
  - 6.6. portability; and
  - 6.7. modifiability?
7. Is there a significant difference between the assessments of the two groups of respondents on the acceptability of the computerized proficiency test?

## **HYPOTHESES**

This study tested the following null hypotheses:

- H1      There is no significant difference in the level of proficiency of the respondents with respect to the different learning areas in terms sex, academic performance in English and Mathematics.*
- H2      There is no significant difference between the assessments of the two groups on the acceptability of the computerized test.*

## **DISCUSSION OF EXPECTED OUTPUT AND JUSTIFICATION**

The expected output of the study is a computerized proficiency test for the third year college students whose major is Information Technology. It covered the ten major IT subjects taken by the students in the first and second years of their course. The subjects integrated in the computerized proficiency test were: Introduction to Information and Communications Technology, Program Logic Formulation with Programming 1, Wordprocessing, Spreadsheet, Computer Organization and Architecture, Operating System, Graphics Presentation and HTML, Data Communication and Networking, Database Programming, and Basic Electronics and PC Troubleshooting. The written exams constructed by the IT professors/instructors, syllabi, internet websites, computer books, and system software were the bases of test contents.

The computerized proficiency test suits in the level of knowledge of the third year IT students. It gauges the cognition and skills of the students in their major field. Consequently, it determines the preparedness of the students in the field or course they are into.

A system software is created using the Microsoft Visual Basic version 6.0. The software includes good features and is user-friendly that even a novice user can understand and operate. The computerized proficiency test consists of navigation buttons, on-line help, automatic printing, security and password, and automatic scoring. The developed software is purely automated that lessens manual tasks in administering the proficiency test. The developed software is expected to be accurate, complete, user-friendly, useful, portable and modifiable. This study could contribute to the education of the University of Rizal System. The results of the test of the students quite reveal the educational services that the institution offers. This could help them identify the contributory factors that influence the performance of the students in the computerized proficiency test.

## **THEORETICAL FRAMEWORK**

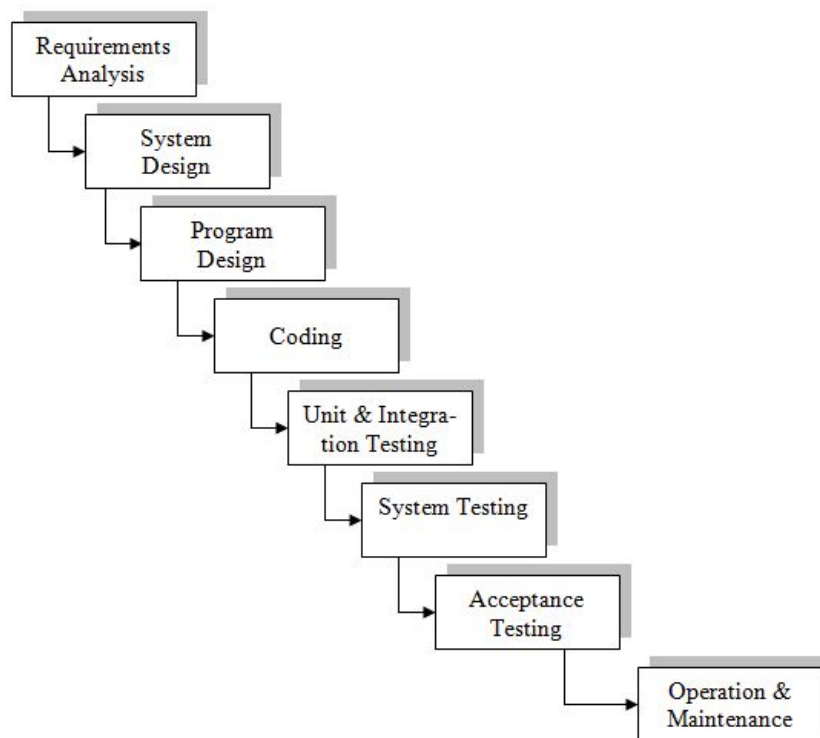
The Systems Development Life Cycle (SLDC) and Waterfall model are the preferred frameworks in the analysis and design of computerized proficiency test. The SDLC is a phased approach to analysis and design which holds that systems are best developed through the use of a specific cycle of analyst and user activities.

Some of the phases of the systems development life cycle were adapted in the development of the computerized proficiency test. These are:

- a. Identifying problems, opportunities, and objectives.
- b. Determining information requirements.
- c. Designing the existing and recommended system.
- d. Developing a software.
- e. Testing the system.
- f. Evaluating the system (Kendall and Kendall, 1995).

On the other hand, Waterfall Model depicts the stages as cascading from one another (Royce, 1970). One development stage should be completed before the next begins. Thus, when all of the requirements are elicited from the customer/client, analyzed for completeness and consistency, and documented in a requirements document, then the development team can go on to system design activities. The waterfall model presents a very high level view of what goes on during development, and it suggests to developers the sequence of events they should expect to encounter (Pfleeger, 2002).

Figure 1: The Waterfall Model



The concepts of SDLC and Waterfall model conform to the processes that the study had undergone. The development of computerized test involved the phases of SDLC and Waterfall model in generating the automation of the test. The study involved software development which was tested and evaluated by the users and experts. Actually, SDLC and Waterfall model are the designs that can be regarded in terms of development of system software. It entails the step-by-step procedure in systems development.

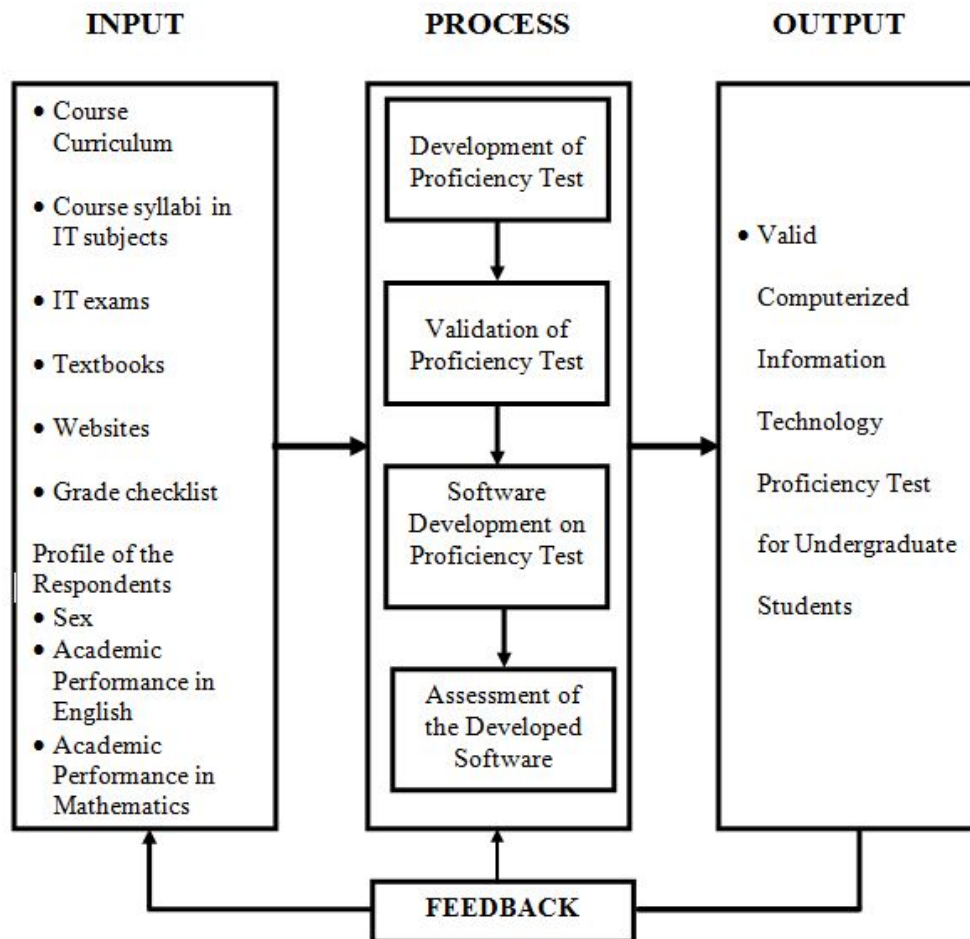
### CONCEPTUAL FRAMEWORK

The conceptual framework that guided the researchers in the design and flow of the objective of the study is illustrated in figure 2. The study uses the Coomb's Input-Process-Output model of systems analysis (Zwaenepoel, 1985).

The first frame is the input. This includes the information requirements needed in the study. The course curriculum, syllabi, term examinations made by the teacher, textbooks, and computer websites are the requirements needed in the test construction. Grade checklist is used in determining the academic performance of the students in English and Mathematics. The term examinations prepared by the instructors/professors who are teaching IT course were considered in the test construction. Some of the items in the examinations made by the

professors/instructors were adapted and others were made by the researchers. In addition, the profile of the respondents is also considered such as the sex, academic performance in English and academic performance in Mathematics.

**Figure 2: Conceptual Paradigm Showing the Development and Validation of Computerized Proficiency Test for Undergraduate Students**



The second frame is the process. It consists of the activities that the study had undertaken. The first procedure is the development of the proficiency test. Contents of the test were based on the major subjects taken by the Three-year Computer Management Technology third year students. The developed proficiency test was tried-out and item analysis method was applied in determining the discrimination and index difficulty of each question. After which, software development follows. The phases of the Systems Development Life Cycle (SDLC) and Waterfall model were the approaches used in the computerization of the proficiency test in Information Technology. The fourth subprocess is the assessment of the developed software.



The third frame is the output. It is the target objective of the study which is the computerized proficiency test for undergraduate students. The software is intended for the third year college students whose course is Information Technology.

The arrow lines show the flow of activities and arrow lines coming from the feedback suggest the continuous process on the development and effectiveness of the computerized proficiency test.

## **RESEARCH DESIGN**

The developmental process of research was employed in the computerization of the proficiency test. Developmental Research intends to produce knowledge with the ultimate aim of improving the processes of instructional design, development and evaluation. Seels and Richey (1994) defined it as "the systematic study of designing, developing and evaluating instructional programs, processes, and products that must meet the criteria of internal consistency and effectiveness." Three major endeavors of developmental research are:

1. Performing and studying the processes of design, developing or/and evaluation;
2. Study of the impacts of someone else's instructional design and development efforts;
3. Study of the instructional design, development, and evaluation process as a whole, or of a particular process component ([http://www.personal.psu.edu/users/w/x/wxh139/IT\\_research.htm](http://www.personal.psu.edu/users/w/x/wxh139/IT_research.htm)).

The developmental research is the design used in the study. The computerized proficiency test involves development of instructional design and evaluation. The computerized proficiency test is considered as instructional material in the Information Technology course due to the fact that it contains proficiency test in IT that could determine the strengths and weaknesses of the students in their major subjects. Hence, this could help the mentors to devise ways and means on how to increase learning to the students.

## **STATISTICAL TREATMENT**

For better interpretation of the results of the study, the following statistical treatment was utilized. In problem 1, the item analysis was employed in determining the indices of difficulty and discrimination of the tests.

The table of equivalents was used in interpreting the results of the difficulty index (Oriondo, 1984).

- .00 - .20 = Very Difficult
- .21 - .80 = Moderately Difficult
- .81 – 1.00 = Very Easy

In problem 2, to determine the profile of the respondents in terms of sex, academic performance in English, and academic performance in Mathematics, Frequency, Percentage and Rank Distribution was used.

In problem 3, to determine the level of proficiency of the respondents as revealed by the result of computerized test with respect to the ten areas of learning, Mean and Standard Deviation were used.

In problem 4, to determine if there is significant difference in the level of proficiency of the respondents with respect to the ten areas of learning in terms of sex, academic performance in English and academic performance in Mathematics, two-way ANOVA was utilized.

In problem 5, to determine the correlation of the scores of the proficiency test with the respondents' performance in computer subjects, Pearson-r was utilized.

In problem 6, to determine the assessment of the acceptability of the computerized proficiency test of the teacher respondents and student respondents, Weighted Mean was applied.

In problem 7, to determine if there is significant difference between the assessment of the two groups of respondents with respect to the criteria of the computerized test, Independent t-Test was used.

The Likert scale was adapted to determine the degree of acceptability of the computerized proficiency test.

<u>Scale</u>	<u>Scale Interval</u>	<u>Verbal Interpretation</u>
5	4.20 – 5.00	Outstanding
4	3.40 – 4.19	Very Satisfactory
3	2.60 – 3.39	Satisfactory
2	1.80 – 2.59	Moderately Satisfactory
1	1.00 – 1.79	Not Satisfactory

## **RESULTS AND DISCUSSIONS**

This part presents the interpretation of the results and discussions of the problems stated in the study.

## Item Analysis of the Test Items in the Computerized Proficiency Test

Table 1 presents the result of the item analysis of the test items for the computerized proficiency test.

<b>Table 1: Result of Item Analysis Based on the Indices of Difficulty and Discrimination Index of Test Items</b>									
<b>Skills</b>	<b>Index of Difficulty</b>						<b>Decision</b>		
	Easy	%	Average	%	Difficulty	%	Retained	Revised	Rejected
Intro to Information Communications and Technology	12	40	14	47	4	13	14	12	4
Wordprocessing	7	23	13	43	10	33	13	7	10
Spreadsheet	7	23	17	57	6	20	17	7	6
Data Communication and Networking	1	3	21	70	8	27	21	1	8
Computer Organization and Architecture	1	3	22	73	7	23	22	1	7
Program Logic Formulation with Programming 1	2	7	25	83	3	10	25	2	3
Database Programming	0	0	27	90	3	10	27	0	3
Computer Graphics & HTML	10	33	18	60	2	7	18	10	2
Operating system	0	0	25	83	5	17	25	0	5
Basic Electronics and PC Troubleshooting	0	0	26	87	4	13	25	0	4
<b>Total</b>	<b>40</b>		<b>208</b>		<b>52</b>		<b>208</b>	<b>40</b>	<b>32</b>

It could be gleaned from the table that out of the 300 items constructed for the computerized proficiency test, 208 items were found to be of average difficulty and were considered as retained items. Forty items were revised and 52 items were rejected. After the item analysis, there were 248 items considered as valid test items. However, only 20 items for each skill were included for uniformity, with a total of 200 items.

## Profile of the Respondents

Table 2 and Figures 3 and 4 present the frequency and rank distribution in terms of sex, academic performance in English and academic performance in Math.

It can be gleaned from the table and on Figure 3 that most of the student respondents are female with a frequency of 29 or 63 percent. The academic performance in English ranges from 1.7-2.3 with a frequency of 36 and academic performance in Mathematics ranges from 2.4-3.0 with a frequency of 24.

<b>Table 2: Frequency, Percentage and Rank Distribution in Terms of Sex, Academic Performance in English and Academic Performance in Mathematics</b>			
<b>Sex</b>	<b>f</b>	<b>%</b>	<b>Rank</b>
Male	17	37.00	2
Female	29	63.00	1
Total	46	100.00	
<b>Academic Performance in English</b>	<b>f</b>	<b>%</b>	<b>Rank</b>
2.4 – 3.0	4	8.70	3
1.7 – 2.3	36	78.26	1
1.0 – 1.6	6	13.04	2
Total	46	100.00	
<b>Academic Performance in Math</b>	<b>f</b>	<b>%</b>	<b>Rank</b>
2.4 – 3.0	24	52.17	1
1.7 – 2.3	12	26.09	2
1.0 – 1.6	10	21.74	3
Total	46	100.00	

**Figure 4: Distribution of Respondents by Sex**

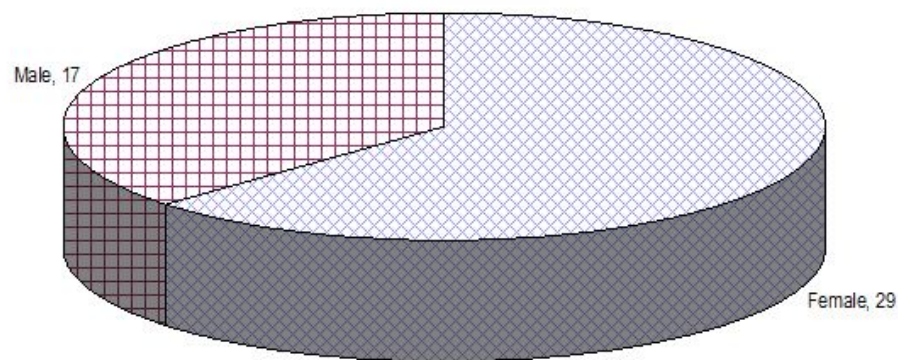
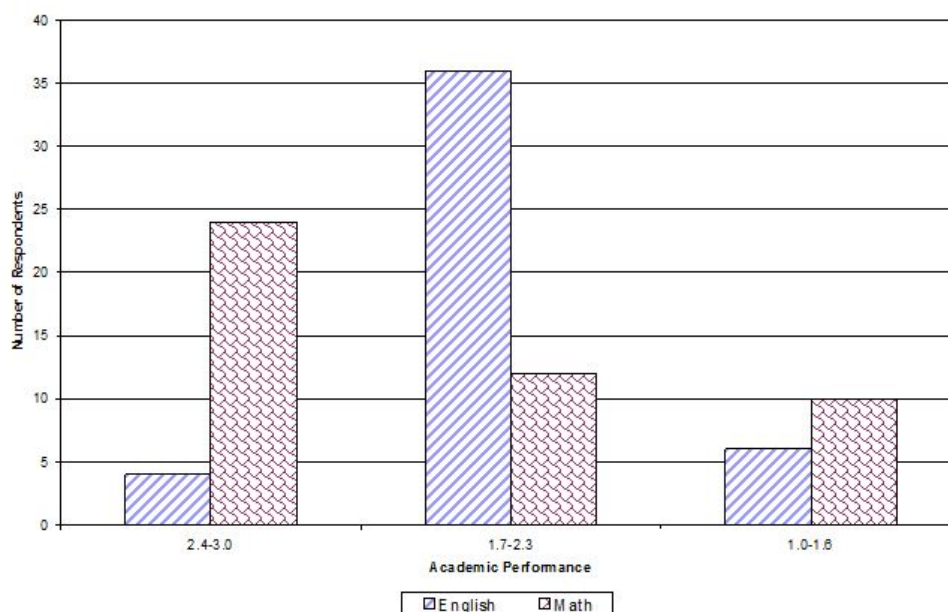


Figure 5: Distribution of the Performance of the Respondents in English and Math



Apparently, the academic performance of the respondents in English is better than the academic performance in Mathematics. It can be concluded that majority of the respondents have average grade in English and lower grade in Mathematics. As observed in the teaching of computer science, IT course requires analytical ability which is a requirement in programming skills. Programming often involves mathematical ability.

As cited in the study of Golding and McNamara, some colleges have specific mathematics requirements for those students doing computer science. There is notion that states “the concepts which a student has to comprehend in order to master mathematics problems are similar to those for programming”.

### Level of Proficiency of the Student Respondents in the Computerized Proficiency Test with Respect to the Different Skills

Table 3 presents the level of proficiency of the student respondents in the computerized proficiency test with respect to the different skills.

As shown in the table, the respondents obtained mean performance of 17.26 and 18.15 in Introduction to Information and Communications Technology and Wordprocessing, both interpreted very proficient. The respondents got proficient performance in other areas such as Program Logic Formulation with programming 1, Spreadsheet, Computer Organization and Architecture, Operating System, Database Programming and Basic Electronics and PC Troubleshooting with means of 15.08, 14.83, 15.71, 14.82, 16.04 and 13.05 respectively. On the

other hand, the students obtained means of 12.03 and 16.04 in Graphics Presentation and HTML, both interpreted moderately proficient. The computed standard deviations revealed that there is homogeneity among the group. This may imply that the respondents have similar interest in Information Technology.

<b>Table 3: Computed Mean and Standard Deviation on the Level of Performance of the Respondents in the Computerized Test with Respect to the Different Skills</b>			
<b>Skills</b>	<b>Mean</b>	<b>Verbal Interpretation</b>	<b>SD</b>
Introduction to Information and Communications Technology	17.26	Very Proficient	4.64
Program Logic Formulation with Programming 1	15.08	Proficient	5.96
Wordprocessing	18.15	Very Proficient	6.84
Spreadsheet	14.83	Proficient	1.65
Computer Organization and Architecture	15.71	Proficient	2.83
Operating System	14.82	Proficient	4.10
Graphics Presentation and HTML	11.59	Moderately Proficient	3.04
Data Communication and Networking	12.03	Moderately Proficient	5.08
Database Programming	16.04	Proficient	1.59
Basic Electronics with PC Troubleshooting	13.05	Proficient	2.78
<b>General Average</b>	<b>14.86</b>	<b>Proficient</b>	<b>3.84</b>

This also implies that the respondents have instilled in-depth learning in basic subjects like Introduction to Information and Communications Technology and Wordprocessing. The skills of the respondents in Wordprocessing are very proficient due to exposure in the use of the system. Wordprocessing is often used in generating reports or producing simple documents.

This result is supported by the research conducted by McGowan and Comer (1999) that students have earned rudimentary principles on how to manipulate MS Word than other computer software. Nowadays, students entering college have greater level of computer proficiency than before. In their study, 70% of the students reported using wordprocessing while nearly 60% reported using spreadsheet software.

### **Significant Difference on the Level of Proficiency of the Student Respondents with Respect to the Different Skills in Terms of the Selected Variables**

Table 4 presents the computed F-values on the significant difference on the proficiency of the student respondents in terms of the selected variables.

**Table 4: Computed f-value on the Difference on the Proficiency of the Respondents in Terms of Selected Variables**

Variables	df	F <sub>comp</sub>	F <sub>tab</sub>	H <sub>o</sub>	VI
Sex	9/510	1.08	1.89	Accepted	Not Significant
Academic Performance in English	18/500	2.39	1.58	Rejected	Significant
Academic Performance in Math	18/500	2.56	1.58	Rejected	Significant

As reflected in the table, sex of the respondents is found not significant on the proficiency level of the respondents in the computerized test since the computed F-value of 1.08 did not exceed the tabular F-value of 1.89 at .05 level of significance, thus the null hypothesis is accepted. On the other hand, academic performance in English and academic performance in Math are found significant on the proficiency level of the students since the computed F-values of 2.39 and 2.56 both exceeded the tabular F-value of 1.58 at .05 level, thus, the null hypothesis is rejected.

The findings can be correlated to the study of Mohammad Khodayarifard, which appears that male and females present different patterns of causal attributions for similar achievement outcomes. The researchers observed no difference between male and female students in terms of academic performance.

The students' performance in English and Mathematics are contributory to their proficiency in the computerized test. The academic performance in English and Mathematics has bearing in their proficiency in the computerized test. Information Technology curriculum involves programming subjects. Programming subjects involve mathematical operations; therefore, IT course requires proficiency in Mathematics. Also, to be able to comprehend the construction of the problem in computer, proficiency in English is also needed.

As cited in the study of Golding and McNamara, earlier studies (especially those prior to 1975) indicated that being male (gender) impacted on computer science success, later studies have found no correlation between gender and computer science success. Other demographic factors and personal background did not prove significant.

In the study of Wilson et al, they included math background as one of the twelve factors and have reviewed as potentially predictive to success in computer science.

As quoted in the study of Jamal Abedi, Carol Lord, and Carolyn Hofstetter, Butler and Stevens (1997) stated that students' performance may be influenced by language background factors such as English language proficiency in academic contexts.

### Relationship Between the Proficiency of the Students in the Computerized Proficiency Test and Performance in Computer Subjects

Table 5 presents the computed r-value on the relationship between the proficiency of the students in the computerized test and performance in computer subjects.

<b>Table 5: Computed r-value on the Relationship between the Students' Proficiency Level in the Computerized Test and Performance in Computer Subjects</b>					
<b>Variables</b>	<b>r-value</b>	<b>Significance of r</b>			
		<b>t<sub>comp.</sub></b>	<b>t<sub>tab</sub></b>	<b>Ho</b>	<b>VI</b>
Proficiency Test	.89	14.79	1.671	Rejected	Significant
Performance in Computer Subjects					

It could be gleaned from the table that a computed r-value of .89 was obtained on the proficiency level and performance in computer subjects of the respondents. It is significant at .05 level of significance having a computed t-value of 14.79 which is greater than the tabular t-value of 1.671. Thus, the null hypothesis is rejected. This means that students' proficiency in the computerized test is related to their performance in computer subject.

This implies that students with high scores in the proficiency test obtained high grades in the computer subjects.

As cited by Paul Golding and Sophia McNamarah, according to Taylor and Mountfield, prior experience in programming provide a significant indication of how students perform in the computer science program and/or subsequent programming courses. They concluded, (in support of Ramberg), that prior exposure whether at the high school or college level is an important factor to students' success in computer science programs.

### Level of Acceptability of the Computerized Proficiency Test as Perceived by Teachers and Students

Table 6 presents the computed weighted mean on the level of acceptability of the computerized proficiency test as perceived by teachers and students.

It could be gleaned from the table that both groups of respondents perceived that the computerized proficiency test is very satisfactory with average weighted mean of 4.12 and 3.82 respectively. Among the items, for the teacher respondents, portability, modifiability and workability are first, second and third in ranks with weighted means of 4.38, 4.28, and 4.22 all interpreted outstanding.



The rest of the items are interpreted satisfactory with applicability as last in rank with a weighted mean of 3.75 interpreted as very satisfactory. Similarly, for the students, portability is also first in rank with a weighted mean of 4.18 interpreted very satisfactory. Last in rank is accuracy with a weighted mean of 3.04 interpreted as satisfactory.

**Table 6: Computed Weighted Mean on the Level of Acceptability of the Computerized Proficiency Test as Perceived by Teachers and Students**

ITEM	Teachers			Students		
	$w\bar{x}$	VI	Rank	$w\bar{x}$	VI	Rank
1. Accuracy	3.96	VS	6	3.04	S	7
2. Applicability	3.75	VS	7	3.49	VS	6
3. User-friendly	4.18	VS	4	4.08	VS	3
4. Workability	4.22	O	3	4.01	VS	4
5. Completeness	4.04	VS	5	3.83	VS	5
6. Portability	4.38	O	1	4.18	VS	1
7. Modifiability	4.28	O	2	4.09	VS	2
<b>Average Weighted Mean</b>	<b>4.12</b>	<b>VS</b>		<b>3.82</b>	<b>VS</b>	

Evidently, the acceptability level of the teacher and student respondents is very satisfactory. It could mean that the computerized proficiency test can be adapted by the institution. The computerized proficiency test includes good features of the software package.

This confirmed the findings of Guzman et al. (2003) that the computerized test gave accurate, fast, and reliable results and information that lessened the bulk of work and reduced the time and effort of an individual in taking the test.

### **Significant Difference on the Perception of the Two Groups of Respondents on the Level of Acceptability of the Computerized Proficiency Test**

Table 7 presents the computed t-value on the difference between the perceptions of the two groups of respondents on the acceptability of the computerized proficiency test.

**Table 7: Computed t-value on the Difference Between the Perceptions of the Two Groups of Respondents on the Acceptability of the Computerized Proficiency Test**

Respondents	Mean	Mean Difference	SD	df	$t_{\text{comp}}$	$t_{\text{tab}}$	Ho	VI
Teachers	4.12	.30	1.87	78	2.04	1.671	Rejected	Significant
Students	3.82							

As depicted in the table, significant difference exists between the perceptions of the two groups of respondents on the level of acceptability of the developed computerized proficiency test since the computed t-value of 2.04 exceeded the tabular t-value of 1.671 at .05 level of significance, thus, the null hypothesis is rejected. This implies that the teachers' perceptions on the level of acceptability of the developed computerized proficiency test differ from the perceptions of the student users. It also means that the appreciation of the teacher and student respondents in computer proficiency test is different. The teacher respondents have greater level of acceptability than with the student respondents may be because that the software is more useful on their part. It would be easy for them to identify the strengths and weaknesses of the students once this system is implemented in the institution.

This is supported by the result study of the American Association of University Women (AAUW). The study contends that students find programming instruction dull and tedious. The study also discusses that teachers perceived that students are passive and disinterested in computer technology, particularly manipulating computer program wherein they would be reading and analyze through computer.

According from source in the internet, from the instructor's point of view, the tests measure student progress and identify student problems. From the student's view, these tests are activity through which he is able to increase and internalize his learning by doing something with the training just received. Opportunities to use new skills and knowledge immediately tend to increase retention. Performance testing confirms student progress or points to the need for correction (http://www.airpower.maxwell.af.mil/airchronicles/aureview/1975/sep-oct/snyder.html).

## **SUMMARY OF FINDINGS**

Based from the data gathered and interpretation of the results, the following findings are hereby summarized.

### **Item Analysis of the Test Items Based on the Indices of Difficulty and Discrimination**

Out of 300 items, 208 items were found to be of average difficulty and were considered retained items. After item analysis, there were 248 items considered as valid test items. However, only 20 items were considered for each subject for uniformity, with a total of 200 items.

### **Profile of the Student Respondents**

There were 46 respondents composed of 29 or 63 percent female respondents and 17 or 37 percent male respondents. Thirty-six (36) or 78.26 percent of the respondents obtained an academic performance in English from 1.7-2.3 while 24 or 52.17 percent of the respondents have grades between 2.4-3.0.

### **Level of Proficiency of the Student Respondents in the Computerized Test**

The student respondents obtained a general average of 14.86 verbally interpreted as proficient. It was found out that the respondents are very proficient in Wordprocessing and Introduction to Information and Communications Technology and moderately proficient in Graphics Presentation and HTML and Data Communication and Networking.

### **Significant Difference on the Level of Proficiency of the Student Respondents with Respect to the Different Skills in Terms of the Selected Variables**

In terms of sex, the null hypothesis is accepted since the computed F-value of 1.08 did not exceed the tabular F-value of 1.89.

In terms of academic performance in English, the null hypothesis is rejected since the computed F-value of 2.39 exceeds the tabular value of 1.58.

In terms of academic performance in Mathematics, the null hypothesis is rejected since the computed F-value of 2.56 exceeds the tabular value of 1.58.

### **Significant Relationship Between the Proficiency of the Students in the Computerized Test and Performance in Computer Subjects**

Proficiency level and performance of the students in computer subjects are significantly related with an r-value of .89 and a computed t-value of 14.79 which exceeds the tabular t-value of 1.671 at .05 level.

### **Level of Acceptability of the Computerized Proficiency Test as Perceived by Teachers and Students**

The computerized test is perceived to be very satisfactory by both groups of respondents with average weighted means of 4.12 and 3.82.

Both of the respondents perceived that the computerized proficiency test is modifiable and portable.

### **Significant Difference on the Perceptions of the Two Groups of Respondents on the Level of Acceptability of the Computerized Proficiency Test**

Teachers and student users' perceptions on the acceptability of the computerized proficiency test differ significantly having a computed t-value of 2.04 which exceeded the tabular t-value of 1.671 at .05 level of significance.

### **CONCLUSIONS**

Based from the summary of findings, the following conclusions are hereby presented:

1. Male and female respondents do not differ in the proficiency in the computerized proficiency test. However, academic performance in English and Mathematics contributes in the proficiency of the respondents in computerized proficiency test.
2. High proficiency in the computerized proficiency test means relative proficiency in the different learning areas in Information Technology.
3. The perception of the student respondents in the acceptability of the computerized proficiency test differs from the perception of the teacher respondents.

### **RECOMMENDATIONS**

In the light of the findings and conclusions, the following recommendations are presented:

1. The researchers strongly recommend the adoption of the computerized proficiency test which can be utilized in measuring the knowledge of the IT students in terms of different areas in Information Technology.
2. The computerized proficiency test could further be enhanced and can be executed through incorporating the LAN-based system. This computerized proficiency test minimizes the bulk of test papers to be checked and involves actual conduct of testing and automatic assessment. The program would also speed up the examination process and give fast results.
3. The computerized test can be also enhanced that could be able to formulate a database file for the examinees so that academic ranking could be done easily.
4. Training and seminars should further be provided to the faculty members to develop and adopt rudimentary principles in manipulating computer and any related topics on Information Technology.

5. Subjects in Information Technology such as Graphics and HTML and Data Communication should be taught thoroughly and with in-depth explanation on the different topics of the subject.
6. The administration should provide fund and support for the development of computer software for the betterment of the services provided to the students particularly computerized or automated proficiency test in Information Technology and also to allied computer subjects. Computer program could also be developed for the entrance exam of the freshmen students and graduate school students.
7. Orientation about the automated proficiency test in Information Technology should be done with the students prior to the examination proper.
8. Follow-up studies could be conducted to further enhance the developed software.

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# STUDENT PERFORMANCE ON THE CALIFORNIA CRITICAL THINKING SKILLS TEST

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## ABSTRACT

*This paper examines the determinants of performance on the California Critical Thinking Skills Test (CCTST). The sample consists of 96 students at a mid-sized regional institution located in the Southwestern region of the United States. The empirical model employed controls for grade point average, standardized test scores (SAT/ACT), online courses, gender, ethnic background, age, major, and transfer students. Classification as a business major, grade point average, and ability measured via standardized test scores are the three model variables that are positive and statistically significant. The only statistically significant variable with a negative coefficient is the transfer variable, which controls for students transferring 18 or more hours from another university or community college. The results indicate that students completing 18 or more hours in the online environment score approximately five percent lower on the CCTST exam, although the result is not statistically significant. None of the demographic variables in the model are statistically significant determinants of performance on the CCTST exam.*

## INTRODUCTION

Assessment of learning goals and effectiveness of instruction are explicit obligations of modern academic programs. Many programs include critical thinking as a key learning goal. The California Critical Thinking Skills Test (CCTST) is a national exam used to exam critical thinking skills and serves as a predictor for future job-related performance. Unlike most traditional standardized test, the CCTST does not measure general knowledge, but more specifically how that knowledge can be applied and interpreted. There is a limited amount of research on CCTST scores (Whitten & Brahmasrene, 2009). The purpose of this paper is to evaluate the determinants of student performance on the CCTST exam. Model variables include controls for ability, demographics, major, and taking multiple courses in the online environment. The research cohort for this study is a public university located in the Southwestern part of the United States. The institution is mid-sized with a total enrollment of approximately 8,000 total students at a public institution.

The organization of the manuscript is as follows: First, a brief literature review is put forth. The second section of the manuscript describes the data and model. The next section

offers empirical results for the determinants of performance on the CCTST exam. The final section offers conclusions and discusses the limitations of the study.

## LITERATURE REVIEW

Facione (1990) wrote a manual, *The Delphi Report*, which summarized the concept of critical thinking. This concept was pieced together and announced by a panel of experts from the United States and Canada. They concluded that critical thinking is characterized as the process of purposeful, self-regulatory judgment. Critical Thinking, so defined, is the cognitive engine, which drives problem solving and decision-making. Standardized tests are a concrete way to measure student performance across a large number of institutions. The design of the CCTST aims to assess different levels of critical thinking and predict future job performance. The California Critical Thinking Skills Test family of exams is comprised of a total of nine tests that all measure critical thinking, but are applied in different academic and work related fields. The modifications to the CCTST over the last twenty years has been aimed at making sure the testing instrument meets validity and reliability traits (Khalili & Hossein, 2003).

According to Bycio and Allen (2007), standardized tests provide a fair assessment of learned knowledge that does not merely assess whether a curriculum is being taught, but rather that the curriculum is being learned and understood. Many educators have had proven success in their classrooms with critical thinking exercises. However, the problems that most institutions of higher learning face are that very few teachers are able to post and compare successful teaching techniques with that of other institutions because the information is not always publicly available.

A copious amount of research exist relating to student performance on standardized tests but a dearth of research over the California Critical Thinking Skills Test (CCTST). Whitten and Brahmasrene (2009) study offer one of the only studies focusing on critical thinking skills. In their study focusing on students in an introductory accounting course, they find the high school rank and college classification to be the only significant determinants.

The research track that most closely relates to the CCTST is information focusing on the determinants of student performance on the Educational Testing Service's (ETS) field exam. Mirchandani, Lynch, and Hamilton (2001) find that two types of variables are related to student performance on the ETS exam: input variables (SAT scores, transfer GPA, and gender) and process variables (grades in quantitative courses). They conclude that the SAT score is a dominant variable explaining most of the variation in ETS exam scores, although other variables including GPA and gender are also statistically significant. Black and Duhon (2003) employ a large sample of 297 students to determine student performance on the ETS exam. Their regression model reveals that GPA, ACT score, gender, and major are significant determinants of performance on the ETS exam. Bagamery, Lasik, and Nixon (2005) find gender, whether students took the SAT, and grades to be significant determinants of the ETS exam, while

location, age, transfer status, and major are not significant. Bycio and Allen (2007) contribute to the literature by showing that, in addition to GPA and SAT scores, student motivation is an important determinant of performance on the ETS exam. Terry, Walker, and Kelley (2010) find that higher ACT scores are positively related with higher performance on the business major field achievement ETS exam but transfer student status does not have an impact on performance.

Three frequently used course formats include the traditional campus courses, online courses, and newer hybrid courses. Course formats in business schools today are varied and frequently driven by both student demand and the desire of schools to use resources in efficient ways as well as to attract students from broader areas. The nature of course format could influence ETS scores if one instruction mode is inherently inferior to another. Hybrid courses are taught using a mode of instruction that combines some of the inherent features of online (e.g., time independence) and campus (e.g., personal interaction) environments (Terry, 2007).

Online course offerings in postsecondary schools are growing rapidly. Postsecondary institutions offering online courses include both traditional institutions and institutions founded to offer only online courses. An example of a postsecondary institution founded to offer only online courses is Capella University. Founded in 1993, Capella currently has over 19,900 adult learners enrolled in online courses. According to the U.S. Department of Education, 90 percent of degree-granting postsecondary institutions offered asynchronous Internet courses in 2001 (National Center for Education Statistics, 2001). Both the numbers of postsecondary schools offering online courses and the numbers of students enrolling in online courses are increasing. Jeff Seaman, chief information officer and survey director of the Sloan Consortium states, "There were nearly 3.2 million students taking at least one course online this past fall, up from 2.3 million just last year" (Allen & Seaman, 2007). Brown and Corkill (2007) indicate that almost two-thirds of colleges and universities that offer face-to-face courses also are providing graduate courses via the online environment.

As the numbers of students enrolled in online instruction have increased, researchers have debated the effectiveness of online instruction (Bowman, 2003; Fann & Lewis, 2001; Fortune, Shifflett & Sibley, 2006; Lezberg, 1998; Okula, 1999; Terry, 2000; Worley & Dyrud, 2003). Terry, Mills, Rosa, and Sollosy (2009) determine that students completing multiple business courses online score approximately six percent lower on the ETS exam. The federal government has shown interest in the effectiveness of online instruction as a component of overall program effectiveness.

While the need for assessment is not new, the focus of assessment as illustrated by the Association to Advance Collegiate Schools of Business (AACSB) International has clearly intensified (Pringle & Michel, 2007). All accredited collegiate business programs seek continuous improvement and program assessment (Bagamery, Lasik & Nixon, 2005; Martell & Calderon, 2005; Trapnell, 2005). Traditionally, accrediting bodies were focusing primarily on input measures (Peach, Mukherjee & Hornyak, 2007). Input measures could reflect characteristics of the students who attended the business program (Mirchandani, Lynch &

Hamilton, 2001) or organizational factors such as the institution's reputation, faculty-student ratio, or number of faculty with terminal degrees (Peach, Mukherjee & Hornyak, 2007). Collegiate business programs aspiring to meet or maintain the standards of accreditation established by AACSB are required to have program learning goals and utilize direct measures that reflect student demonstration of achievement of these goals (Martell, 2007; Pringle & Michel, 2007). Critical thinking skill is an important learning goal for most academic programs, especially business programs.

## DATA AND MODEL

The purpose of this section is to develop an empirical model that can test student performance on the California Critical Thinking Skills Test (CCTST) exam. Davisson and Bonello (1976) propose an empirical research taxonomy in which they specify the categories of inputs for the production function of learning. These categories are human capital (admission exam score, GPA, discipline major), utilization rate (study time), and technology (lectures, classroom demonstrations). Using this taxonomy, Becker (1983) demonstrates that a simple production function can be generated which may be reduced to an estimable equation. While his model is somewhat simplistic, it has the advantage of being both parsimonious and testable. A number of problems may arise from this research approach (Chizmar & Spencer, 1980; Becker, 1983). Among these are errors in measurement and multicollinearity associated with demographic data. Despite these potential problems, there must be some starting point for empirical research into the process by which there is evidence of business knowledge learning.

The choice as to what demographic variables to include in the model presents several difficulties. A parsimonious model is specified in order to avoid potential multicollinearity problems. Race and age are controversial variables to include in a learning model. Following Siegfried & Fels (1979) and Hirschfeld, Moore, & Brown (1995), we include race, gender, and age variables in the study. We consider a number of model specifications using work experience and concurrent hours in various combinations. Inclusion of these variables into the model affected the standard errors of the coefficients but not the value of the remaining coefficients. For this reason, they are not included in the model. University academic records are the source of admission and demographic information because of the potential biases identified in self-reported data (Maxwell & Lopus, 1994).

The model developed to analyze student learning relies on a production view of student learning. Assume that the production function of learning critical thinking concepts via the CCTST exam can be represented by a production function of the form:

$$(1) Y_i = f(A_i, E_i, D_i, X_i),$$

where Y measures the degree to which a student learns, A is information about the student's native ability, E is information about the student's effort, D is a [0, 1] dummy variable indicating demonstration method or mode, and X is a vector of demographic information. As noted above, this can reduce into an estimable equation. The specific model used in this study is:

$$(2) \text{SCORE}_i = B_0 + B_1\text{ABILITY}_i + B_2\text{GPA}_i + B_3\text{NET}_i + B_4\text{TRANSFER}_i + B_5\text{AFA}_i + B_6\text{HISPANIC}_i + B_7\text{GENDER}_i + B_8\text{AGE}_i + B_9\text{MAJOR}_i + u_i.$$

The dependent variable used in measuring student critical thinking skills is percentile score (SCORE) on the CCTST exam. Table 1 presents the descriptive statistics of all variables employed in the model. Senior students in four undergraduate capstone courses completed the CCTST exam as a formal class requirement. The mean percentile score for the research cohort is the 49.37 percentile with a standard deviation of 28.26. The CCTST score at a mean of approximately the 50<sup>th</sup> percentile combined with a large standard deviation of both very good and relatively poor student performances yields a research cohort that is very representative of a typical regional university.

<b>Table 1: Summary Statistics</b>		
<b>Variable</b>	<b>Mean</b>	<b>Std. Deviation</b>
SCORE	49.37	28.26
ABILITY	21.14	3.64
GPA	2.98	0.60
NET	0.41	0.49
TRANSFER	0.39	0.33
AFA	0.07	0.26
HISPANIC	0.21	0.41
GENDER	0.46	0.50
AGE	23.65	4.37
MAJOR	0.21	0.40
Note: n=96.		

The ACT entrance exam or SAT converted to ACT equivalency measures student's academic ability (ABILITY). The average ACT score for the research cohort is 21.14 (equivalent to 1020 on the math/reading SAT or 1550 on the 2400-point SAT). The ABILITY variable via the ACT exam is used as a proxy of student innate ability before entering the university. Student ability as measured by the ACT exam is expected to have a positive impact on CCTST score.

Grade point average (GPA) is included in the model based on previous research indicating that grade point average is one of the primary positive determinants of student performance on standardized exams (Black & Duhon, 2003; Terry, Walker & Kelly, 2010).

Student grade point average in the study for the cohort is 2.98 with a standard deviation of approximately half a grade point at 0.6.

The categorical variable NET represents student enrollment in six or more online courses during the undergraduate academic program. The university in the research study is primarily a campus institution but does offer a significant amount of courses (e.g., 25-30%) in the online environment. Forty-one percent of the students in the research cohort completed six or more courses via online instruction. The NET variable is expected to have a negative impact on CCTST scores given the online environment is still developing as an instructional mode relative to the traditional chalk and talk of the classroom. The online environment is of particular interest because current students gravitate toward the convenience of the asynchronous learning environment. Despite the convenience, many researchers question the quality control and efficacy of the online environment (Bowman, 2003; Fann & Lewis, 2001; Fortune, Shifflett & Sibley, 2006; Terry, 2000).

The variable TRANSFER is included in the model as a demographic variable controlling for students that complete six or more courses at an alternative institution, which is usually a two-year community college. Transfer students represent over thirty-nine percent of the students in the research cohort. The transfer variable is expected to have a negative impact on CCTST score based on the assumption that the foundation core classes at a community college are not expected to meet the rigor of the courses at a four-year university.

Four demographic variables are included in the model. The demographic variables AFA and HISPANIC are included in the study to test for possible differences in critical thinking across ethnic groups. African American students (AFA) represent seven percent of the research cohort and Hispanic students are at twenty-one percent. There is no reason to believe one ethnic group will have a higher or lower critical thinking score than another ethnic group. The variable GENDER is included in the model based on the finding of previous researchers (Bagamery, Lasik & Nixon, 2005; Black and Duhon, 2003; Mirchandani, Lynch & Hamilton, 2001) that male student performance on standardized exams is higher than female. Males represent forty-six percent of the research cohort. The last demographic variable in the model is AGE. Average age for the research cohort is 23.65 with a standard deviation of 4.37. One potential result is that older students with more life experience will have greater critical thinking skills.

The final variable in the model is a control variable for major. Twenty-one percent of the students in the research cohort are business majors, which includes accounting, economics, finance, marketing, management, and computer information systems. The students that are not business majors are from education or fine arts and humanities programs. The expectation is for the MAJOR variable to have a positive impact on SCORE. Business programs tend to focus on critical thinking skills in ways that are very prescriptive with respect to curriculum and performance expectations. In fact, the Association to Advance Collegiate Schools of Business (AACSB) explicitly acknowledges the importance of critical or reflective thinking in the description of the accreditation standard fifteen, which focuses on management of curriculum.

## RESULTS

Results from the ordinary least squares estimation of equation (2) are presented in this section and Table 2. The sample cohort is derived from students from four different courses taking the CCTST exam in the spring 2010. The total usable sample size is 96, with 15 students eliminated from the global sample of 111 because of incomplete information, usually relating to the lack of ACT/SAT scores (Douglas & Joseph, 1995). None of the independent variables in the model have a correlation higher than .50, providing evidence that the model specification does not suffer from excessive multicollinearity. The equation (2) model explains over 48 percent of the variance in performance on the CCTST exam. Four of the nine independent variables in the model are statistically significant.

<b>Table 2: Estimation of Equation: Determinants of the CCTST</b>		
<b>Variable</b>	<b>Coefficient</b>	<b>t-statistic</b>
Intercept	-46.170	-1.97
ABILITY	3.215	4.09*
GPA	13.777	3.11*
NET	-4.986	-1.24
TRANSFER	-10.023	-2.37*
AFA	-1.198	-0.12
HISPANIC	-0.216	-0.04
GENDER	3.223	0.82
AGE	-0.063	-0.11
MAJOR	11.113	2.78*
Notes: R-square = .4862, F = 23.86, *p<.05, and n = 96.		

Two of the statistically significant variables are ABILITY and GPA. The results imply that student score on the CCTST exam are directly related to academic ability measured by the ACT college entrance exam and academic performance measured by college grade point average, consistent with previous research (Mirchandani, Lynch & Hamilton, 2001). The significance of the ABILITY variable provides support for the notion that students with innate academic ability perform at a relatively high level on all standardized exam test, which includes the CCTST exam. The results relating to the ACT exam are somewhat tempered by the observation that fourteen percent of the students in the initial sample were eliminated primarily for not having an official ACT/SAT score posted with the university. The positive and significant impact of GPA on the CCTST exam is not surprising. Students with high grades normally perform at a higher academic level on various performance metrics than students with a relatively low grade point average. Consistent with Mirchandani et al. (2001), overall GPA has a strong internal validity and provides a measure of student performance related to the curriculum of the school.

One of the more interesting results from the study revolves around the variable NET. Holding constant ability, grades, and demographic considerations, students completing six or more courses via the Internet (NET) format scored approximately five percent lower on the CCTST exam but the result is not statistically significant (t-stat of -1.24). The insignificant statistical result implies the online instruction mode produces a learning environment that is statistically equivalent to the traditional campus environment. Recent advances in online instruction tools that make it relatively easy to utilize streaming video, narrated graphic illustrations, and related communication instruments have narrowed the quality gap between the campus and online learning environments. Although not statistically significant, it is interesting to note the negative sign on the NET variable. Despite the growth in both the demand and supply of online classes in higher education, the campus mode continues to deliver slightly better student performance results than the online mode.

The empirical results yield a negative and statistically significance for the TRANSFER variable. The results imply that students transferring eighteen or more credit hours from a community college score approximately ten percentile points lower on the CCTST exam, controlling for factors like effort, ability, major, and demographic characteristics. This result is somewhat surprising given previous results in the literature (Terry, Walker & Kelley, 2010). The general stereotype that students starting at a community college receive an inferior education appears verified in this study. A more likely explanation is that critical thinking performance on a standardized exam is positively correlated high school graduates entering college at a four-year university over a community college. Although it is possible that the foundation core classes at a community college do not meet the rigor of the courses at a four-year university, it is also possible that the four-year university simply admits students as freshman with stronger innate critical thinking skills that are more focused on completing a college degree in a timely fashion.

The model results include four demographic variables. None of the demographic variables in the model is statistically significant. In fact, only the gender variable produces a t-statistic that is greater than 0.8. The complete lack of statistical significance is interesting but not surprising. Controlling for ability and GPA, there is no ethnic, gender, or age differential with respect to developing critical thinking skills. Bagamery, Lasik, and Nixon (2005) provide evidence that demographic characteristics influence student performance on the ETS exam but results from this study do not find statistical significance for any demographic traits.

The last variable in the model is a categorical variable comparing the performance of business majors to majors from liberal arts programs. The empirical results indicate the MAJOR variable is positive and statistically significant. The results imply business students score approximately eleven percentile points higher on the CCTST exam than their liberal arts peers. Business programs tend to focus on critical thinking skills as a formal learning objective. The results of this study provides evidence that efforts by business school to focus on developing critical thinking skills with case studies and other tools has a positive and significant impact.



## CONCLUSION

This study examines the determinants of student performance on the CCTST exam at a regional university. Consistent with previous research, the results find that academic ability measured by the college entrance exam and student grade point average are the primary determinants of student performance on the CCTST exam. The empirical results indicate transfer students score significantly lower on the exam but business students score relatively high on the exam. Specifically, transfer students score approximately ten percentile points lower but business student score approximately eleven percentile points higher on the CCTST exam. Ethnic background, age, and gender do not have a statistically significant impact on CCTST exam performance. Completing multiple courses via the online environment has a negative impact on student CCTST exam performance but the result is not statistically significant. One significant limitation of the research is that one academic institution is the source of all data. It is hard to know if the institution hosting the research cohort is unique or generally representative of regional institutions. A more robust sample of multiple institutions should be a focus of future research endeavors in order to verify the consistency of the empirical results.

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# STUDENT PREPARATION AND PERSONALITY TRAITS IN THE JOB MARKET

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## ABSTRACT

*Utilizing a sample of 250 students from a regional university in Florida and participants of the March 2011 FMA Leaders' Conference, we investigate how college students, particularly finance students, differentiate themselves from their peers in the job market. Specifically, we investigate the extent to which students utilize internships and social networking sites to connect with employers and how this relates to students' personality traits. Most students have social networking accounts, but FMA participants are using these accounts more to connect with potential employers. Also, the minority of our sample has completed an internship, but the majority of upper-level finance students has either completed an internship or is currently in an internship. FMA attendees and finance majors are much more involved with student organizations. Students exhibiting more openness, conscientiousness, or extraversion are more likely to believe that employers view applicants' social networking accounts; more neurotic students are less likely to use social networking accounts to connect with employers, while more extraverted students are more likely to do so. Conscientiousness, openness, agreeableness, and extraversion are positively associated with the breadth or depth of club-level involvement or professional networking, while neuroticism is negatively associated. Implications for employers and career management centers are discussed.*

## INTRODUCTION AND MOTIVATION

The Federal Reserve recently released reports indicating the economy is strengthening throughout much of the United States. Five Fed banks, including Boston and San Francisco, said the economy grew “at a slight to modest” rate, while five others, including New York and Chicago, reported a “somewhat stronger pace of economic activity.” Conditions were reported as “mixed” in the Philadelphia and St. Louis regions. (Zumbrun J. , 2010) These indicators, along with jobless claims reaching their lowest point in November 2010 since July 2008, all seem to be positive signs for job markets. However, even with the private sector improving and the Fed's announcement of \$600 billion in asset purchases to help cut unemployment, the decline of unemployment will likely be a slow process. (Zumbrun J. , 2010)

While the present economic situation provides a threat to all in the workforce, it also poses concerns for upcoming college graduates. After years of education, eager graduates find

themselves in the turmoil of job shortages. In addition, graduates not only have to compete with their peers, but also with individuals who already have years of work experience and industry expertise who were laid off due to the recession. There are many sides to this debate; some argue that recent college graduates have the upper hand because they equate cheaper labor as opposed to the well-qualified or over-qualified applicants. Adding to the “cheap labor” argument is the fact that graduates are not being offered the same caliber of salaries that were seen prior to the economic downturn, which is to be expected during a time when many professionals are taking pay cuts just to keep their jobs.

A glimmer of hope exists with a flat-lining of unemployment versus the sharp increases in 2009, but the shape and duration of a possible recovery remains unknown. One thing is certain, due to the economic situation, there is increased competitiveness in the job market. Intellect, networking, and persistence are crucial to thrive in this market. Just a degree confirming an advanced education will no longer suffice. In 2008, as the shocks of the recession hit, top business schools saw major banks, such as JP Morgan, Lehman Brothers, and Deutsche Bank cancel recruitment sessions and remove themselves from the universities’ career services’ web sites. Today, with signs of recovery, recruitment has also improved. Its effects, however, cannot be ignored in the selective process. It is critical to stand out among the millions in the search. Human resources’ departments are inundated daily with resumes from students across the world and across the spectrum of academic performance. (Leland, 2008)

Our objective is to investigate what college students, particularly finance students, are doing to secure themselves a job given the current state of the economy. A secondary objective is to investigate the extent to which students utilize internships and social networking sites to connect with employers. The findings reported here are useful to both career management centers across the country and employers, since it indicates that the job market for college graduates may be cyclical. For example, a finding that college graduates are preparing themselves more for the job market as a result of a recession (or crisis) may indicate that the tail end of a recession is the best time to hire college graduates. To career management centers, it would indicate that demand for their services would increase at that time.

To investigate what more advanced finance students are doing versus ‘average’ business students to improve their chances of securing a quality finance-related job, we seek answers to the fourteen questions listed in the Appendix. During the analysis, we divide the questions into three groups. Question 1 through 4 address general job-related questions. Questions 5 through 9 address previous work experience and internship efforts; lastly, questions 10 through 14 assess students’ networking activities, including their involvement in student organizations.

Our sample consists of 326 survey responses. 243 of these responses were obtained from students at a regional university in Florida. The remaining surveys were collected from universities across the country at the Financial Management Association’s Leader Conference in New York in March 2011. We consider these 83 responses to be above-average finance students<sup>1</sup>. Via these samples, we hope to find evidence of certain tactics used by the above

average students to prepare themselves for the job market that the average students are not using. The goal is to discover how these above-average students differ from “typical” business students. We hope that by informing the average students, it will motivate them to work harder academically and professionally to prepare them for the competitive job market.

The remainder of this paper is organized as follows. Section II presents a review of related literature. The data are discussed in Section III, while Section IV presents the results. Section VII concludes.

## REVIEW OF RELATED LITERATURE

Many papers have been written examining the relationship between student motivations and securing a job. A major difference in 2011 is the job market for graduating college students. The goal of our research is to discover whether above average students display different tactics versus average students. Many recent articles were published during prosperous economic times with relatively abundant demand for labor, even as recent as 2007. The difference between now and then is substantial. Though the unemployment rate for college graduates is 4.8 percent according to December 2010 US Bureau of Labor Statistics data, college undergraduate seniors are apprehensive about landing a quality position soon after graduating. The 4.8 percent figure includes persons with bachelor's, master's, professional, and doctoral degrees, not to mention years of experience (United States Department of Labor, 2011).

What are some students doing now to improve their odds at garnering a full-time job? Facebook is used by nearly all college students, but some use it as a means to effectively network. A study by *Peluchette* and Karl (2010) found that there are primarily two types of users of Facebook. College students use the social networking site either to impress their peers or to post appropriate content for family and employers. Our research area focuses on the employer side of the use of Facebook and LinkedIn. Obviously, LinkedIn is intended to be used for networking purposes and to post items that would be appealing to employers. Facebook is open to students posting inappropriate content which would be harmful in the effort to land a job. Our goal is to discover whether students are using these sites for the purpose of marketing themselves to potential employers. Are the students at the FMA conference conservative and professional with the content they post on the important social networking sites? We believe the FMA students are more likely to fall into the category of those who are more aware of family and employers looking at their profiles. The average students may be more likely to post content to impress peers.

Another aspect of our paper will investigate whether students are pursuing internships to augment a strong academic background. A study by Gault, Leach, and Duey (2010) confirms findings from the mid-1990s which indicate firms are more willing to hire students with internship experience versus those with strictly academic backgrounds. In addition, the 2010 study found employers were more willing to hire and compensate interns who performed well versus non-interns. Our survey will yield data as to the percentage of above average students at the FMA conference versus average students at the CCB who have an internship. With empirical evidence from previous studies, we may be able to infer that above average students are more

motivated to seek internship experience. Another aspect that can add to the findings from the 1990s and the recent research published by Gault, Leach, and Duey in 2010 is whether students are pursuing internships earlier in their academic careers. Students at the FMA conference will be of different class levels, which makes it appealing to study age and motivation.

A separate research article published by Vicknair et al. (2010) asked students if they were aware of the possibility that employers could be looking at their social networking profiles. The study found that about half of the students were not aware. Also, the study found that the students who were not aware of the possibility were also not aware of the privacy settings on their accounts. Our research compares the level of awareness among the above-average students versus the average students which can add value to the previous studies. It is likely that the students at the March 2011 conference will be more aware as the dangers of posting publicly available content have been widely publicized in recent months. Indeed, previous studies indicate students are becoming more attentive to controlling the privacy settings on sites such as Facebook.

McCorkle et al. (2003) highlighted the issue of proactive preparation for business students. The study confirmed our premise that understanding the job search process (how to find out about available positions, making contact with businesses and how to effectively market one's skills, abilities, and knowledge) is vital to both the short and long term career success of students. All too frequently, "it's not the one who can do the job who necessarily gets hired. It's the one who knows the most about getting hired" (Hagedorn, Kaul, & Mennel, 2010).

Through our survey, the goal is to investigate if those students who are actively using networking sites are also utilizing other sources provided by the university to self-market. Both business-orientated organizations and the university's career services provide self-marketing opportunities for students as well as an increased focus on careers and need for preparation according to the 2003 research. We believe the FMA students are more prone to utilize their university's career services than the average UNF students since they are already involved in both a business-orientated and national professional organization. It will be interesting to discern if students are using multiple marketing sources to complement each other, or if they are placing more focus on a particular outlet. Another aspect to infer from this information is to determine how many juniors versus seniors are employing the universities' resources and social networking sites for purposes of seeking out a job.

Eisner (2010) researched the most important traits for undergraduate students to possess in order to be successful in finding a job. The Eisner research cited several characteristics, but among the most agreed upon by employers for graduates to possess were the following: interpersonal ability, ethics, and accountability (Tanyel, Mitchell, & McAlum, 1999). A Gallup poll also cited in Eisner's piece found another personality trait equally important for success in the business world – political savvy. Political savvy, defined as the ability to perform in an office setting and the ability to deal with coworkers effectively, proved to be of a different skill set. The Gallup data indicates those who excel intellectually are not always the most politically savvy. However, this personality trait proved to be vital in order to effectively work and progress in an organizational structure.

In addition to political savvy, a study from 2000 suggests conscientiousness and extraversion to be an important contributing factor for new job market entrants (Wanberg, Banas,

& Kanfer, 2000). In 2009, further results from a separate study confirmed these traits to be consistently linked with job search activities and success (Turban, Stevens, & Lee, 2009). Results concluded both conscientiousness and extraversion influenced metacognitive activities, which academics have argued are critical for learning new skills (Bell & Kozlowski, 2002). Metacognitive activities can broadly be defined as activities that involve setting goals, developing plans, and being able to monitor and analyze the progress toward accomplishing those goals (McCorkle, Alexander, Reardon, & Kling, 2003). According to the study, conscientious applicants searched for higher quality jobs due to scrutiny of prospective employers for assurance of an appropriate fit. Job seekers with this personality trait also more effectively followed up with the employers (i.e. sending thank you cards that emphasized their qualifications). This positive correlation also provided the assumption that employers tend to screen applicants based on their conscientiousness, under the theory that they will be more productive.

## DATA

In order to investigate how the sample students prepare themselves for the job market we conducted a survey containing the questions in the Appendix. The survey was conducted in an introductory finance course at a regional university in Florida, resulting in 221 responses (response rate of 65.38%). In return for their participation, students were provided with extra credit. The survey was also conducted in an upper level Behavioral Finance course, resulting in an additional 22 responses (response rate of 66.67%). Students in this class were rewarded with participation points in return for completing the survey.

To investigate whether upper-level students are better prepared than regular business students, the survey was also conducted at the Financial Management Association (FMA) Finance Leaders' Conference. In 2011, this conference had 310 registrants and over 30 universities in attendance. The students attending this conference are generally leaders of their student FMA chapters and very involved. Consequently, we consider them to be especially motivated. At the conference, 83 students completed the survey (response rate of 26.77%).<sup>2</sup> Incomplete and nonsensical answers reduced the final sample to 250 students (205 from the regional university in Florida and 45 from the FMA Finance Leaders' Conference)<sup>3</sup>

Out of the total sample, 61% are male, and 10% are married. 8% of the sample has children. Our sample is perfect for investigating the choices of upper classmen, since 98% of the sample is either juniors or seniors. Moreover, out of nine possible classifications regarding socioeconomic status, 72% classify themselves in the middle three categories. In the sample, roughly 30% are finance majors. Out of the final sample of 45 FMA participants, 76% are finance majors, while about 20% of the students at the regional Florida university are finance majors.

Next, we discuss three categories of questions to assess student preparation for the job market: 1) General job search-related questions that inquire whether students believe it will be difficult to find a job and whether they use social networking to connect with employers; 2) Work-related questions that seek to determine whether students have experience in their field or are working as an intern; and 3) Club and professional networking questions that investigate how

involved sample students are in student clubs and professional organizations. These three categories of questions will be assessed for the overall sample of 250 students and for three subsamples: 1) FMA students vs. Florida students; 2) Finance majors vs non-finance majors; and 3) FMA finance majors vs. Florida finance majors. These results are presented next:

## RESULTS FOR STUDENT PREPARATION

### General Job Search-Related Questions

The results for the general job search-related questions are presented in Tables 1 and 2. Table 1 presents the averages responses for questions 1 through 4 listed in the Appendix. On a five-point Likert scale, students believe it will be a little more difficult than easy to find a job after graduation (mean = 3.14).

<b>Table 1.</b> Summary Statistics for General Job Search-Related Questions (Median in Parentheses).				
	<b>Difficulty Finding Job?<sup>a</sup></b>	<b>Use LinkedIn or Facebook with Employers?<sup>b</sup></b>	<b>Social Networking Account?<sup>c</sup></b>	<b>Believe Employers View Networking Account?<sup>d</sup></b>
Total (n = 250)	3.14 (3.00)	2.05 (2.00)	86.00%	4.32 (5.00)
FMA (n = 45)	3.49** (3.00)	2.80*** (3.00)	93.33%*	4.31 (5.00)
Non-FMA (n = 205)	3.13** (3.00)	1.88*** (1.00)	84.88%*	4.32 (5.00)
Finance Major (n = 74)	3.34 (4.00)	2.28* (2.00)	87.84%	4.26 (5.00)
Non-Finance Major (n = 176)	3.14 (3.00)	1.95* (2.00)	85.80%	4.34 (5.00)
FMA Finance Major (n = 34)	3.53 (3.50)	2.91*** (3.00)	97.06%**	4.18 (5.00)
Non-FMA Finance Major (n = 40)	3.18 (4.00)	1.75*** (1.00)	80.00%**	4.33 (4.00)
* The difference between the sub-group means is significant at the .1 level. ** The difference between sub-group means is significant at the .05 level. *** The difference between sub-group means is significant at the .01 level. <sup>a</sup> A five-point Likert scale was used for this question, from 1 = Not at all difficult to 5 = Very difficult. <sup>b</sup> A five-point Likert scale was used for this question, from 1 = Never to 5 = Always. <sup>c</sup> Percentage indicated is those who have a social networking account. <sup>d</sup> A five-point Likert scale was used for this question, from 1 = Disagree strongly to 5 = Agree strongly.				

The median response is that it will be neither easy nor difficult. While there is no significant difference in the average response to this question for finance vs non-finance majors and FMA finance majors vs non-FMA finance majors (rows 4 through 7 of Table 1), students attending the Finance Leaders' Conference believe it will be more difficult than average students. Also interesting is the fact that, while 86% of the sample has a social networking



accounting, they, on average, rarely use it to connect with potential employers. However, FMA students and FMA finance majors use these accounts more than their counterparts to connect with employers. Also, as shown in the last column, the average student agrees that employers view networking accounts,<sup>4</sup> which disagrees with the findings by Vicknair et al. (2010) that about half of their sample are unaware of this action by employers.<sup>5</sup>

### Work-Related Experience Questions

Table 2 presents the summary statistics for questions 5 through 9 from the Appendix. For the total sample, only 26% have previously completed an internship. However, 55% are currently working as interns (or at least looking for an internship). Moreover, 43% of the total sample has some work experience in their field. A little disconcerting is the fact that there is no strong preference on the part of students to accept unpaid internships (mean response = 3.20) and that, on average, students rarely to sometimes utilize their university's career management center (mean = 2.72).

<b>Table 2. Summary Statistics for Work-Related Questions (Median in Parentheses).</b>					
	<b>Completed Internship?</b>	<b>Currently an Intern?<sup>a</sup></b>	<b>Willing to Work as Intern for Free?<sup>b</sup></b>	<b>Work Experience in Field (incl. Internship)?<sup>a</sup></b>	<b>Utilizing University CMC?<sup>c</sup></b>
Total (n = 250)	26.00%	55.20%	3.20 (3.00)	43.20%	2.72 (3.00)
FMA (n = 45)	53.33%***	68.89%**	3.91*** (4.00)	60.00%**	3.18*** (3.00)
Non-FMA (n = 205)	20.00%***	52.45%**	3.05*** (3.00)	40.00%**	2.62*** (3.00)
Finance Major (n = 74)	33.78%	62.16%	3.46* (4.00)	47.30%	2.93* (3.00)
Non-Finance Major (n = 176)	22.73%	52.27%	3.10* (3.00)	40.91%	2.62* (3.00)
FMA Finance Major (n = 34)	55.88%***	55.20%**	4.00*** (4.00)	58.82%*	3.35*** (3.00)
Non-FMA Finance Major (n = 40)	15.00%***	50.00%**	3.00*** (3.00)	37.50%*	2.58*** (3.00)
<p>* The difference between the sub-group means is significant at the .1 level.  ** The difference between sub-group means is significant at the .05 level.  *** The difference between sub-group means is significant at the .01 level.  <sup>a</sup> Percentage indicated is those who have completed an internship, are currently an intern, or have work experience in the field.  <sup>b</sup> A five-point Likert scale was used for this question, from 1 = Disagree strongly to 5 = Agree strongly.  <sup>c</sup> A five-point Likert scale was used for this question, from 1 = Never to 5 = Always.</p>					

The majority of FMA attendees (53%) and FMA finance majors in particular (56%), have completed internships, and the majority of FMA attendees (69%) and FMA finance majors (55%) are currently in an internship or looking for one. Interestingly, these two groups of

students are also more likely to accept an unpaid internship and have significantly more work experience in the field. FMA attendees, finance majors, and FMA finance majors are also more likely to utilize the university's career management center than their counterparts.<sup>6</sup>

### Club and Professional Networking Questions

Tables 3 and 4 present the responses to questions 11 through 15 from the Appendix. These questions are designed to assess whether students are actively engaged in a club or with professional organization. In other words, we are interested in determining to what degree students are networking even during their college years.

For the total sample of 250 students, Table 3 shows us that the average student in the sample is a non-active member (mean = 2.28). The average and median student in the sample belongs to one club, but only 25% of the sample serves in club leadership roles. On average, students in the sample feel that they are proactive in group work activities. Students also, on average, have few networking contacts with professional organizations.

<b>Table 3. Summary Statistics for Club and Professional Networking (Median in Parentheses).</b>					
	<b>Involved with Student Organization?<sup>a</sup></b>	<b>How Many Clubs?<sup>b</sup></b>	<b>Serve in Club Leadership Role?<sup>c</sup></b>	<b>Proactive Leader in Group Work?<sup>d</sup></b>	<b>Networking with Professional Organizations?<sup>e</sup></b>
Total (n = 250)	2.28 (1.00)	2.05 (2.00)	25.2%	3.61 (4.00)	2.30 (2.00)
FMA (n = 45)	4.24*** (5.00)	3.36*** (3.00)	80.00%***	4.31*** (4.00)	2.89*** (3.00)
Non-FMA (n = 205)	1.85*** (1.00)	1.77*** (1.00)	13.17%***	3.45*** (4.00)	2.18*** (2.00)
Finance Major (n = 74)	3.01*** (3.50)	2.53*** (2.00)	47.30%***	3.88** (4.00)	2.58** (2.50)
Non-Finance Major (n = 176)	1.97*** (1.00)	1.85*** (1.00)	15.91%***	3.49** (4.00)	2.19** (2.00)
FMA Finance Major (n = 34)	4.24*** (5.00)	3.32*** (3.00)	79.41%***	4.38*** (4.00)	2.94** (3.00)
Non-FMA Finance Major (n = 40)	1.98*** (1.00)	1.85*** (2.00)	20.00%***	3.45*** (4.00)	2.27** (2.00)
<p>* The difference between the sub-group means is significant at the .1 level.  ** The difference between sub-group means is significant at the .05 level.  *** The difference between sub-group means is significant at the .01 level.  <sup>a</sup> A five-point Likert scale was used for this question, from 1 = Not a member to 5 = Very active, officer.  <sup>b</sup> A five-point Likert scale was used for this question, from 1 = 0 to 5 = 4 or more.  <sup>c</sup> Percentage indicated is those who say they serve an active club leadership role.  <sup>d</sup> A five-point Likert scale was used for this question, from 1 = Never to 5 = Always.  <sup>e</sup> A five-point Likert scale was used for this question, from 1 = None to 5 = A lot.</p>					

Table 4. Frequencies for Club and Professional Networking by Class Level						
	1 = Not a member	2 = Member, not active	3 = Sometimes go to meetings	4 = Active member	5 = Active, officer	Total
	Involved with Student Organization? <sup>a</sup>					
Freshmen	0	0	0	0	1	1
Sophomore	1	0	0	0	1	2
Junior	76	10	13	20	13	132
Senior	52	17	11	15	18	113
Graduate	0	0	0	0	2	2
Total	129	27	24	35	35	250
	How Many Clubs? <sup>b</sup>					
	1 = 0	2 = 1	3 = 2	4 = 3	5 = 4 or more	Total
Freshmen	0	0	0	1	0	1
Sophomore	1	0	0	1	0	2
Junior	63	37	15	10	7	132
Senior	42	34	22	10	5	113
Graduate	0	1	0	1	0	2
Total	106	72	37	23	12	250
	Serve in Clubs Leadership Role? <sup>a</sup>					
	Yes		No		Total	
Freshmen	1		0		1	
Sophomore	1		1		2	
Junior	27		105		132	
Senior	32		81		113	
Graduate	2		0		2	
Total	63		187		250	
	Proactive Leader in Group Work?					
	1 = Never	2 = Rarely	3 = Sometimes	4 = Often	5 = Always	Total
Freshmen	0	0	1	0	0	1
Sophomore	0	0	0	1	1	2
Junior	12	12	27	51	30	132
Senior	9	9	27	37	31	113
Graduate	0	0	0	2	0	2
Total	21	21	55	91	62	250
	Networking with Professional Organizations? <sup>b</sup>					
	1 = None	2 = Few	3 = Some	4 = Several	5 = A lot	Total
Freshmen	0	0	0	1	0	1
Sophomore	0	0	1	1	0	2
Junior	47	37	20	21	7	132
Senior	33	34	31	10	5	113
Graduate	0	0	2	0	0	2
Total	80	71	54	33	12	250

<sup>a</sup> The  $\chi^2$  test indicates that the distributions are different at the .05 level of significance.  
<sup>b</sup> The  $\chi^2$  test indicates that the distributions are different at the .10 level of significance.

Differentiating between our three subgroups of students, the differences are very pronounced. FMA attendees, finance majors, and FMA finance majors are much more involved with student organizations and in more organizations. They are also more likely to serve in club

leadership roles, feel they are more proactive leaders in group work, and network significantly more with professional organizations. Clearly, these groups of students are doing more to differentiate themselves for the job market.

Table 4 shows that the distribution for four out of the five questions from Table 5 is significantly different for the different class levels. It is notable that seniors appears more involved with student organizations, belong to more clubs, are more likely to serve in a club leadership role, and are networking more actively with professional organizations.

Next, we wanted to investigate whether those students that are particularly active believe it will be easier to find a job after graduation. Specifically, we were interested in the breakdown of answers for those students who have completed an internship or are currently an intern or looking for an internship, who use the university's career management center, and who are active in their club. Table 5 presents the cross-tabulations of these questions, which are discussed next.

<b>Table 5. Who Believes It Will Be Difficult to Find a Job After Graduation?</b>						
	<b>Difficult to Find a Job After Graduation?</b>					
	1 = Not at all difficult	2 = Somewhat easy	3 = Neither easy nor difficult	4 = Somewhat difficult	5 = Very difficult	N (100%)
Completed Internship <sup>a</sup>	4.55%	10.61%	34.85%	34.85%	15.15%	66
No completed internship <sup>a</sup>	11.96%	13.04%	30.98%	40.76%	3.26%	184
Currently an intern or looking <sup>b</sup>	6.57%	16.06%	31.39%	37.23%	8.76%	137
Not currently intern or looking <sup>b</sup>	14.16%	7.96%	33.63%	40.71%	3.54%	113
Never Use CMC <sup>a</sup>	27.08%	4.17%	22.92%	39.58%	6.25%	48
Rarely Use CMC <sup>a</sup>	3.28%	13.11%	36.07%	37.70%	9.84%	61
Sometimes Use CMC <sup>a</sup>	7.41%	12.35%	32.10%	43.21%	4.94%	81
Often Use CMC <sup>a</sup>	0.00%	24.24%	36.36%	36.36%	3.03%	33
Always Use CMC <sup>a</sup>	14.81%	11.11%	33.33%	33.33%	7.41%	27
Not club member	10.85%	10.85%	33.33%	38.76%	6.20%	129
Inactive club member	11.11%	7.41%	33.33%	44.44%	3.70%	27
Somewhat active	0.00%	25.00%	25.00%	50.00%	0.00%	24
Active member	14.29%	17.14%	25.71%	37.14%	5.71%	35
Active and officer	8.57%	8.57%	37.14%	31.43%	14.29%	35
<sup>a</sup> The $\chi^2$ test indicates that the distributions are different at the .01 level of significance.						
<sup>b</sup> The $\chi^2$ test indicates that the distributions are different at the .05 level of significance.						

The responses shown in Table 5 are very interesting. First, apparently those students who have completed an internship or are currently in an internship believe that it will be more difficult to find a job after graduation than those who do not. The difference in the responses of these two groups is significant at the .05 level of significance. A possible explanation for this is that those students who have already worked as an intern have learned how difficult it is to enter the job market, while those who have not yet worked as an intern are still “blissfully ignorant” of the difficulties associated with entering the job market.

Second, 27% of those who never use the university’s career management center believe it will be not at all difficult to find a job after graduation, versus 0% of those who often use the CMC and 15% of those who always use the CMC. A possible explanation for this is that these students do not use the CMC because they already have a job lined up after graduation. There does not seem to be much variation in the responses of those saying it will be somewhat difficult or very difficult to find a job after graduation relative to their use of the CMC. In fact, over 40% of students believe it will be at least somewhat difficult to find a job after graduation. Third, the distribution of responses to the questions whether it will be difficult to find a job does not differ based on students’ level of networking.

## **RESULTS FOR STUDENT PERSONALITY TRAITS**

In order to investigate whether the responses to questions 1 through 15 from the Appendix differ based on the students’ personality traits, we next investigate the correlations of the Big Five Personality Traits. The five dimensions are (1) extraversion; (2) agreeableness; (3) conscientiousness; (4) neuroticism; and (5) openness to experience. We use the instrument developed by John (1990).

To validate the five scales, we first conducted confirmatory factor analysis. The five factors listed above contain eight, nine, nine, eight, and ten questions, respectively, for a total of 44 questions. Subsequent to the factor analysis, three, five, eight, seven, and six questions remained in the five categories, respectively. Cronbach’s alphas for the five scales are .68, .57, .61, .65, and .60, respectively. According to Hair et al. (2010, p. 92), “Measures of reliability that ranges from 0 to 1, with values of 0.60 to 0.70 deemed the lower limit of acceptability.” Thus, an alpha of .60 is deemed as an acceptable cut-off point in assessing the reliability of the variables. All scales, except for agreeableness, are therefore deemed as reliable. We take caution when interpreting the results of the agreeableness scale due to its low alpha.

Next, we assessed the degree of convergent and discriminant validity of the variables<sup>7</sup>. Convergent validity was assessed by determining whether each indicator’s estimated coefficient on its scale is significant, and the value is greater than twice its standard error<sup>8</sup>. The standard errors of all our indicators are low, ranging from .112 to .405. Additionally, each indicator’s coefficient on its scale is significant at least at the .05 level and greater than twice the standard

error. Discriminant validity is assessed via chi-square difference tests using measures of each pair of constructs. The reduction in chi-square from a model containing only one construct to a model containing two separate latent constructs is significant at least at the .05 level of significance for all ten scale combinations.

### General Job Search-Related Questions and Personality

In order to investigate whether the Big Five personality traits are related to questions 1 through 4 from the appendix, simple correlations between the factor scores and question responses were computed. The results are displayed in Table 6.

Table 6 displays the correlations between the Big Five personality trait factor scores. Moreover, the last two rows in Table 6 display the mean and standard deviations for the Big Five personality traits. All questions were assessed using a five-point Likert scale. Correlations between the factor scores are similar to those reported in other literature<sup>9</sup>. Based on the mean factor scores in the second to last row of Table 6, it appears that our sample considers itself to be fairly open to new experiences, conscientious, and extraverted, on average. Conversely, students in the sample are not very neurotic, on average.

<b>Table 6. Correlations Between Big Five Personality Traits and General Job-Search Related Questions.<sup>a</sup></b>									
	<b>OP</b>	<b>CO</b>	<b>NEU</b>	<b>AG</b>	<b>EX</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>
<b>OP</b>	1.000	.414**	-.300**	.372**	.197**	-.121	.116	-.001	.153*
<b>CO</b>		1.000	-.431**	.528**	.244**	-.132*	.086	.007	.136*
<b>NEU</b>			1.000	-.369**	-.351**	.197**	-.059	-.168**	-.082
<b>AG</b>				1.000	.171**	-.069	.169**	.167**	.003
<b>EX</b>					1.000	-.127*	.180**	.171**	.220**
<b>Q1</b>						1.000	-.124*	.005	-.019
<b>Q2</b>							1.000	.264**	-.044
<b>Q3</b>								1.000	.001
<b>Q4</b>									1.000
<b>Mean</b>	3.804	4.005	2.383	3.749	3.633				
<b>SD</b>	0.567	0.511	0.642	0.618	0.881				
* Correlation is significant at the 0.05 level. ** Correlation is significant at the 0.01 level. a OP = Openness CO = Conscientiousness NEU = Neuroticism AG = Agreeableness EX = Extraversion Q1 = Do you believe it will be difficult to find a job in your field after graduation? Q2 = Do you have a social networking account? Q3 = Are you using sites such as LinkedIn or Facebook to socially connect with employers? Q4 = Do you believe potential employers view applicants' social networking accounts?									

The remaining correlations reported in Table 6 involve the general job search-related questions. The results can be summarized succinctly. First, the more open students in the sample are to new experiences, the more likely they are to believe that employers view applicants' social

networking accounts. Second, more conscientious students think that finding a job will be easier and are more likely to believe that potential employers view applicants' social networking accounts. Third, more neurotic students believe that finding a job will be more difficult and are less likely to use social networking sites to connect with employers. Fourth, more agreeable students are more likely to have a social networking account and to use that account to socially connect with employers. Lastly, more extraverted students believe it will be easier to find a job, are more likely to have a social networking account and to use that account to connect with employers, and are more likely to believe that potential employers view applicants' social networking accounts.

### Work-Related Experience Questions and Personality

Table 7 presents the correlations between the work-related experience questions (questions 5 through 9) and the Big Five Personality Traits. Compared to Table 6, the correlations in Table 7 are much less pronounced. Only three correlations between the questions and the personality traits are significant. First, conscientiousness is positively correlated with previous job experience. Second, more agreeable students are more likely to have utilized the university's career management center. Third, more extraverted students are more likely to be currently in an internship or to be looking for an internship.

<b>Table 7. Correlations Between Big Five Personality Traits and Work-Related Questions.<sup>a</sup></b>					
	<b>Q5</b>	<b>Q6</b>	<b>Q7</b>	<b>Q8</b>	<b>Q9</b>
<b>OP</b>	.067	.032	.048	.033	.054
<b>CO</b>	-.013	.021	.075	.049	.126*
<b>NEU</b>	.006	-.062	-.006	-.020	-.067
<b>AG</b>	.043	.093	.098	.182**	.088
<b>EX</b>	.102	.139*	.087	.045	.037
<b>Q5</b>	1.000	.198**	.056	.100	.320**
<b>Q6</b>		1.000	.169**	.410**	-.035
<b>Q7</b>			1.000	.154*	-.029
<b>Q8</b>				1.000	.028
<b>Q9</b>					1.000
* Correlation is significant at the 0.05 level. ** Correlation is significant at the 0.01 level. <sup>a</sup> OP = Openness CO = Conscientiousness NEU = Neuroticism AG = Agreeableness EX = Extraversion Q5 = I have previously participated in one or more internships. Q6 = I am currently involved in an internship or am looking for an internship. Q7 = Have you accepted or are you willing to accept intern-type work free of an hourly wage? Q8 = Are you utilizing the university's career management center? Q9 = Do you have work experience in your field, including internships?					

### Club and Professional Networking Questions and Personality

The correlations between the Big Five Personality Traits and club and professional networking related questions are presented in Table 8. As shown in the table, student personality traits are significantly correlated with their club and professional networking activities.

<b>Table 8. Correlations Between Big Five Personality Traits and Club and Professional Networking Questions.<sup>a</sup></b>					
	<b>Q10</b>	<b>Q11</b>	<b>Q12</b>	<b>Q13</b>	<b>Q14</b>
<b>OP</b>	.031	.048	.096	.167**	.102
<b>CO</b>	.221**	.236**	.271**	.249**	.136*
<b>NEU</b>	-.145*	-.152*	-.207**	-.189**	-.198**
<b>AG</b>	.118	.134*	.143*	.184**	.006
<b>EX</b>	.103	.090	.105	.272**	.184**
<b>Q10</b>	1.000	.738**	.615**	.335**	.396**
<b>Q11</b>		1.000	.620**	.366**	.384**
<b>Q12</b>			1.000	.332**	.357**
<b>Q13</b>				1.000	.398**
<b>Q14</b>					1.000
* Correlation is significant at the 0.05 level.					
** Correlation is significant at the 0.01 level.					
<sup>a</sup> OP = Openness					
CO = Conscientiousness					
NEU = Neuroticism					
AG = Agreeableness					
EX = Extraversion					
Q10 = Are you actively involved with a business-oriented student organization?					
Q11 = Of how many education societies, clubs or groups are you a member?					
Q12 = Do you serve in a leadership role in any of the clubs of which you are a member?					
Q13 = Are you a proactive leader in group work activities?					
Q14 = Do you have any networking relationships with organizations in your field?					

Conscientiousness is especially pronounced; it is positively correlated with all five questions. More conscientious students are more involved, members of more clubs, more likely to serve in leadership roles, more proactive in work activities, and more likely to network with professional organizations. Additionally, agreeableness is positively correlated with the number of clubs students are involved with, with the probability of serving in a leadership role, and with the degree to which is a student is proactive in group work activities. Moreover, both extraversion and openness to new experiences are positively correlated with the degree of proactivity in group work activities. Lastly, more extraverted students engage in more professional networking activities. Interestingly, neuroticism is negatively correlated with all five questions. More neurotic students are less involved, members of fewer clubs, less likely to serve in leadership roles, less proactive, and less likely to network.

Based on the discussion above, it definitely appears that personality plays a role in the way in which students prepare for the job market, particularly in the use of social networking accounts and in the degree of networking, be it as part of a student organization or via professional organizations. While there is some evidence that personality traits are correlated



with work experience and the probability of obtaining an internship, that relationship is weaker than for networking opportunities. Given these findings, it may be possible to assess students' personality prior to their major declaration. These results could then be used to overcome the hesitation to become involved in a club or a professional organization.

## CONCLUSION

The present economic situation poses concerns for upcoming college graduates. Eager graduates find themselves in the turmoil of job shortages and have to compete not only with their peers, but also with individuals who already have years of work experience and industry expertise who were laid off due to the recession. In this climate, it is interesting to investigate what college students, particularly finance students, are doing to secure themselves a job given the current state of the economy. Secondary relevant research questions are to determine to what extent students utilize internships and social networking sites to connect with employers and how these actions are determined by the students' personality traits.

Utilizing a sample of 250 students consisting of students from a regional university in Florida and participants of the March 2011 FMA Leaders' Conference in New York, several important findings emerge relative to student demographics: 1) We find that most students have social networking accounts, but that FMA participants are using these accounts more to connect with potential employers; 2) About a quarter of our sample has completed an internship, but the majority of upper level finance students has completed an internship or are currently in an internship. Moreover, seniors are more likely to have completed an internship; 3) FMA attendees, finance majors, and FMA finance majors are much more involved with student organizations and in more organizations, are more likely to serve in club leadership roles, feel they are more proactive leaders in group work, and network significantly more with professional organizations. Additionally, seniors appears more involved with student organizations, belong to more clubs, are more likely to serve in a club leadership role, and are networking more actively with professional organizations; 4) Cross-tabulations reveal that those students who have completed an internship or are currently in an internship believe that it will be more difficult to find a job after graduation than those who do not, which may be explained by the fact that those students who have already worked as an intern have learned how difficult it is to enter the job market, while those who have not yet worked as an intern are still ignorant of the difficulties associated with entering the job market. Similarly, 27% of those who never use the university's career management center believe it will be not at all difficult to find a job after graduation, versus 0% of those who often use the CMC and 15% of those who always use the CMC. A possible explanation for this is that these students do not use the CMC because they already have a job lined up after graduation.

When investigating how the students' personality traits relate to these findings, the results are interesting. Generally speaking, the results discussed here show that students exhibiting more

openness, conscientiousness, or extraversion are more likely to believe that employers view applicants' social networking accounts. Conversely, more neurotic (extraverted) students are less (more) likely to use social networking accounts to connect with employers. With respect to club involvement and professional networking, conscientiousness, openness, agreeableness, and extraversion are all positively associated with either the breadth or depth of involvement. Conversely, neuroticism is negatively associated with the level of club involvement and professional networking.

Overall, these findings support and complement the research by Wanberg et al. (2000) and Turban et al. (2009) that personality traits, particularly conscientiousness and extraversion, are important contributing factors for new job market entrants and are linked with job search activities and success. Moreover, the incorporation of personality traits into the analysis of social networking accounts extends the work by Vicknair et al. (2010), who find that about half of the students in their sample are not aware that potential employers view their networking sites. The findings reported here are useful to both employers and career management centers. First, employers would benefit greatly from using events such as the FMA Leader's Conference to conduct interviews. Second, career management centers could stress the importance to students of attending such events and of networking in general. Third, employers may consider using personality tests such as the Big Five in order to identify students who are more likely to be optimally prepared for the job they are applying for. Career management centers could also use this test in order to help students overcome any potential barriers to networking stemming from their personalities. As a possible extension to the present research, it would be interesting to see how the most prepared students actually perform on the job after graduating.

## ENDNOTES

- <sup>1</sup> The FMA Leader's Conference takes place every year, typically in Chicago or New York. This year, over 30 universities attended, with 310 registered participants.
- <sup>2</sup> The relatively low response rate can be explained by the absence of any extra credit opportunities. However, students were informed that we would gladly share the results of the survey. We consider the 83 students to be especially motivated and an appropriate sample.
- <sup>3</sup> We eliminated all observations with multiple missing data items for any of the questions listed in the appendix, with two exceptions. First, two entries were blank for questions 7 and 11. We substituted the average response for these two missing entries. Second, there were two nonresponses each for marital status and socioeconomic status, and one nonresponse for whether the students had children. Since these items were not the primary focus of our analysis and are only reported as demographic information, we chose not to eliminate the entire observation. Results are not materially different even if these items are excluded.
- <sup>4</sup> Anecdotal evidence from the Career Management Center at the regional Florida university confirms that employers view Facebook accounts as an initial screen for students.

- <sup>5</sup> Although not shown in the table, we also investigate whether there was a statistically significant difference in responses by class level. Interestingly, chi-square tests for differences in distributions indicate no statistically significant differences in the distribution of responses across all four questions. This indicates specifically that juniors and seniors view the difficulties of finding a job and the importance of networking accounts similarly
- <sup>6</sup> Although not shown in Table 2, we also investigated whether there are differences in the distribution of responses by class level for the five questions. Chi-square tests for differences in distribution indicate that the distribution differs by class level only for the first question – “I have previously participate in one or more internships.” It appears that seniors are more likely to fall into this category. This makes sense, since most students do not declare their major until the end of the sophomore year and will start taking the basic courses in their field in the junior year.
- <sup>7</sup> See, for example, Perugini and Bagozzi (2001) and Sambasivan, Wemyss, and Rose (2010).
- <sup>8</sup> See Anderson and Gerbing (1988).
- <sup>9</sup> See, for example, Teh et al. (2011). Specifically, neuroticism is inversely correlated with agreeableness, extraversion, openness, and conscientiousness. Also, extraversion is positively correlated with openness, conscientiousness, and agreeableness, agreeableness is positively correlated with openness and conscientiousness, and openness and conscientiousness are positively correlated.

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## APPENDIX

### Survey Questions:

1. Do you believe it will be difficult to find a finance-related job after graduation?
2. Do you have a social networking account?
3. Are you using sites such as LinkedIn or Facebook to socially connect with employers?
4. Do you believe potential employers view applicant's social networking accounts?
5. I have previously participated in one or more internships.
6. I am currently involved in an internship or am looking for an internship.
7. Have you accepted or are you willing to accept intern-type work free of an hourly wage?
8. Are you utilizing the university's career management center?
9. Do you have work experience in your field, including internships?
10. Are you actively involves with a business-oriented student organization?
11. Of how many educational societies, clubs or groups are you a member?
12. Do you serve in a leadership role in any of the clubs of which you are a member?
13. Are you a proactive leader in group work activities?
14. Do you have any networking relationships with organizations in your field?

John (1990) questions to assess personality traits, using a five-point Likert scale:

I see Myself as Someone Who...

- |   |  |
|---|--|
| <input type="checkbox"/> Is talkative                           | <input type="checkbox"/> Tends to be lazy                              |
| <input type="checkbox"/> Tends to find fault with others        | <input type="checkbox"/> Is emotionally stable, not easily upset       |
| <input type="checkbox"/> Does a thorough job                    | <input type="checkbox"/> Is inventive                                  |
| <input type="checkbox"/> Is depressed, blue                     | <input type="checkbox"/> Has an assertive personality                  |
| <input type="checkbox"/> Is original, comes up with new ideas   | <input type="checkbox"/> Can be cold and aloof                         |
| <input type="checkbox"/> Is reserved                            | <input type="checkbox"/> Perseveres until the task is finished         |
| <input type="checkbox"/> Is helpful and unselfish with others   | <input type="checkbox"/> Can be moody                                  |
| <input type="checkbox"/> Can be somewhat careless               | <input type="checkbox"/> Values artistic, aesthetic experiences        |
| <input type="checkbox"/> Is relaxed, handles stress well        | <input type="checkbox"/> Is sometimes shy, inhibited                   |
| <input type="checkbox"/> Is curious about many different things | <input type="checkbox"/> Is considerate and kind to almost everyone    |
| <input type="checkbox"/> Is full of energy                      | <input type="checkbox"/> Does things efficiently                       |
| <input type="checkbox"/> Starts quarrels with others            | <input type="checkbox"/> Remains calm in tense situations              |
| <input type="checkbox"/> Is a reliable worker                   | <input type="checkbox"/> Prefers work that is routine                  |
| <input type="checkbox"/> Can be tense                           | <input type="checkbox"/> Is outgoing, sociable                         |
| <input type="checkbox"/> Is ingenious, a deep thinker           | <input type="checkbox"/> Is sometimes rude to others                   |
| <input type="checkbox"/> Generates a lot of enthusiasm          | <input type="checkbox"/> Makes plans and follows through with them     |
| <input type="checkbox"/> Has a forgiving nature                 | <input type="checkbox"/> Gets nervous easily                           |
| <input type="checkbox"/> Tends to be disorganized               | <input type="checkbox"/> Likes to reflect, play with ideas             |
| <input type="checkbox"/> Worries a lot                          | <input type="checkbox"/> Has few artistic interests                    |
| <input type="checkbox"/> Has an active imagination              | <input type="checkbox"/> Likes to cooperate with others                |
| <input type="checkbox"/> Tends to be quiet                      | <input type="checkbox"/> Is easily distracted                          |
| <input type="checkbox"/> Is generally trusting                  | <input type="checkbox"/> Is sophisticated in art, music, or literature |



# TIME COMPRESSED DELIVERY FOR QUANTITATIVE COLLEGE COURSES: THE KEY TO STUDENT SUCCESS

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## ABSTRACT

*Shrinking university budgets are dictating a greater sense of accountability for college classes. Due to space limitations and required performance markers, students no longer have the luxury of unlimited opportunities to repeat classes ad infinitum when failing in previous attempts. This is especially true in the case of quantitative courses. However, it is not just the students who are feeling the pressure to perform successfully in the classroom. College instructors are being “gently urged” (more aptly describe as a “directive” from their administrators) to help all students progress toward graduation on a strict but reasonable timetable. It is for these aforementioned reasons that innovative teaching techniques are now being investigated by both administrators and instructors. One such approach to teaching inferential statistics at the Craig School of Business, California State University, Fresno, was first investigated during the 2007 summer session, with very promising results on an ad hoc basis. To test the efficacy of a time rearrangement format, students were exposed to the same amount of course material covered in a traditional semester setting but at almost twice the time length of a normal summer session course per class period (still equaling the time spent in a traditional 15 week semester setting). The class was completed in two-thirds of the time (equivalent to 10 weeks). The class average on the comprehensive final exam for this extended time format showed significantly improved results when compared to the historical data (collected from an exam which has been essentially unchanged for the past 30 years, protected from becoming a public domain entity, and faithfully administered every semester). Furthermore, this success was also exemplified in the final letter grade distribution. There were many more “A”s and “B”s than expected.*

*The 2011 summer session provided another excellent opportunity to test a different innovative approach: a time compressed (accelerated) delivery format. As in the summer of 2007, the same amount of course material covered in a regular semester was taught to the students at an accelerated pace, without adjusting the class contact minutes (95 minutes), sacrificing almost 3½ weeks of face to face time. The entire course was covered in what would be equivalent to less than 12 weeks of a regular 15 week semester course. The results of this time compression approach demonstrated that when students are forced to focus on quantitative*

*subjects in a concentrated environment (or be lost along the way), a greater effort is forthcoming. Their effort resulted in significantly higher scores, even when compared to the summer 2007 outcomes. The highest ever class average on the comprehensive final exam and the best ever grade distribution for this instructor were realized through the students' dedication and determination. Although not totally conclusive, there is a very strong positive correlation that students can perform at a higher level of achievement, even in quantitative courses, IF and WHEN they are expected to do so. Moreover, innovative classroom instruction can produce remarkable results. It could be further hypothesized that the traditional 15 week semester, consisting of three 50 minute classes, which allows a student to attempt 18 plus units should be supplanted by an untraditional six week concentrated offering, consisting of 95 minute classes four times a week, limiting a student to a maximum of nine units per term attempted.*

## INTRODUCTION

A substantial amount of investigation has been conducted into using a time compressed or shortened delivery of differing college level courses (Wlodkowski & Westover, 2009). However, much of this research has been targeted towards the remediation of adult aged college students who are reentering the academic arena after years of other endeavors (Attewell, et al., 2006). The time compressed courses have had varying results, usually contributed to the prior preparation, work ethic, and desired outcome of the adult student (Kasworm, 2001). Current research is continuing on the effects of time compression in college courses with what one might refer to actual young, matriculating students. Anderson, Wielicki & Anderson (2009) have found that different barriers to a student's success are not necessarily related to the amount of time that the student is exposed to course material, but rather other extraneous forces and influences on the student. In 2008, Anderson published his results of a twenty-five year study on differing testing approaches to determine how to maximize student outcomes on final exams for quantitative courses. It is suggested by Scott (1996) that students have a voice into determining how certain college courses should be delivered. Many other articles (Bailey, 2009; Wielicki, 2005; Wlodkowski, Mauldin & Gahn, 2001; Conley, 2005) stress a similar theme concerning the time compressed delivery for college class offering from the standpoint of remediation of reentry students. However, what has not been effectively researched is the decisive impact of an accelerated lecture approach for quantitative subjects (like inferential statistics) on college students.

Due to the unique opportunity a summer session offers, a time compression study for the delivery an upper division inferential statistics course in the Craig School of Business, California State University, Fresno was undertaken. Instead of rearranging the number of contact minutes (which was successfully tried in 2007), or changing the venue (online versus the customary lecture hall), a new approach was carried out where the contact hours per day remained the same but the traditional delivery rate of the lecture material was substantially increased. Moreover,



when all of the material for a regular semester was covered, the class then ceased to meet. Essentially, the time compression that the students experienced was a much faster paced lecture. This approach is very similar to a reading class in junior high school where the teacher used a video projection machine to display the text of a story, where the students were accustomed to viewing at 75 words per minute. Then, all of a sudden, a new story was inserted into the machine and the viewing rate was upped to 125 words per minute without the students' knowledge. The students knew something was a little different than before, but they were not suspicious that the pace of the delivery was increased substantially. Such was the case for the students who enrolled in DS 123 (Inferential Statistics) during this past summer in the Craig School of Business. Due to the vagaries of summer session scheduling (95 minutes per day, four days a week), students were forced to not only attend class every session, due to the pace of coverage of the course material, but they were forced to study the material on a more consistent basis, especially when compared to a traditional 15 week semester schedule. The trial approach of this time compressed delivery has lead to the proposal of the hypothesis that students can consistently perform better at higher rates of achievement when using an accelerated pace of lecturing.

## RESULTS

### Historical

During a regular, traditional semester, the inferential statistics course (DS 123) meets for 75 minutes, twice weekly for 15 weeks (2250 semester minutes plus a 120 minute final exam) offering three units credit. During a regular summer session, this class meets for 95 minutes, four times a week for six weeks (2280 semester minutes plus a 120 final exam). The final grade for this course is determined by the student's performance on four unit exams and a comprehensive final exam. The unit exams are returned to the students the following class period after taking the exam, in hopes that they will learn from their mistakes. None of these exams are ever repeated or recycled, as the instructor creates new exams for each unit, every semester (NOTE: none of these exams are generated from textbook test banks but are rather cleverly created from topical information culled from current events and personal experiences). Once a unit exam has been returned, it is considered to be in public domain and unusable.

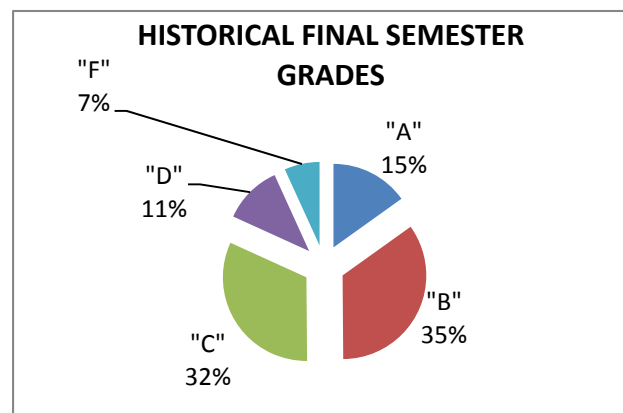
However, unlike the four unit exams, the final exam has been scrupulously guarded, from time of its inception, from ever becoming public domain. It consists of 100 multiple choice and true-false questions covering all quantitative and qualitative material to which the students were exposed during the semester. For the past 30 years (some 78 semesters of instruction, including summer sessions, and almost 9000 participating students), this exam has been changed very little. Consequently, this instrument provides an accurate historical reference for the basis of judging individual student outcomes for final exam scoring and final grade distributions.

Although the student's daily attendance and classroom participation are not explicit considerations for the final grade, there is, however, a very high correlation between student performance and attendance. Students are encouraged to attend with the assurance that each new class period will always contain new information with a very limited review of prior topics. As can be imagined in most statistics classes, attendance seems to dwindle (especially when there is no penalty for an absence) as the 15 week semester wears on. The following is a graphic of the final grade distribution from a thirty year accumulation of student performance data in DS 123. Both the final exam average as well as the final average for the class has been determined.

<b>HISTORICAL</b>	"A"	15.10%
<b>DISTRIBUTION</b>	"B"	34.80%
	"C"	31.90%
	"D"	11.40%
	"F"	6.80%

$\mu$  FINAL EXAM = 70.5882%

$\mu$  FINAL CLASS = 72.7081%



## 2007 Summer Session

During the summer of 2007, a new and innovative approach was proposed to the 32 attending students. This approach was to essentially double the time exposure per class period to cover the entire semester's material. This extended time approach was possible as this class was regularly scheduled to begin at 8:00 in the morning and there were no other summer session classes on the CSU, Fresno campus slated to start before this time. Consequently, there was no university associated conflict to preempt the trial of a new approach, and the class started at 7:30, with full student approval. An empirical study was conducted to determine if an extended time exposure per class period would result in a greater understanding, comprehension, and retention of inferential statistics. The entire 15 week semester's material was to be covered in the usual six week session (or until all of the material was exhausted) by expanding the normal 95 minute class period into four 135 minute class periods per week.

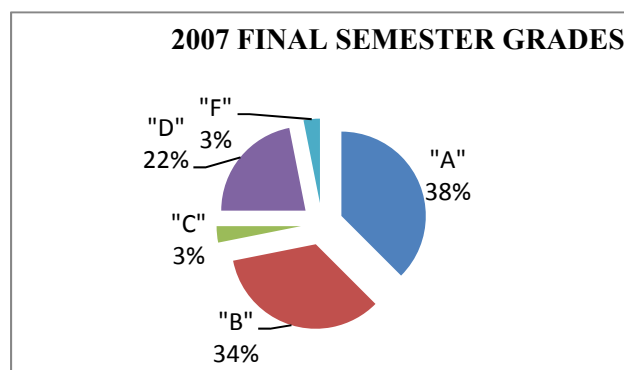
When all of a regular 15 week semester's material was covered in this format, the final exam was administered and then the summer session class was considered finished. In this case, the class was completed in four weeks (2160 semester minutes). The results for this extend time format showed very promising results as students not only scored significantly higher on the

comprehensive final exam (a measurement of overall knowledge) when compared to the historical average, but finished with a higher semester's average as well. Using a one sample test for large samples (comparing the mean of this sample against the expected or historical value), the calculated statistic was 2.849558, which resulted in a p-value of 0.2189%. This small percentage is interpreted as evidence that this time rearrangement approach to teaching inferential statistics is *significant* (a statistician's code word for an outcome which is very much different than expected). In this case, the difference was very positive, an indicator that a new approach to teaching quantitative subjects can result in much higher grades than expected historically. The final grades themselves reflected significantly higher achievement as well. Although not used as a specific marker to gauge outcomes, daily attendance in this class was about 87%.

<b>2007 DISTRIBUTION</b>	"A"	37.50%	<b>12</b>
	"B"	34.38%	<b>11</b>
	"C"	3.13%	<b>1</b>
	"D"	21.88%	<b>7</b>
	"F"	3.13%	<b>1</b>
			<b>n = 32</b>

$$\bar{x}_{\text{FINAL EXAM}} = 77.8683\%$$

$$\bar{x}_{\text{FINAL CLASS}} = 81.8962\%$$



## 2011 Summer Session

In order to verify outcome of the 2007 experimental hypothesis that time rearrangement exposure to quantitative subject matters results in measurable positive outcomes, a similar but different experiment was implemented during the 2011 summer session. Instead of a time rearrangement exposure, the students were subjected to an entire's semester of statistics in a fast paced approach. There was a third more students (43 to be exact) enrolled in DS 123. For some students, this was the sole class taken (at \$315 per unit or \$945 per course); others were enrolled for as many as 9 units. Without expanding the number of daily minutes of exposure for a regular summer session (95 minutes per session), the instructor was able to completely cover the entire course curriculum 20 class periods (1900 semester minutes) with incredible results. In terms of 50 minute class periods, this summer session class was completed in less than thirteen weeks rather than the customary 15 weeks. The results for this extend time format showed very promising results as students not only scored significantly higher on the comprehensive final exam (a measurement of overall knowledge) when compared to the historical average. Using a

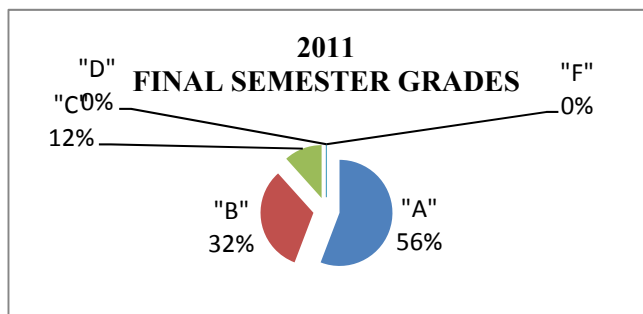
one sample test for large samples (again comparing the mean score for the final exam against the historical mean), the calculated statistic was 9.19961, which resulted in a p-value of essentially zero (0.0000000000000001798%). This microscopic percentage is interpreted as evidence that this time compression approach to teaching inferential statistics resulted in a *significant* improvement in scores on the comprehensive final exam as opposed to the traditional lecture format. In this case, the difference was very positive, an indicator that a new approach to teaching quantitative subjects can result in much higher grades than expected historically.

The final grades themselves reflected significantly higher achievement (the best final outcome that the instructor has ever experienced in 30 years of teaching). Again not used as a specific marker to gauge outcomes, the average daily attendance in this class was an astounding 42 students (about 97%). Moreover, using a two sample test for large samples to the outcomes of the two summer sessions compared against each other, the computed statistic is 1.9383 which results in a p-value of 2.6292%. This calculation indicates that the outcome of the application of the time compressed exposure to the material during the 2011 summer session was even more successful (in terms of final semester averages) when compared to the 2007 summer session. A cursory glance at the accompanying pie charts for all three methodologies provides visual confirmation of the time compression approach results in the best outcomes.

<b>2011 DISTRIBUTION</b>	"A"	55.81%	<b>24</b>
	"B"	32.56%	<b>14</b>
	"C"	11.63%	<b>5</b>
	"D"	0%	<b>0</b>
	"F"	0%	<b>0</b>
	<b>n =</b>		<b>43</b>

$$\bar{X}_{\text{FINAL EXAM}} = 84.6791\%$$

$$\bar{X}_{\text{FINAL CLASS}} = 88.3764\%$$



## CONCLUSION

Shrinking university budgets are dictating a greater sense of accountability for college classes. Due to space limitations and required performance markers, students no longer have the luxury of unlimited opportunities to repeat classes *ad infinitum* when failing in previous attempts. Unfortunately, this repeating occurs with greater regularity in quantitative courses. However, it is not just the students who are feeling the pressure to perform successfully in the classroom. College instructors are being "gently urged" (more aptly describe as a "directive" from their administrators) to help all students progress toward graduation on a strict but reasonable timetable. It is for these aforementioned reasons that innovative teaching techniques are now being investigated by both administrators and instructors. As discussed in Anderson

(2008), final semester averages were significantly higher when using new, innovative classroom techniques, as compared to the more traditional approach. This is especially true when a time rearrangement approach to teaching inferential statistics in the Craig School of Business at CSU, Fresno, was first tested during the 2007 summer session. The results demonstrated that a new approach could produce significantly higher grades when compared to the traditional approach of teaching inferential statistics. An even more radical approach was tried with even greater success than the 2007 summer session approach during the 2011 summer session. Students were essentially fast paced through the same coverage of inferential statistics, finishing the entire semester's coverage in just over 80% of the regular time. Student outcomes from this attempt would amaze even the most skeptically cynic.

Of course, it could be argued that students who participate in summer sessions (at a much higher cost per unit of instruction) are much more motivated to succeed. This motivation in turn is exemplified by their final averages for the term. The cynic might argue that there may be many less distractions and outside pressures for students during a summer session, which might skew the results. But, on the other hand, if you believe that every large sized college class tends to follow the normal distribution (as most statisticians would argue), then the above comparisons demonstrate that a manageable change in course delivery structure could result in higher individual scores for students. Even more importantly, from the stand point of college administration's plea, students can and will be able to successfully navigate through quantitative college classes which have normally thrown up barriers (real and imagined) to graduation rates in the past.

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# **ASSESSING STUDENT PERFORMANCE AND ATTITUDES BASED ON COMMON LEARNING GOALS AND ALTERNATIVE PEDAGOGIES: THE CASE OF PRINCIPLES OF FINANCIAL ACCOUNTING**

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## **ABSTRACT**

*This study focuses on one semester when five experienced instructors teaching principles of financial accounting focused on 17 common student learning outcomes and collaboratively designed a common final exam. One instructor used a nontraditional format that included: (1) reliance on Internet-based content (e.g., Wikipedia, the most current financial statements using real company data), rather than a textbook, (2) emphasis on Excel spreadsheets to journalize transactions and prepare financial statements, and (3) use of small group collaboration to learn computer skills and reinforce accounting concepts. The four other instructors used a procedural textbook and relied primarily on a lecture-based approach with little emphasis on Excel or small group collaboration. Performance on the final exam showed that students who learned from the textbook showed no statistical difference from students taught in the nontraditional format. As for student satisfaction with the course, a pre- and post-attitudinal survey was completed by 267 students. Overall, student perceptions of collaborative learning, computer knowledge and usefulness of accounting knowledge in their chosen career were significantly better than students taught in a traditional, lecture-based format with a textbook.*

*This study is limited in that it is not possible to separate the textbook effect from the instructor effect, because only one instructor used the nontraditional format and the study is restricted to one semester. Given its limitations, however, our article has two important implications. First, by basing a course on common student learning outcomes and a common final exam tied to these outcomes, instructors are encouraged to experiment. Our results show that students of an instructor who jettisoned the traditional textbook and employed nontraditional teaching techniques performed no better or worse on the final exam than students learning in the traditional manner. Second, instructor teaching techniques do have a material positive effect on student soft skills (e.g., teamwork, computer competency), satisfaction with the course, and perceived value of accounting knowledge in their future careers.*

## INTRODUCTION

In the mid-1990s, the accounting department at a comprehensive, public university on the West Coast completely reengineered its two introductory undergraduate accounting courses. The model for these courses was disseminated to six other colleges and universities across the U.S. as a result of two grants from U.S. Department of Education Fund for the Improvement of Postsecondary Education (FIPSE). The goals of the revised Introduction to Accounting I and Accounting II courses were “to (1) introduce students to decision making processes involving financial data, (2) bring about accounting literacy, and (3) develop students' problem-solving skills. The strategy moved away from the traditional rule based, procedure oriented mode to a more dynamic, interactive learning mode” (DeBerg, Adams & Lea, 1998). Almost all of the instructors teaching the courses during the five-year grant period were tenured or tenure-track faculty.

The re-designed courses had drastically altered the role of the instructor both in and outside the classroom. For example, within the classroom, the instructor was expected to call on students frequently during interactive, full-group discussions which required skills in use of the Socratic teaching method. The instructor also had to assist student teams as they worked on their in-class group assignments, which required coaching/facilitator skills. Instructors were also expected to take a more active role in providing useful feedback to students regarding their writing and oral communication skills, which also required additional coaching/facilitator skills.

In the late 1990s and early 2000s, the accounting department drifted back to a more traditional approach. This occurred for several reasons, but the main reason was the replacement of retiring faculty with temporary or inexperienced faculty to teach the introductory courses. Except for one professor remaining from the FIPSE project, the replacement instructors were not trained to teach the re-designed courses.

Between 2001 and 2004, the accounting department had little choice but to revert to a traditional model. The traditional model did not rely on a course coordinator for both courses; instead, instructors were allowed to choose their own learning goals and objectives, they had the freedom to choose their preferred textbook, and they authored their own final exams. Collaboration among faculty was minimal. Gone were the FIPSE days of weekly faculty meetings to have conversations about course content, teaching styles and approaches that worked.

However, the environment changed in late 2004 when the College of Business adopted 10 learning goals and related student learning outcomes as part of its assurance of learning efforts to inform and influence continuous improvement efforts. These goals and outcomes were identified after the issuance of new standards by the Association for the Advancement Collegiate Schools of Business (AACSB, 2003), which emphasized outcomes assessment and accountability. Moreover, in 2005, the College of Business created a set of formal course coordinator guidelines for courses with multiple instructors. The development of consistent



learning outcomes, the appointment of a course coordinator, and a renewed emphasis on assessment spurred the accounting faculty to be more systematic and rigorous in evaluating pedagogical outcomes.

This study focuses on one semester (fall, 2007) when all five instructors teaching the course: (a) agreed to focus on 17 common student learning outcomes, (b) designed a common final exam to test whether these outcomes had been achieved, and (c) encouraged one instructor (who was also the course coordinator) to teach in a nontraditional format. The nontraditional format included heavy reliance on technology (e.g., the instructor chose not to use a textbook; instead, he relied on free Internet content and Excel spreadsheets as the primary learning materials) and small group collaboration. The main questions addressed in this study are: (1) Does the choice of textbook/traditional pedagogy versus no-textbook/nontraditional pedagogy have an impact on student performance as measured by a common final exam based on desired student learning outcomes?, (2) How are student attitudes affected toward the course when comparing a course with a textbook/traditional pedagogy versus no-textbook/nontraditional pedagogy?, and (3) Does the choice of textbook/traditional pedagogy versus no-textbook/nontraditional pedagogy have an impact on student beliefs that accounting will be useful in their chosen career?

This paper starts by providing a history of the accounting education reform movement, starting in the 1980s, and carries this forward to the outcomes assessment initiatives put into place by AACSB in the mid-2000s. Included in this section are a few relevant articles from other disciplines as they relate to collaborative learning and use of other forms of media to teach courses that are rules-based, such as accounting. Next, we explain how our accounting department identified 17 student learning outcomes for principles of financial accounting, and how a common final exam was created to measure these outcomes. This section also presents the results of the common final exam, broken down by instructor. In the next section, we explain how an attitudes survey was administered in fall 2007 to students on a pre- and post-test basis to determine if there were differences in attitudes about the course based on textbook used and pedagogies employed. Results of the survey are summarized in this section. Finally, the last section provides a discussion and summary.

### **ACCOUNTING EDUCATION REFORM: A HISTORY AND LINK TO ASSESSMENT**

Leading accounting practitioners and educators have been making the case for reform in accounting education for well over two decades, starting with the work of the Bedford Committee (American Accounting Association, 1986). This led to a White Paper issued by the (then) Big 8 public accounting firms (Arthur Andersen & Co. et al., 1989), followed by the creation of the Accounting Education Change Commission (1990). All of these initiatives resulted in calls for major reform in course content and pedagogy in order to produce graduates

capable of meeting the challenges of the 21st century (Association of American Colleges and Universities, 2007). The AECC specifically asked accounting programs to include coursework that enhances communication skills, intellectual skills, and interpersonal skills. Such skills include an ability to work effectively in groups and to provide leadership when appropriate.

Not only was course content challenged, but so were the approaches to course delivery. The Bedford Committee (p. 178), for example, questioned the effectiveness of traditional teaching and learning methods. It also suggested that more emphasis should be given to student development:

*The ability to apply accounting knowledge requires that students develop pertinent skills and attitudes regarding, for example, how to become aware or sensitive to the needs of others, how to listen, how to understand management requirements, how to negotiate, and how to relate to the information requirement of the general public. At a minimum, current teaching methods need to be supplemented with discussion of concepts.*

The White Paper concurred, and encouraged faculty to deliver courses in an integrated, "learning by doing" manner. Teamwork was encouraged across course and departmental lines.

Outside of the accounting and business, educators from other disciplines were making similar calls for reform. Barr and Tagg (1995) described a shift from what they call an "Instruction Paradigm" (traditional, passive lecture-discussion format) to a "Learning Paradigm" (interactive, experiential, and "holistic" format). Barr and Tagg envisioned an education environment gradually shifting from traditional structures and processes to a new, student-centered paradigm. Barr and Tagg (1995, p. 20) said, "The Learning Paradigm prescribes no one 'answer' to the question of how to organize learning environments and experiences. It supports any learning method that works, where 'works' is defined in terms of learning outcomes, not the degree of conformity to an ideal classroom archetype."

One way to move to the Learning Paradigm is to (1) put more emphasis on collaborative learning and to (2) use technology to address the needs of individual learners. First, with respect to collaborative learning, Astin (1993, p. xxii) provides evidence that one of the reasons the traditional educational model of higher education should be revised is because "the single most important environmental influence on student development is the peer group; by judicious and imaginative use of peer groups, any college or university can substantially strengthen its impact on student learning and personal development." He found that the relevance of the "peer group effect" is in the underlying principle: students in similar circumstances and with common needs and interests have been afforded an opportunity to interact and learn together. Astin concluded that there are many ways in which institutions can be much more creative in facilitating the formation of peer groups. Prime considerations for the formation of peer groups are twofold: (1) to find common ground on which identification can occur (e.g., career interests, curricular interests, political interests) (2) to provide opportunities to interact on a sustained basis.

A great deal of research in the general education arena has focused on learning with books, television, computers, and multimedia environments. The general conclusion from these studies is that students who are exposed to a multisensory approach are more successful [Kozma, 1991, p. 195]. As accounting is normally taught, however, instructors rely almost exclusively on the traditional lecture/problem approach to teaching, an approach that involves effective note taking skills. However, note taking can be difficult for learners new to a topic because it requires the integration of so many processes. For example, listening carefully, remembering what was heard, sorting through to determine what is important, writing rapidly, and remembering how to spell words is extremely difficult for students who are having problems with the course. For these reasons, alternative learning aids are needed.

Schank (1991, p. 3) said, "Ironically, it is those disciplines that believe that they have rules to teach, those that feel that their domains are well understood, that have teaching problems caused by the desire to have students memorize rules apart from these cases in which those rules were derived. However, this style of teaching results ..[in].. knowledge that can be retrieved on demand but is not spontaneously retrieved when it would be helpful for solving a problem." Schank, considered a pioneer in interactive educational software using an approach called case-based reasoning, believes that a computer system that is a real life simulation can create a situation, pose it as a problem to the student, and ask for a response. The computer serving as a teacher must be able to force conjectures on the part of the student and it must be able to simulate real world situations.

Unquestionably, in the mid-1990s, technological advances were beginning to change how education was delivered; at the same time, leading accounting organizations were asking accounting departments also to change course content to a more user oriented approach. In other words, there was a movement away from the procedural approach to teaching accounting to a more conceptual, problem-solving approach.

However, this changed with the dawning of the new century and, soon thereafter, the dot.com crash. The crash was soon followed with several accounting scandals (e.g., Enron and Arthur Andersen), which led Congress to pass the Sarbanes-Oxley (SOX) in July 2002. SOX forced corporations to take more responsibility for their internal controls and for public accounting firms to do a better job of conducting their audits. The shift in the economic and legal climate caused accounting firms to begin hiring accounting graduates that were very well-grounded procedurally at the expense, perhaps, of such "soft skills" as problem-solving skills, teamwork and communication skills.

Not surprisingly, the accounting reform movement at our university—and nationally—lost momentum during this period because general climate in the accounting profession that leaned toward a return to a procedures-based approach. However, a renewed momentum began on our campus with the AACSB's assurance of learning standards in 2003. The AACSB standards emphasized student learning outcomes, and processes put in place to ensure that these outcomes are being achieved. The combination of (1) a course designed around student learning

outcomes, (2) an environment that emphasizes learning over teaching (i.e., one that encourages innovation in both content and pedagogy), and (3) availability of new technology (e.g., smart classrooms, laptop computers, email, Internet research, open source software on the web), there was renewed momentum for accounting education reform on our campus, and provided one of the main reasons for the present study.

Consistent with the 2004 AACSB standard changes, the College of Business adopted 10 learning goals and related student learning outcomes as part of its assurance of learning efforts to inform and influence continuous improvement efforts. These goals and outcomes were identified shortly after the issuance of new standards by the Association for the Advancement Collegiate Schools of Business (AACSB, 2006), which emphasized outcomes assessment and accountability at the program level—or “macro” level. The AACSB also encouraged assessment at the course level—or “micro level.” This type of assessment is known as course-embedded assessment (CEA).

Examples of studies in the micro category include Cornick, Bhamornsiri and Malmgren (2003) and McConnell, Hoover, and Miller (2008). Cornick et al. focused on two “classroom-assessment techniques,” (CATs) to provide faculty with information to improve the delivery and content of Principles of Accounting I and II. One CAT focused on a faculty survey administered at the beginning of the semester asking each faculty member to rate the extent of their coverage of non-technical topics covered in the course, such as oral and written communications, teamwork, global issues and Internet usage. The other CAT was administered to students at the end of the course, seeking their feedback on 12 items related to their perceptions of the course. Faculty members reviewed student responses and compared them with their coverage of specific topics in order to implement future changes.

Another micro-level article by McConnell et al. (2008) provided numerous examples of CEA for the business discipline as a whole (not just accounting). The authors state that “CEA can be used at the course level to help individual faculty members determine to what extent their course learning objectives are being met, and it can be used at the program level to assist in measuring to what degree program level learning goals are being met” (p. 20). Examples of course-embedded artifacts include research papers, oral presentations, case study reports and lab performance.

To get an idea of which teaching techniques in accounting are considered most effective at accomplishing course objectives, Stice and Stocks (2005) surveyed over 450 members of the Teaching and Curriculum section of the American Accounting Association. Five major categories were identified that contribute to a positive learning environment: course content, classroom mechanics, teaching techniques, student involvement and learning atmosphere. Results of the survey showed that, while many of the most important factors identified as effective relate to characteristics of the individual teachers (e.g., enthusiasm, sense of humor), many of the factors relate to teaching techniques that do not require a large amount of effort, and can be incorporated into a teacher’s portfolio (e.g., use of real-world examples; clearly define

student responsibilities; encourage student participation; start class on time; identify objectives daily to students).

The American Accounting Association's monograph (Flinn and Crumbley, 2009a), *Measure Student Learning Rather than Student Satisfaction in Higher Education*, contained several articles criticizing higher education's lack of emphasis on student learning (e.g., Crumbley & Smith, 2009; Moore, 2008; Merritt, 2009). Moore and Flinn (2009) were especially critical of the current system. The current system's dysfunctionality, they say, is designed to reduce disappointment. Measuring students (through tests) and measuring teaching effectiveness (through Student Evaluation of Teaching) result in a lot of disappointed people. As a result, dysfunctional behavior ensues (e.g., dumbing down the class; inflating student grades).

In summary, a good assessment program must identify student learning outcomes first, and then employ effective instruments to measure student learning. Moreover, faculty are encouraged to employ teaching techniques and make assignments that include production of artifacts that contribute to student learning. Stated another way, student learning comes down to two things: course content and course delivery. Bisoux (2008, p. 26) provides a few examples of business programs that have begun their assessment programs in earnest, but most programs seeking AACSB reaccreditation have failed to use the data to make tangible improvements. She concludes:

*Many assessment experts suggest that achieving genuine enthusiasm about assessment starts with faculty development. Most faculty are trained to explore their disciplines, not new modes of teaching....therefore, an even bigger challenge is to ensure that faculty learn new pedagogies that will translate to better outcomes.*

## **IDENTIFICATION AND ASSESSMENT OF STUDENT LEARNING OUTCOMES**

The course coordinator instructed each principles of financial accounting instructor, when preparing for fall 2006, to be careful to address all 17 student learning outcomes (SLOs) in their syllabi and course planning (note: syllabi, common final exams and survey instruments are available from the authors upon request). These learning outcomes were identified by a joint committee of the state university and community college faculty in 2006. Exhibit 1 provides a summary of these SLOs. The purpose of the statewide committee was to contribute to an articulated principles course, such that learning outcomes resulting from Principles of Accounting I at a community college would be transferable to any university within the system, thereby allowing students to move more easily between community colleges and the four-year universities.

**Exhibit 1**  
**Student Learning Outcomes**

Upon successful completion of the course, students will be able to:

1. Explain the nature and purpose of generally accepted accounting principles (GAAP);
1. Explain and apply the components of the conceptual framework for financial accounting and reporting, including the qualitative characteristics of accounting information, the assumptions underlying accounting, the basic principles of financial accounting, and the constraints and limitations on accounting information;
2. Define and use accounting and business terminology;
3. Explain what a system is and how an accounting system is designed to satisfy the needs of specific businesses; summarize the purpose of a journal and a ledger;
4. Apply transaction analysis, input transactions into the accounting system, process this input, and prepare and interpret the four basic financial statements;
5. Distinguish between cash basis and accrual basis accounting and their impact on the financial statements, including the matching principle;
6. Identify and illustrate how the principles of internal controls are used to manage and control the firm's resources and minimize risk;
7. Explain the content, form, and purpose of the basic financial statements (including footnotes) and the annual report, and how they satisfy the information needs of investors, creditors, and other users;
8. Explain the nature of current asset issues including measuring and reporting receivables and bad debts, measuring and reporting inventory and cost of goods sold;
9. Explain the valuation and reporting of current liabilities, estimated liabilities, and other contingencies;
10. Identify and illustrate issues relating to long-term asset acquisition, use, depreciation, and disposal;
11. Distinguish between capital and revenue expenditures;
12. Identify and illustrate issues relating to long-term liabilities including valuation of debt, issuance, and retirement;
13. Identify and illustrate issues relating to stockholders' equity including issuance, repurchase of capital stock, and dividends;
14. Explain the importance of operating, investing and financing activities reported in the Statement of Cash Flows when evaluating solvency and liquidity of the firm;
15. Interpret company activity, profitability, and liquidity through selection and application of appropriate financial analysis tools; and
16. Identify the ethical implications inherent in financial reporting and be able to apply strategies for addressing them.

To allow for faculty creativity and academic freedom, each instructor was encouraged to include one or two additional learning outcomes based on their personal preferences and styles (e.g., one instructor included the following learning outcomes: Calculate present and future values of single amounts and annuities). This strategy is consistent with Whetten's (2007) approach to learner-centered course design, which emphasizes a course with clear direction for

faculty but allowing them to apply their own “thoughtful adaptation.” Also, to accommodate style and academic freedom, it was agreed that two main approaches would be used to teach the course: (a) a procedural textbook and traditional lecture method, (b) a conceptual textbook and nontraditional lecture method. The procedural textbook was authored by Harrison and Horngren (2004) and the conceptual book was authored by Ingram and Albrecht (2006).

Each instructor contributed to the authorship of a common final exam by submitting two or three multiple-choice questions mapping onto at least one SLO. The course coordinator winnowed the questions down to 60 multiple-choice questions, which were then approved by the other instructors to be included in the common final exam.

In fall 2006 four instructors taught the course; the procedural textbook was used by two instructors and the conceptual textbook was used by the other two instructors. In spring 2007, a total of six instructors taught the class; the procedural book was used by four of them, while the conceptual book continued to be used by the two same instructors from fall 2006. An analysis of variance (ANOVA) was conducted to see if the final exam scores differed based upon using the conceptual textbook (mean = 36.93) or procedural textbook (mean = 38.92). The omnibus statistical test of the differences was statistically significant ( $F = 15.49$ ,  $p < .05$ ). Closer inspection with a series of post hoc Bonferroni paired-comparisons tests indicates that the conceptual textbook had significantly lower scores than the procedural textbook ( $p < .05$ ). Based on these results, the two instructors using the conceptual book decided to shift direction in fall 2007. One instructor switched to the procedural book, while the other instructor—the one who was involved in the FIPSE grants a decade earlier, and who was more comfortable with nontraditional teaching techniques—switched to no book at all.

### **Performance on the Common Final Exam**

Table 1 shows the average score earned on the final exam for each instructor, with an overall average of 38.96 correct answers out of 60 ( $n = 322$  students). This equates to 68.9%. (Note: some might interpret this to mean that instruction, at this university, is of questionable effectiveness, especially when academics generally consider less than 60% mastery of material to be failing. But some might also interpret this to mean, as we do, that this is exactly why micro level assessment is warranted. Close scrutiny of a course’s learning outcomes, and the manner in which these objectives are assessed, are needed before making assumptions about what is generally considered to be mastery of learning outcomes. Without an adequate outcomes assessment program, setting an arbitrary minimum level such as 60% measure is just that—arbitrary).

**Table 1: Averages on Final Exam**

INSTRUCTOR	PEDAGOGY	AVERAGE ON FINAL EXAM	NUMBER OF STUDENTS
1	No textbook, nontraditional pedagogy	39.81	84
2	Procedural textbook, traditional pedagogy	38.32	111
3	Procedural textbook, traditional pedagogy	41.81	62
4	Procedural textbook, traditional pedagogy	41.44	34
5	Procedural textbook, traditional pedagogy	33.84	51
	Overall Average on Exams/Number of Students	38.96	322

Final exam scores for three of the four experienced instructors who used the procedural textbook, as compared to an experienced instructor who did not use a textbook, showed no statistically significant difference ( $p > .10$ ). Note the student score for Instructor 5, who taught one large section of a night class. His average was 33.84, which was significantly different from the other four instructors ( $p < .05$ ). Instructor 1, the no-textbook instructor, averaged 39.81, slightly above Instructor 2 and slightly below Instructors 3 and 4. This finding suggests that the innovative instructor's students fared as well as the other students. The fact that there is no significant difference between the three procedural instructors and the no-textbook instructor is an interesting finding in and of itself (e.g., consider the textbook publishing industry; if these results are generalizable across instructors and universities, then the traditional hard-bound textbook may soon be in jeopardy).

### **ASSESSING STUDENT ATTITUDES AND PERFORMANCE BEFORE AND AFTER THE COURSE**

In fall 2007, all five instructors administered a survey at the beginning and end of their courses. The intent of the survey was twofold: first, to glean some insight as to effectiveness of course design elements employed by various instructors, such as learning activities (e.g., group work), teaching strategies (group discussion and lecture methods; written assignments; multiple choice and essay exam questions; textbook or no-textbook) and tools used to enhance skills (e.g., computer skills); and second, to assess student expectations about the course at the beginning of the semester and to compare these prior expectations with their actual impressions at the end of the term. By comparing the pre- to the post-survey results, we believed that instructors could get a much better idea of which learning activities and strategies were resulting in more student satisfaction and competencies. In short, the attitudes survey allowed us to gain a better understanding of the profile of incoming students, and to determine whether or not the course caused their views to change by the end of the semester.

At the beginning of the fall 2007 semester, 377 students completed the survey; at the end, 267 completed the survey. Tables 2-4 provide a summary of student responses to several of the key questions. Questions related to group exercises and collaborative learning (see Table 2),



computer competency and to the use of a textbook or web-based content as a primary learning tool (see Table 3), and students' perceptions of the usefulness of accounting knowledge in their chosen career (see Table 4). Tables 2-4 summarizes pre-and post-results, broken down between the instructor who did not use a textbook (n= 84 students taking the final exam) vs. the four instructors who used a procedural textbook (n=258 students taking the final exam).

### Collaborative Learning

Table 2 presents the results of selected questions related to collaborative learning. Note that there was a statistically significant difference on the post-test between the no-textbook/nontraditional pedagogy versus the textbook/traditional pedagogy approach for two of the three questions. Generally, the students in the no-textbook course ended the term with more positive attitudes toward collaborative learning. When asked to agree or disagree with "I find it easier to learn in classes that emphasize group discussion methods, as opposed to classes that emphasize lecturing", 55.9% of the no-textbook students agreed with this statement at the end of the semester as compared to 40.1% of the textbook students. This difference approached significance ( $p = .054$ ). Similar results held for questions related to group exercises as an effective way to learn technical material and whether learning how to work with others should be an important objective of this course. Here, differences were significant ( $p < .05$ ).

<b>Table 2: Collaborative Learning</b> <b>Students' Perceptions of Course and Outcomes: Textbook vs. No Textbook Sections</b> <b>(Percentage of Students Answering "Agree or Strongly Agree")</b>			
<b>Collaborative Learning Questions</b>		<b>No Textbook</b>	<b>Textbook</b>
I find it easier to learn in classes that emphasize group discussion methods, as opposed to classes that emphasize lecturing.	Pre	38.7	41.4
	Post	55.9	40.1
Group exercises are an effective way to learn technical material.	Pre	50.6	47.2
	Post*	67.5	48.9
Learning how to work with others should be an important objective of this course.	Pre*	46.7	37.9**
	Post*	52.7	24.6

The instructor who chose not to use a textbook was the only one to assign students to groups and to emphasize collaborative learning. At the beginning of the semester, students completed a student information sheet which served as a basis to form students into groups of four or five. Exhibit 2 provides a copy of the student information sheet. For each group, one of the students self-reported Excel spreadsheet skills of six or more out of ten; this student became the "spreadsheet leader." Another student with a self-reported GPA of 3.0 or more was assigned to be the "academic captain." The remaining two or three student team members in a group were assigned to ensure a balance of gender and intended major. Throughout the semester, student teams were encouraged to work together in and out of class.

**Exhibit 2**  
**Student Information Sheet**  
**(Used By No-textbook/Nontraditional Pedagogy Instructor)**

<b>Principles of Financial Accounting: ACCT 201</b>		Class Time
<b>Student Information Sheet: Fall 2007</b>		
Name	Preferred Email address (print clearly):	
Check here to indicate your year of academic study: FR <input type="checkbox"/> SOPH <input type="checkbox"/> JUNIOR <input type="checkbox"/> SENIOR <input type="checkbox"/>		
Proposed concentration/option (e.g., marketing, finance, accounting, MIS, management, don't know, etc.):		
Is English your first language?      Yes <input type="checkbox"/> No <input type="checkbox"/>		
Do you know how to use a computer spreadsheet (e.g., Excel)? Yes <input type="checkbox"/> No <input type="checkbox"/>		
How would you rate your spreadsheet skills on a scale of 1 (not much) to 10 (expert)? _____ out of 10		
My cumulative GPA at college/university is (check one): _____ Between 2.0 and 2.499      _____ Between 2.5 and 2.99      _____ Between 3.0 and 3.49      _____ Above 3.5		
On the other side of this paper:		
1. Briefly describe any prior international travel experiences, if any.		
2. Briefly describe any prior <u>business-related</u> work experience that you have acquired (clerical, sales, warehousing, bookkeeping, etc.).		
3. Briefly indicate any career plans that you intend to pursue or are thinking about pursuing.		

### Computer Competency and Web-Based Content

Table 3 presents the results of questions related to students' perceptions related to their computer use and competency before and after the course. Note that a total of 79.3% of the no-textbook students agreed that they had become a more competent computer user after taking the course, as compared to 19.2% of the textbook students. In a similar fashion, 88.0% of the students in the no-textbook course agreed that learning how to use computers to aid in financial analysis should be an important objective of this course, while 61.5% of the students in the textbook-based course felt this way. Students in the no-textbook course also were much more inclined to state that they believed using computers is an effective way to learn about accounting and business.

Of course, before the course started, students in all classes did not know whether or not their instructor planned to use a text. As expected, there is no significant difference between the no-textbook vs. textbook students on a pre-test basis regarding if they would prefer that their accounting teacher use web-based content, and not a textbook, as a primary learning tool. After the course was completed, there was a significant difference between the no-textbook vs. textbook students. At the beginning of the semester, 44% of the students in the no-textbook course preferred web-based content, but this increased significantly to 72.8% at the end. This

indicates that, once exposed to web-content as the primary learning tool, a significant number of students preferred this option. In contrast, 34.8% of the students who used a textbook came into the semester stating they preferred using web-based content, yet by the end of the semester this percentage dropped significantly to 24.6%.

<b>Table 3: Students' Perceptions of Computer Use and Competency: Textbook vs. No Textbook Sections</b>			
<b>Collaborative Learning Questions</b>		<b>No Textbook</b>	<b>Textbook</b>
(After taking this course) I am (now) a (more) competent computer user. <sup>a</sup>	Pre	78.7	77.5**
	Post*	79.3	19.2
Learning how to use computers to aid in financial analysis should be an important objective of this course. <sup>a</sup>	Pre	82.7	84.3**
	Post*	88.0	61.5
I believe that using computers is an effective way to learn about accounting and business. <sup>a</sup>	Pre	74.6**	76.2**
	Post*	92.2	60.9
I would prefer that my accounting teacher use web-based content, and not a textbook, as a primary learning tool. <sup>a</sup>	Pre	44.0**	34.8**
	Post*	72.8	24.6
My level of knowledge regarding computer spreadsheets is best described as: <sup>b</sup>	Pre	36.0**	21.4
	Post*	76.6	28.8
My level of knowledge regarding computer database management is best described as: <sup>b</sup>	Pre	5.3**	10.6**
	Post*	39.4	18.7
<sup>a</sup> Percent answering Agree or Strongly Agree from a five-point Strongly Disagree to Strongly Agree scale.			
<sup>b</sup> Percent answering Moderately to Extensive knowledge of spreadsheets from a five-point No Knowledge to Extensive Knowledge scale.			
* Statistically significant difference between row percentages (no text vs. text), $p < .05$			
** Statistically significant differences between column percentages (pre vs. post), $p < .05$			

Furthermore, when asked about their level of knowledge regarding computer spreadsheets, the no-textbook students had significant improvements in their perceived spreadsheet skills. The no-textbook students moved from 36.0% to 76.6% of the students stating they had moderately extensive or extensive knowledge by the end of the semester, as compared to only 28.8% of the textbook-based students. A similar pattern is found regarding student's perceived knowledge about the use of computer databases. Again, students in the no-textbook course were much more likely to feel they had increased their knowledge about the use of databases in management compared to the textbook-based students.

These results are not surprising given that (1) the Excel team leader was strongly encouraged to help his other team members acquire minimal spreadsheet competency by the end of the second week of class, and (2) all homework assignments were required to be completed using Excel spreadsheets. Example assignments included creating a personal budget for a month; starting one's own hypothetical business for a month; expanding the business to a second month; projecting transactions for a complete year; preparing financial statements using spreadsheets linked to overall spreadsheet representing the main accounting database; preparing schedules

supporting account balances, such as bank reconciliations, aging of accounts receivable schedules, perpetual inventory cards, and loan amortization schedules.

### Perceived Usefulness of Accounting Knowledge

Table 4 provides the results from a question which asked students to rate the perceived usefulness of accounting knowledge in their chosen career. As expected, on a pre-test basis, there is no significant difference between no-textbook students vs. textbook students. However, by the end of the semester, perceptions about the value of accounting knowledge had taken a dramatic turn. For the no-textbook students, 56% of the students came into the course believing that accounting knowledge would be useful, but leaving the course, this number increased significantly to 71.5%. Compare this with students using the textbook. Coming into the course, 52% of the students in the textbook-based courses believed that accounting knowledge would be useful, but this number dropped significantly to 44.7% at the end of the course. Compare these findings with Malgwi (2006), which showed that, after taking the first course in accounting, one third of the students perceived the first course to be significantly important to their future career, one third stayed the same, and one third dropped. This indicates that use of web-based content, including Wikipedia, current financial statements using real company data, and on-line business articles related to accounting, had a significantly positive effect on how students perceived accounting.

<b>Table 4: Usefulness of Accounting Knowledge in One's Career</b> <b>Students' Perceptions of Course and Outcomes: Textbook vs. No Textbook Sections</b> <b>(Percentage of Students Answering "Moderately and Extremely Useful")</b>			
<b>Collaborative Learning Questions</b>		<b>No Textbook</b>	<b>Textbook</b>
In my chosen career, I believe that accounting knowledge will be:	Pre	56.0**	52.5
	Post*	71.5	44.7
* Statistically significant difference between row percentages (no text vs. text), $p < .05$			
**Statistically significant differences between column percentages (pre vs. post), $p < .05$			

## DISCUSSION AND CONCLUSION

The above findings have interesting implications. Even when a course is based on common student learning outcomes, and students are examined based on a common final exam, instructors should be encouraged to experiment. The results suggest powerful possibilities. It appears that as long as instructors focus on learning outcomes, the manner in which the course content is delivered does not matter. By focusing on outcomes and course design, instructor teaching styles may have no material effect on student performance. However, instructor teaching techniques may have a material positive effect on student soft skills (e.g., teamwork,

computer competency), satisfaction with the course, and perceived value of accounting knowledge in their future careers. Readers are cautioned, however, into reading too much into these results; we would expect that students who spend more time in group work or using spreadsheets would perceive these activities as more important than students who did not.

In addition to student learning and student perceptions of accounting, another real consideration is the cost of textbooks. From the perspective of the student, and also from the perspective of textbook publisher and bookstore, of course, the decision to use or forego a textbook does matter. The purchase price at the university bookstore of the new procedural book in fall 2006 was \$158; by spring 2008 it had risen to \$172, and by spring 2010 it had risen to \$218.

This study is limited, of course, to one semester, and to one accounting department at a public, comprehensive university where class sizes averaged about 40 students. We compared four instructors relying on a traditional textbooks and traditional pedagogy and compared the results to just one other instructor; this instructor jettisoned a textbook and adopted alternative pedagogies. Therefore, we recognize that it is not possible to separate the textbook effect from the instructor effect, and a longitudinal study, with more faculty experimenting with nontraditional teaching approaches, is warranted.

The profile of the university in this study is typical of many small to medium accounting departments across the country, where the introductory course is often taught by doctoral students or adjunct instructors. For these instructors who are not tenured, administrators often put a great deal of weight on traditional student evaluation of teaching (SET) instruments to determine teaching effectiveness. Unfortunately, these SET are usually not designed to reward innovation. In fact, most SET instruments include questions designed primarily for the lecture mode; they do not include questions on such things as effectiveness in leading group discussions, managing groups or implementing new technology to teach accounting concepts and skills.

In conclusion, this study provided an example of an assessment program focusing on the first course in financial accounting. The program identified 17 student learning outcomes for the course, obtained input from all faculty teaching the course to create a common final exam (with test questions mapping questions directly onto the outcomes) and encouraged faculty to employ nontraditional pedagogies that can translate to better outcomes. While students of the instructor using alternative pedagogies did not outperform students using traditional pedagogies, they certainly performed equally as well. Moreover, students reported more positive feelings toward collaborative learning, significantly greater competency with computers and electronic spreadsheets, as well as increased perceptions of the value that financial accounting would have in their future careers. All this while saving the students hundreds of dollars by using the internet to access Web-based content.

Our study provides a signal that faculty should, indeed, be encouraged to innovate. Some may be more comfortable with a procedural approach, while others a more conceptual approach that relies on materials freely available on the Internet. Results have provided insight as to the

effectiveness of varied learning materials and different pedagogical approaches. Given that one such approach involves teaching without a textbook, results should be of great interest to textbook publishers. To the extent that other accounting departments might use our experience as a model in implementing a similar assessment program, the ultimate winners will be students who better learn and appreciate financial accounting.

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# **A QUALITATIVE ANALYSIS OF COLLEGE STUDENTS' PERCEPTIONS OF ACADEMIC INTEGRITY ON CAMPUS**

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## **ABSTRACT**

*Based on the data in this study, it appears that it is not a lack of awareness of the academic policy guidelines on campus that is contributing to the prevalence of cheating, but rather a lack of enforcement that is the main problem. In fact, many students expressed the belief that if the consequences are effectively communicated and enforced along with the guidelines then that will have a far greater impact than a policy alone. Most students also felt that the faculty had to get more involved and that they were responsible for encouraging a cheat-free environment. As one student said, "...Other professors pay a lot of attention to cheating and emphasize the consequences of it and I do strongly believe that in those classes cheating is extremely minimal if even inexistent." Two of the most important conclusions of this analysis are: first, faculty members need to enforce the standards of academic integrity more strictly and when the dishonesty is uncovered the punishment should follow without failure. Second, students should be made partners in prevention and detection of academic cheating. Moreover, some interesting suggestions made by students are: offer rewards for informing the cheating and provide easy & anonymous access to reporting mechanism for students to report such cheating.*

## **INTRODUCTION**

Cheating on campus is more prevalent today than ever and academic dishonesty seems to be more rampant in business programs as compared to non-business programs (Mangan 2006). Previous studies have tried to adopt either a traits approach or a context approach to understand the incidences of violations of academic honor codes (McCabe and Trevino, 1997). The studies adopting traits approach attempt to discover the individual characteristics that may make someone more prone to cheating. While, the context approach focuses on identifying the situational factors that are responsible for academic cheating. Previous studies have also noted that the students and the faculty across various campuses seem to differ on the definition of the term academic integrity (Kidwell et al, 2003; Stern and Havlicek, 1986). Moreover, there seemed to be differences even among the perspectives of full time and part-time faculty (Hudd et al., 2009).

In an attempt to better understand the phenomenon of academic dishonesty, we distributed a survey to 250 undergraduate students located in a North Eastern University and asked them a variety of open-ended questions relating to various topics of academic integrity. For example, we asked them questions regarding what they perceived the academic integrity policy to be on campus, what their role was in following the rules, whether cheating was prevalent in their classes, their recommendations for improvement as well as some other relevant questions. We then conducted a content analysis on the data. Two researchers independently went through the entire data and identified a set of themes that emerged out of this first round of reading. Next, the researchers compared their list of themes and created a combined set of themes. Later, we went over the data again and distributed the various responses across the identified themes. We compared these classifications and if any discrepancy was found in our classification then it was sorted out through mutual discussion. Various themes that emerged from this qualitative data analysis with regards to students' feelings about academic integrity on campus are listed in the Table 1.

<b>Table 1: Themes Pertaining to Academic Integrity</b>	
<b><i>Policy Understanding</i></b>	<ul style="list-style-type: none"> <li>• Are students familiar with the policy and do they understand the definition of academic integrity?</li> <li>• How do students become familiar with the policy?</li> <li>• What is considered to be cheating?</li> <li>• How do students feel about the policy?</li> </ul>
<b><i>Instructor as an Impact</i></b>	<ul style="list-style-type: none"> <li>• How important is the instructor's role in enforcing academic integrity amongst students?</li> <li>• Are instructors doing enough?</li> </ul>
<b><i>Students Role</i></b>	<ul style="list-style-type: none"> <li>• What is the role of students in academic integrity?</li> <li>• Should students be required to report cheating?</li> </ul>
<b><i>Prevalence of Academic Integrity Violations</i></b>	<ul style="list-style-type: none"> <li>• Is cheating on campus perceived as prevalent or minimal?</li> <li>• Have most students themselves cheated?</li> </ul>
<b><i>Attitude towards disciplinary action</i></b>	<ul style="list-style-type: none"> <li>• What form should disciplinary action take?</li> <li>• Are Professors and Deans taking proper disciplinary action against violators of academic integrity?</li> </ul>
<b><i>Resources necessary for Prevention</i></b>	<ul style="list-style-type: none"> <li>• What needs to be done to prevent future cheating?</li> </ul>

### **POLICY UNDERSTANDING**

- Are students familiar with the policy and do they understand the definition of academic integrity?
- How do students become familiar with the policy?
- What is considered to be cheating?
- How do students feel about the policy?

From the data, it appears that the large majority of students were familiar with the University's academic integrity policy. Most of them became familiar with the policy at (1) orientation, (2) the first day of class, and/or (3) read about it in their syllabus. Many students stated that each semester, the instructor went over the policy, some more briefly, "he spent a minute or two on the first day of class" (Male, 18 years old) and others more elaborately, "almost the whole first half of class was devoted to going over it." (Male, 19 years old).

What was particularly interesting in the data was that though students were familiar with the policy, there appeared to be an overwhelming ambiguity as to the definition of cheating. As mentioned ahead the prior research has demonstrated the differences of meaning of cheating between the faculty and students (Kidwell et al., 2003). In the present study we discovered that even among students there is a huge variance in their interpretations of what constitutes as academic cheating. E.g. most students agreed that it was wrong to cheat on a test, whether it was copying from a friend or making cheat sheets. At the same time, they found certain topics to be questionable as to whether or not they were considered to be actual cheating. A number of students wondered if "discussing homework answers with a fellow classmate, or studying from a previous semesters test" (Female, 18) were considered to be cheating! Others noted that in group-assignments, if a student doesn't do his/her share then it should be considered a form of cheating as well. Further, the topic of plagiarism came up often, and the general consensus was that students who plagiarized, did not necessarily do so deliberately (as compared to when cheating on a test) but rather because they lacked the necessary resources and skills for citation and paraphrasing.

For example, one student wrote, "...I think some students misunderstand the logic behind citing sources and that some may even think they are not supposed to draw on the works of others." (Female, 21) And another "I think an efficient way of decreasing a student's urge to use someone else's work without properly giving them credit would be to remind them about paraphrasing, quoting, etc. We really aren't told by a specific professor /course instructor about this, we're just kind of expected to know." (Male, 21). In a similar tone another student wrote, "I have had problems figuring out plagiarism. I never graduated from high school so I never really learned. I was able to get help from a librarian." (Male, 20)

Another interesting finding was that the awareness of the consequences of cheating was not as widespread as the awareness of the policy. It is clearly evident from the fact that not one of the students was able to pin point what would happen if somebody were caught cheating. Some students thought "maybe they get expelled" (Male, 18) others said "earn an F" (Male, 19) and as one student put it, "not really sure what would happen. I guess get into some sort of trouble. It is hard to say." (Female, 19).

Though a few students believed that "cheating is inevitable" (Female, 22) and "a way of life" (Male, 21) most agreed with the idea and importance of an academic integrity policy and

believed that “cheating is 100% wrong.” (Female, 18). Further, they felt that it is a necessary and positive policy for all schools to have.

### **INSTRUCTOR AS AN IMPACT**

- How important is the instructor’s role in enforcing academic integrity amongst students?
- Are instructors doing enough?

Hulstart and McCarthy (2009) present a comprehensive model to discourage and tackle the problem of academic dishonesty in the classrooms. Their model significantly underscores the role of faculty members in creating the ethical foundation in any class. They put the onus to maintain classroom integrity squarely on the shoulders of the faculty members. According to them, faculty members can lead by action i.e. ethical behavior and should be role models for their classes. By examining the data, it appeared that students felt very strongly that instructors played a very important role in enforcing academic integrity. Students felt that it was the instructor’s job to monitor tests (more) closely, to give different versions of tests to prevent cheating, and to constantly be on the lookout for cheating. Many students complained that during exams, instructors would read newspapers, grade other exams etc. and therefore facilitate a test environment that was conducive to cheating. For example, one student wrote “Exam instructors (should) pay more attention during exams instead (of) reading or doing something else. It is like they are asking us to cheat the way they sit there in oblivion.” (Parentheses added) (M, 21). It was generally felt that instructors were not doing enough and that cheating was occurring “under their noses.” (F, 18). One student wrote, “Faculty need to be more proactive looking for those students who are cheating during exams. Sitting in the front of the class room ...is not really a deterrent.” (F, 23). There was even the perception that enforcing academic integrity was part of the faculty’s job requirement, “...academic integrity is a faculty concern....the faculty have responsibilities of monitoring such activities that are directly tied to their employment.” (M, 22).

While an overwhelming number of students believed that faculty may be falling short in their duties, there were a few who believed that the faculty was playing its part fairly. One student stated, “All of my professors have made the academic integrity guidelines very clear. I was surprised to see that they would even announce that someone was caught in the act of plagiarism and that they were dropped from the course. Everything is very clear.” (M, 21).

### **STUDENTS’ ROLE**

- What is the role of students in academic integrity?
- Should students be required to report cheating?

Megehee and Spake (2008) demonstrate that if students perceive their peers to be engaging in cheating behaviors then they are more than likely to engage in such behaviors themselves. Thus, an effective program to curb academic dishonesty in the classrooms has to find ways to engage to the students in enforcing the standards of ethical behaviors (Caldwell 2010). Student's opinions on their role in academic integrity ranged from active to passive, with the majority being passive. "I'm just a student- my job is to graduate." (M, 20). Those who believed in an active student role felt that incentives should be put into place to reward those who reported cheating.

There was a genuine concern voiced by many students regarding the necessity for an anonymous reporting system. "...Also, professors should give an extra sheet of paper during an exam for students to write if they believed any foul play took place. This way, students would be more likely to report acts of cheating rather than telling the professor in person." (M, 22). Students were also fearful of the repercussions for themselves if they reported a cheating incident. Several students expressed the fear that if they reported a classmate cheating, they would be in physical danger. As one student put it, "I have seen students cheated a few times but feel afraid to report it for fear of the repercussions of doing so." (M, 21).

Many students felt that each student should be responsible for themselves, and that they were not "my brother's keeper." (M, 20). They felt that it was not their duty nor was it fair to expect them to report incidents of cheating, especially if the cheating was done by a friend. There was a major "anti-snitching" theme, in that students have some code of their own which says "die before snitching." (F, 21).

An interesting theme that emerged in the data was regarding the anonymous reporting system. While many were in favor of it, there were quite a few students who offered a different perspective. Some felt that if there was an anonymous reporting system, people would abuse it. For example, "If I did not have to identify myself, what is to stop me from lying in order to get revenge against fellow students?" (F, 22) one student wrote.

Several students also expressed concern pertaining to the lack of action on the part of the faculty after they reported an occurrence of cheating. "I reported cheating on an Accounting exam last term because I had studied so hard and I was so angry that the professor who knew it was going on (because I spoke out in the test and said I had seen the girls sharing answers) did nothing about it." (F, 22).

## **PREVALENCE OF ACADEMIC INTEGRITY VIOLATIONS**

- Is cheating on campus perceived as prevalent or minimal?
- Have most students themselves cheated?

The empirical evidence presented by a variety of studies in the past point to the fact that about 40-80% (the number varies from study to study) students have engaged in some form of violation of academic integrity principles (Chapman et al., 2004; Bun et al, 1992).

While a few students stated that they have never witnessed any cheating in their classes, the majority of students stated otherwise. The response ranged from occasional to rampant. As a whole, there was a perception of cheating on campus being very prevalent.

With regards to students themselves cheating, a few admitted to cheating once or twice, but most stated that they did not and would not. Moreover, it seemed that those who do not cheat appear more sensitive and annoyed at those who do. For example, one student said, "I have not cheated in my entire academic career and throughout both High School and College I have not come across such rampant cheating as I have seen at this School. I am ashamed and upset and this is my top and chief complaint about this school.."(M, 22) and another summed up her frustration in the following statement, "I have witnessed rampant cheating among my fellow students, looking at each others papers, using cell phones to text message answers, etc. It's a difficult situation for an honest student, because ratting out other people in the class isn't exactly a great way to get along with your classmates and have a positive working environment." (F, 23).

One interesting topic that came up a few times was with regards to the prevalence of cheating amongst certain ethnicities. As these comments suggest, "I hate to say but I always saw [Ethnicity X] students cheating in exams, coping from other articles, etc."; (F, 21) "certain ethnic groups here seem to be overly competitive and resort to cheating to ensure a good grade; I've observed this several times in my years here." (M, 22).

### **ATTITUDE TOWARDS DISCIPLINARY ACTION**

- What form should disciplinary action take?
- Are Professors and Deans taking proper disciplinary action against violators of academic integrity?

On one hand, prior research (Pincus and Schmelkin, 2003) has found that faculty and students view the same violation and assign a different degree of severity. So much so, that many times this difference of viewpoint leads to an ideological rift between the faculty and the students (Kidwell et al., 2003) with faculty usually viewing the breaches of academic honesty more severely than the students. On the other hand, in this study we found that there was a clear frustration amongst students that professors and deans were not doing enough when students were caught cheating. Numerous students reported incidents where fellow classmates were caught cheating, and no action was taken. For example, one student stated that "I was disgusted to see that the Professors Dean did not care that this school was losing value, as cheating is rampant here!" (M, 22) Another student wrote, "They need to start taking it seriously. I went to the dean about cheating and they took a blind eye...this was after two profs caught the same kid

cheating twice (in front of the class in plain view) and neither turned him in nor gave him an F.” (F, 22). Moreover, students’ attitude towards the form of disciplinary action ranged from a general attitude of “no second chances” (M, 21) to “everyone makes some mistakes.” (M, 22).

### RESOURCES NECESSARY FOR PREVENTION

What needs to be done to prevent future cheating? Students felt very strongly that more preventive measures are necessary, and were very specific about how to do this. In this section, we summarize the recurring suggestions of the students on how to best prevent future cheating. These suggestion were as follows: (1)educating teachers to recognize cheating, (2) requiring teachers to use multiple versions of tests, (3) have better proctoring during exams, (4) have teachers use essay tests instead of only multiple choice ones, (5) offer better study help to students (6) offer time management classes to teach students how to juggle school/work/family etc., (7) have smaller classes, (8) stress the academic policy through out the semester, and not just on the first day of class, (9) require teachers to not waste class time and then ask questions on the test that the students never learned, (10) do away with curving grades, (11) offer more pass/fail options for classes outside the students major, (12) emphasize how cheating harms everyone in the long run- (as one student put it, “ It ruins the schools reputation, is unfair to classmates, doesn’t prepare you for the job market and the list goes on” (F, 23) (13) have a campaign on campus promoting academic integrity. One student suggested an “Integrity Matters” (F, 21) campaign, and finally (14) for teachers to emphasize the importance of knowledge versus the grade. Students felt that so often it is the final grade that is emphasized, when in fact, learning and mastering the material are what should be the priority.

### SUMMARY

Based on the data in this study, it appears that it is not a lack of awareness of the academic policy guidelines on campus that is contributing to the prevalence of cheating, but rather a lack of enforcement that is the main problem. In fact, many students expressed the belief that if the consequences are effectively communicated and enforced along with the guidelines then that will have a far greater impact than a policy alone. Most students also felt that the faculty had to get more involved and that they were responsible for encouraging a cheat-free environment. As one student said, “...Other professors pay a lot of attention to cheating and emphasize the consequences of it and I do strongly believe that in those classes cheating is extremely minimal if even inexistent” (M, 21).

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# USING TRACKING DATA FOR CONTINUOUS MONITORING IN MANAGEMENT DISTANCE LEARNING COURSES

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## ABSTRACT

*The increasing popularity of distance learning courses attracts academic attention to investigate education quality and instructional techniques of online courses. In the absence of face-to-face interactions, instructors of distance learning courses should consider utilizing techniques to continuously monitor student performance. The utilization of continuous monitoring provides instructors information of student progress for short-term and immediate adjustments. This study provides an exploratory analysis on the application of tracking mechanism offered by the Blackboard system. The data used in the study represent measures of objectivity that capture the features in need of immediate attention. The empirical results indicate that tracking data can serve as an instrument for online instructors to closely monitor student activities and make necessary adjustments in ongoing courses.*

## INTRODUCTION

Many studies in higher education focus on effectiveness of various instructional techniques to improve student achievement. Numerous studies have investigated effective methods that may continuously monitor student performance in an ongoing course. Meanwhile, the increasing popularity of distance learning courses in recent years also attracts academic attention to investigate education quality and instructional techniques of online courses. Instructional techniques that monitor student activities for effective learning have become even more important in the distance learning environment, where instructor-student interactions are limited to the cyber world. Despite the limitations imposed on in-person communication, the integrated technology used in distance education courses provides an advanced monitoring mechanism. Specifically, the advances in instructional systems enable instructors to apply comprehensive monitoring functions to access the accountability and comparability of students' progress in time. Instructors may continuously evaluate students' learning effectiveness, and take appropriate measures when red flags are raised.

The objective of this study is to provide an exploratory analysis of the application of the tracking mechanism offered by Blackboard. By examining the relationship between monitoring

data and student performance, the study attempts to investigate the effectiveness of the monitoring system, and to provide insights into the techniques that promote learning and teaching efficiency. In particular, this study uses tracking data automatically collected by Blackboard, a widely adopted course management system, to analyze the relationship between student effort and course performance. The findings would assist instructors to identify useful objective measures to continuously monitor student performance, and therefore provide in-time guidance for student progress in distance learning courses.

## **LITERATURE REVIEW**

### **Distance Education**

Advances in information technology have brought many changes, including those in the higher education field. For instance, distance learning has become a new paradigm in education during the past two decades, as it offers higher flexibility to reach more students with temporal and spatial constraints. The 21<sup>st</sup> century has witnessed an increase in the number of distance learning courses offered by degree-granting postsecondary institutions (National Center for Education, 2008). Previous studies compare and contrast traditional education in classrooms and distance learning, but the findings are mixed. Since there are a wide variety of factors that may have influence on learning outcomes, it is more meaningful to study how to improve the instructional design rather than debate on the superiority of teaching mode. Any course could be designed differently, and could be more or less effective than its counterpart. For example, students generally achieve higher satisfaction and performance in an online learning community that facilitates the transfer of knowledge and promotes interaction (Conaway, Easton & Schmidt, 2005). In light of building an effective learning environment, online instructors may implement continuous monitoring mechanism as a strategy to track student progress, facilitate immediate feedback and guide the design of interactions.

Technology advancements make it possible to implement richer communications to reach more audiences. Most students and instructors nowadays are proficient in computer operations and Internet technologies, which greatly reduces the technical barrier to adopt distance learning. The paradigm shift of education research is more prominent in the technology-enhanced education through cyber learning.

### **Student Effort**

Previous research has examined the relationship between student effort and course performance. Testing the association between attempts made and amount of time on repeatable online quizzes, Johnson et al. (2002) find a positive association between student effort and performance. Using a sample in an upper level corporate finance course for senior finance major

students, Rich (2006) uses directly observed homework attempt, class attendance, on-time arrival, and participation in class discussions to measure student effort. The empirical results indicate that student effort significantly and positively affects course performance (Rich, 2006). Lin and Chen (2006) report that student cumulative attendance affects student performance in the exams of a public finance class. Mixed or even contradictory results have also been found. Using students' self-reported data, Didia and Hsnat (1998) find a negative relationship between study hours and performance in introductory finance courses. Krohn and O'Connor (2005) suggest that class attendance is not associated with exam scores and study time has significant negative impact on student performance in an intermediate macroeconomics class.

Ability and effort are two prominent factors among those associated with student performance. A number of studies have reported that both ability and effort have positive influence on student academic performance (e.g., Johnson, Joyce & Sen, 2002; Rich, 2006). More particularly, Nonis and Hudson (2006) find that student effort measured by study time is interacted with ability, and significantly affects academic performance. Recent studies have revealed that students tend to spend less time on course work because they need to work long hours off campus (Nonis & Hudson, 2006). In light of this trend, it has become increasingly important for instructors to keep track of the amount of time that students spent studying. Instructors of distance learning courses, in the absence of face-to-face interactions with students, should consider adopting methods to monitor student effort and take remediate measures to prevent potential learning failure.

### **Continuous Monitoring**

The purpose of continuous monitoring is to provide instructors the information with respect to student progress toward learning objectives so that appropriate adjustments can be made in time to enhance learning effectiveness. For instance, Burns and Ysseldyke (2005) envision progress monitoring tools as "a method to monitor student response to instruction or response to instructional interventions".

Continuous monitoring of student learning makes assessment and instruction become interwoven processes. In a traditional summative assessment, instructors normally evaluate student learning outcome through comprehensive exams. The nature of summative assessment determines that it is technically challenged for instructors to inquire into the reasons behind unsatisfactory scores for students in an ongoing course. Continuous monitoring, a formative assessment approach, provides a more effective way for instructional evaluation of distance learning courses. Additionally, continuous monitoring also serves to facilitate instructor-student interactions so that instructors can adapt and refine the course design in response to students' needs and progress (Dewald, et al., 2000).

Emerging instructional technologies provide instructors simple but powerful tools to track student effort continuously and objectively. Previous studies have demonstrated the

advantages of objective data over self-reported data collected in traditional course delivery format (Johnson, Joyce & Sen, 2002). Blackboard, a widely adopted course management system, automatically records the objective data to measure student effort, including amount of online sessions, amount of session time, total mails, and total discussions messages posted. The instant analysis of these data provides instructional instruments for monitoring purposes. Instructors can evaluate the results of tracking statistics and make reasonable prediction on both individual student and overall course levels. Data-driven decision making is particularly important and useful in distance learning environment, where instructors cannot perceive students' feedback from nonverbal communications available through face-to-face teaching mode only.

### **Operational Proposition for Empirical Tests**

Based on the literature review above, we propose that using student tracking data to monitor student effort is an efficient and effective way to assess student performance. Students who spent more time on the course site are more likely to perform better in exams. With technology developments, instructors gain easy access to student online activities in a continuous way so that they can make necessary adjustments and immediately remediate students' potential problems. Therefore, student achievement is expected to be improved under instructors' continuous monitoring, and course design is expected to be enhanced with continuous refinement and student involvement.

*Proposition 1: Student effort is positively associated with student performance in periodic summative evaluation in the format of exam.*

## **BACKGROUND AND EMPIRICAL TESTS**

### **Overview**

The dataset used in this study was collected from the Blackboard tracking data of management distance learning courses offered in a Midwest public university. A substantial portion of the students enrolled in management degree programs of this regional campus are part-time students who work full time. To reach out for the students with difficulty to commute to campus, the School of Management offers a variety of distance learning courses. The student advisors closely supervise the enrollment in these courses to ensure learning quality. For instance, the students are required to have a minimum GPA of 2.5 and show certain level of self-discipline before enrolling in any distance learning courses.

The dataset consists of student tracking and performance data from distance education courses offered by the departments of Information System and Accounting. The upstream courses "E-business strategy" and "Auditing" are required for students majoring in information

system and accounting majors, respectively. “Principles of Information Systems” is an introductory level course, which is required for all management major students.

<b>Table 1: Exam Weights</b>	
<b>Course</b>	<b>Exams</b>
MGMT 211 (Summer 2009)	52%
MGMT 211 (Summer 2010)	58%
MGMT 211 (Spring 2010)	46%
MGMT 318 (Spring 2010)	50%
MGMT 406 (Spring 2010)	50%
MGMT 406 (Fall 2010)	46%
Notes: the percentages are rounded.	
MGMT 211: Principles of Information Systems	
MGMT 318: E-Business Strategy	
MGMT 406: Auditing	

## Data Collection

As Table 1 illustrates, exams were the primary component of evaluation in all courses, ranging from 46% to 58%. The weight of exams indicates that the exams are relatively important assessment instruments in these courses. Table 2 shows the student activity data retrieved from the tracking system on Blackboard course site. The definition of each variable was provided by the Blackboard authorities. We computed a compound variable “Mail” by adding “Mail read” and “Mail sent”, which were used in further tests.

<b>Table 2: Blackboard Variable Definitions</b>	
<b>Variable</b>	<b>Variable Definition</b>
Sessions	Times of each access to the course section.
Time	The total time spent before the assessment.
Mail read	Total times of reading email messages received.
Mail sent	Total times of sending email messages.
Session_time	Square foot of the total time spent on the assessment.
*Mail	The total of variables “Mail read” and “Mail sent”.
Note: The definitions of blackboard variables are adopted from the definition menu provided by the Instructional Technology Office at Purdue University Calumet.	
*The variable “Mail” is generated by summing variables “Mail read” and “Mail sent”.	

<b>Table 3 Descriptive Statistics</b>							
	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
<b>Exam-1</b>							
Grade	132	79.54	14.194	-1.729	.211	6.588	.419
Sessions	132	34.48	22.848	1.949	.211	7.325	.419
Sessions_time	132	182.90	55.162	-.008	.211	-.168	.419
Total Mail	132	17.69	12.942	2.624	.211	10.674	.419
<b>Exam-2</b>							
Grade	132	79.06	18.109	-1.551	.211	3.859	.419
Sessions	132	30.20	19.831	1.803	.211	4.680	.419
Sessions_time	132	172.70	52.135	.890	.211	1.447	.419
Total Mail	132	17.76	10.153	1.883	.211	5.960	.419
<b>Exam-3</b>							
Grade	132	78.20	19.765	-2.811	.211	8.884	.419
Sessions	132	26.65	16.689	1.343	.211	2.594	.419
Sessions_time	132	161.27	47.975	.043	.211	1.981	.419
Total Mail	132	15.71	11.114	1.981	.211	6.253	.419

The objective of this study is to examine the factors associated with student performance in the exams. The courses included in the empirical tests offered three exams throughout the semester. The data collection was conducted on the periodic tracking statistics of student activities using the exam dates as cutoff dates. Thus one student activity data led to three observations in the corresponding regression models. The tracking data were generated by Blackboard system when time criteria were inputted. For instance, the semester started at August 28<sup>th</sup>, 2009, exams 1, 2 and 3 were scheduled for a three day period from October 2 to 5, November 6 to 8, and December 9 to 12, 2009, respectively. The predictors (student activity data) for exam-1 grade were collected from the period from August 28 to October 5, 2009. Similarly, the independent variables used in the regression model with exam-2 and exam-3 grades as the dependent variables were collected from October 6 to November 6 and November 7 to December 12, 2009, respectively.

We collected a total of 132 students' tracking data from Blackboard course sites. Table 3 presents the descriptive statistics for the variables included in further analysis. The variable "Grade" represents student exam performance in the format of percentage. These two variables - "Session" and "Session time" are measurements of student effort. Specifically, "Session" is defined as the total sections that a student logged on the course site, and "Session time" is defined as the square foot of the total time spent. As discussed previously, "Mail" is defined as the total of mails read and sent by a student during a designated period of time.

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## Empirical Results

Normality is an important assumption for regression models. Skewness and Kurtosis statistics reveal that the variables in this study are not normally distributed. Thus we standardized the variables to have the mean of 0 and standard deviation of 1 for the converted variables (z-score). The standardized variables were used in the subsequent empirical tests.

Table 4 illustrates the results of three sets of regression models on the three datasets containing information for each of the three exams. Each set consists of three regression models which were independent of each other. The dependent variable for all three regression models was the z-score of “Grade”. The results of the consolidated dataset show that the three predictors, “Sessions”, “Session\_time”, and “Mail” are all statistically significant in the regression models. The three regression models based on “Exam-3” dataset suggest that variables “Sessions”, “Session Time”, and “Mail” are significant predictors at  $p=0.05$  level, with the coefficients equal to be 0.298, 0.413, and 0.192, respectively. Additionally, while variables “Sessions” and “Session\_time” are statistically significant predictor of student performance in both Exam-2 and Exam-3, the p-values of the predictors in Exam-1 models indicate that none of the three variables seem to predict the student performance in Exam-1.

## DISCUSSIONS

Empirical tests show that variable “Session\_time” is consistently an important predictor of student performance in both Exam-2 and Exam-3. Closer examination also suggests that the coefficient of “Session\_time” in the Exam-3 (0.413) model is substantially greater than that of the Exam-2 model (0.184). That “Session\_time” and other two independent variables do not statistically explain student performance in Exam-1 may reflect the situation that the students were making adjustments to instructional style in the courses and most students tended to “test the water” in the first section of the courses. After the first exam, the students seemed to gradually establish their learning pattern.

Further tests revealed that both explanatory and dependent variables in various periods are significantly correlated, suggesting a consistent student behavior across the periods. Sensitivity tests were also performed to factor in student performance in previous exams. For instance, the student performance in exam-1 (exam-2) was included in the exam-2 (exam-3) models. The findings suggest that the student performance in previous exams (e.g., exam 1 and exam-2) is significantly associated with that in subsequent exams (e.g., exam-2 and exam3). The sensitivity tests corroborate the results in showing that variable “Session\_time” is a meaningful predictor of student performance with the existence of the control variable.

Effective instruction can establish a constructive instructor-student connection to foster motivations toward learning objectives. Most face-to-face courses offered in higher education institutions utilize summative assessment instruments (e.g., exams), in conjunction with

observation of student behavior in class (e.g., attendance and participation in class), to provide periodic and continuous evaluation of student performance. Distance education courses offer technically advanced methods to replace the traditional way of monitoring students by observation. This study provides an analysis of the effect of three factors available at Blackboard tracking system. Empirical results indicate that predictor “Session-time” seems to provide better prediction of student performance in exams than two other available predictors (“Sessions” and “Mail”). The findings are consistent with the proposition that student effort, measured by the time spent on the course site during a period of time, is significantly and positively associated with student performance in the subsequent exams. Whereas “Session” and “Mail” provide information to instructors concerning student activities associated with effective learning reflected in exams, these two predictors may not be as powerful as “Session Time”.

<b>Table 4: Summary Of Regression Models</b>		
<b>Exam-1</b>		
<b>Predictor</b>	<b>Coefficient (Unstandardized)</b>	<b>p-value</b>
Sessions	(0.038)	0.664
Session-time	(0.049)	0.576
Mail	0.033	0.705
<b>Exam-2</b>		
<b>Predictor</b>	<b>Coefficient (Unstandardized)</b>	<b>p-value</b>
Sessions	0.154	0.079*
Session-time	0.184	0.034**
Mail	0.131	0.134
<b>Exam-3</b>		
<b>Predictor</b>	<b>Coefficient (Unstandardized)</b>	<b>p-value</b>
Sessions	0.298	0.010**
Session-time	0.413	0.000**
Mail	0.192	0.028**
<b>Notes:</b> 1. N=396 for “All Exams” models; N=132 for regression models for each of the exams. 2. The dependent variable for all of the three regression models was the standardized score of variable “exam grade”. 3. All predictors included in the regression models are in the format of standardized scores. 4. **significant at $p < 0.05$ ; *significant at $p < 0.10$ . 5. The number in parenthesis stands for negative number.		

That the variable “Session \_time” serves as an indicator of effective learning among available data for continuous monitoring has significant implications for distance learning instructors. For instance, instructors may analyze the periodic tracking data of student activities in online courses and identify the students having problems in catching up with the class. Instructors can then contact the student to find out the underlying reasons of insufficient effort – does the individual student need extra help with the materials? Or is the student just lacking



motivations in learning? Teaching is a process of evaluation and reevaluation of student effort towards learning objectives. Thus the effective use of continuous monitoring mechanism to gather information plays an important role to facilitate instructor assessment and plan for further instruction.

## SUMMARY AND FUTURE RESEARCH

Research shows that college students nowadays spend less time on course work but more time on part time or full time jobs (e.g., Nonis & Hudson, 2006). In teaching practice, instructors hear from students that they have so many other commitments that they put some courses on “the back burner”. With the trend in mind, instructors of higher education should take actions to ensure the achievement of learning objectives. Continuous monitoring, among other measures, is an effective teaching method. A monitoring system that can provide periodic student activity data and immediate feedback is even more prominent in distance learning courses, where instructor-student interactions are restrained to cyber world. This study focuses on data available at the Blackboard system to illustrate an application of tracking data in instructing online courses. Future research may expand to incorporate other variables including but not limited to geographical and survey data. The data of this study is also limited to several management distance learning courses in one university setting, thus the generalization of the results should be exercised with extreme caution.

Despite limitations, this study contributes to education research and teaching practices. A number of papers discuss various perspectives of distance education, whereas very few studies explore the territory of monitoring student performance using data available on course platform. Reflecting on the instructors’ teaching experience, this study aims to provide a preliminary analysis for further discussions. Additionally, this study sheds light on the application of continuous monitoring in distance learning courses.

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# STUDENT PREFERENCES FOR EDUCATIONAL MATERIALS: OLD MEETS NEW

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## ABSTRACT

*Today's university students have never had more varied choices in course materials than they do now. Videos, podcasts and simulations provide ways to access materials without reading a textbook. Even textbooks themselves present new opportunities for learning as e-books for computers and e-books for mobile devices join the traditional paper book. This study presents the results of a survey conducted among business students at a Norwegian college and a small campus of an American university. Course notes posted online were by far the most desired way of obtaining course material, followed by paper textbooks, videos and e-books for computers. However, among a group of students, interactive materials such as simulations and online interactive lessons were likewise popular. This group was also more likely to desire e-books for computers and mobile devices. Another distinct segment preferred audio material such as podcasts and videos. These results indicate that new technologies present better ways to serve the needs of some students, even though other students still prefer traditional materials.*

## INTRODUCTION

Today's university students are accustomed to accessing materials and communicating with each other in almost any place and any time. Mobile devices such as tablets and smartphones are increasing popular and are used by students almost anywhere they go. According to the Pew Research Center's Internet and American Life Project, almost half (46%) of American adults owned a smartphone in February 2012 (Smith, 2012), and this trend is expected to continue worldwide. Developments in mobile technology provide new methods for students to access educational materials.

One of the oldest sources of learning material is the paper textbook. Paper books are still a popular choice among instructors and many students still prefer them over electronic materials (Robinson, 2011). In a blend of the old and the new, electronic textbooks (e-books) are one form of technology gaining popularity as the cost of traditional paper textbooks has become an issue for many students, and devices used for reading e-books (especially tablets and e-readers) become more commonly used. Many traditional textbook publishers offer e-books through a subscription model in which students rent access to material for a limited time (Caldwell, 2008; Hacker, 2010). Other companies, such as Flat World Knowledge and BookBoon offer free online materials while earning revenue from selling hard copies of books and extra online materials (such as study guides, interactive quizzes, and podcasts) or selling ads within the books.

For those who would rather listen than read, podcasts provide students with audio materials, and videos provide both audio and visual material. Online or computer-based simulations and interactive lessons can provide activities for those who learn better by doing rather than just listening or reading. Such resources provide new ways for students to learn and interact with educational material.

An important issue in the question of which educational materials are best for a given class is the preference of the students who will be using them. This study examines the different types of materials students prefer, from traditional paper textbooks to various types of multimedia and internet materials. The responses of women and men at the Norwegian and American colleges are compared, as are the results by materials preference. That is, the responses of those who preferred one type of material are analyzed in light of their preference for other materials. The following section provides a review of the literature on different types of materials, including textbooks, podcasts, videos and simulations.

### **TEXTBOOKS AND MULTIMEDIA**

Textbooks have long been used in classrooms from first grade through the university level. In recent years, however, many students have cut down on school-related expenses by not purchasing textbooks, even when the professor “requires” the book (Owuor, 2006; Robinson, 2011). In a study of a small semi-rural campus of a large public university, two-thirds of the participating students reported that they always purchased “required” textbooks, but only one-fourth reported they buy them when the books are just “recommended” (Robinson, 2011). Over half of these students reported that they usually paid between \$300 and \$500 per year for textbooks, with an additional one-quarter of students paying \$600 – \$700. When asked about their purchasing behaviors, nearly half of these students said they would “think twice” before buying a textbook with a \$100 price tag, but only 5% said they would “refuse to buy” a book at this price. At the \$175-225 price level, over 70% said they would think twice and approximately 50% said they would refuse to buy the textbook. However, one-third of those students said that there was no price at which they would refuse to buy a textbook. On the other hand, a segment of the students reported they were not likely to read a textbook even if it was provided to them free of charge.

It is likely that this refusal to buy books has been a significant factor in the recent downward trend in overall textbook purchases (Weil, 2010). In some parts of the United States, instructors are now required to provide information about textbooks many months before the start of the course so that students know about the costs up front and have time to seek out the most competitively priced textbooks. Such efforts may be paying off for students. According to a survey by Student Monitor, textbook prices are continuing to rise, but average overall spending on textbooks is decreasing. The overall average expenditure in 2010-2011 fell to \$534, compared to \$644 in 2005-2006 (Marklein, 2012; Weston, 2011). Most of these dollars were spent on paper textbook purchases (49% new, 38% used) or rentals (10%), with e-books accounting for only 2% of sales. Similar figures (2-3% of sales were e-books) were reported in May 2010 by the National Association of College Stores (Sadon, 2011). A later report in March 2011 stated that 18% of college students had purchased an e-book that semester (Sadon, 2011). The study by

Robinson (2011) found that almost 40% of students said the price of a textbook influenced their purchase decision “to a great extent,” suggesting that e-books would have an advantage over paper textbooks in this regard. While e-books are said to be cheaper to produce and distribute (Annand, 2008), they are not always more economical than paper books. Volkov (2012) cited an example of a math book that cost more to rent as an e-book than as a paper book. In addition, paper textbooks can be sold after use, decreasing the overall cost of using the book.

While there can be many advantages to e-books, including interaction through hot-links and customization on the screen, most people still prefer to read from paper textbooks (Allen, 2008; Annand, 2008; Ismail & Zainab, 2005; Klute, in Redden, 2009; Matthiasdottir & Halldorsdottir, 2007; Mercieca, 2003; Robinson, 2011; Sadon, 2011; Spencer, 2006; Vernon, 2006; Weston, 2011). Difficulties in using the technology necessary to read e-books (Sadon, 2011), physical discomfort stemming from eye strain (Gelfand, 2002; Ismail & Zainab, 2005; Klute, in Redden, 2009; Matthiasdottir & Halldorsdottir, 2007; Mercieca, 2003; 2004; Spencer, 2006; Vernon, 2006) and a general preference for paper (Ismail & Zainab, 2005; Matthiasdottir & Halldorsdottir, 2007; Mercieca, 2003; Robinson, 2011; Spencer, 2006) are major factors slowing the adoption of e-books (Vernon, 2006). A study by the Student Public Interest Research Group determined that 75% of students would prefer a printed book to an e-book (Allen, 2008; Redden, 2009), and a majority (60%) even stated that they would buy a low-cost (\$30-40) print copy even if an e-book were available at no cost. Similarly, Gelfand (2002), Robinson (2011) and Vernon (2006) found that when the price is under \$50, students prefer to purchase paper books which provide the benefits of paper during the course and as well as the potential to sell the book after the course is finished.

A separate issue with e-books is instructor acceptance of their use in during class. Whereas a paper book is “self-contained,” e-books must be accessed through some form of technology--a laptop, mobile device or dedicated e-book reader. Many instructors restrict or forbid the use of such devices in the classroom (Fang, 2009; Schacter, 2009). While this prevents students from checking their email, reading and posting messages on social media sites, surfing the internet, etc. (or at least makes it more difficult for them to do so), such practices also simultaneously prevent students from using e-books in class. If students need to use textbooks in class, paper books will then be required.

Textbooks in general, whether paper or electronic, are not necessarily students’ most preferred learning materials. Online learning materials are becoming more popular with both students and instructors. A world of websites can be used to supplement or replace textbooks, providing text materials as well as audio and visual material. Simulations, which may be online or installed on lab computers, allow students to actively “learn by doing” rather than passively absorbing information (Gabrielsson, Tell & Politis, 2010). Business simulations have become especially popular for helping students develop a better and deeper understanding of the connections between the different parts of a firm and the consequences of following various strategies.

Similarly, videos can provide students with more deeply engaging educational experiences that help them learn better and remember material longer (Griffin, 2012; Hillner, 2012; National Teacher Training Institute, 2012). While teachers have long shown rented or purchased films produced specifically for the classroom, the internet (especially YouTube)

provides easy and free access to a multitude of videos with varying degrees of educational content. Videos can present common experiences which all students can then discuss. They also provide the opportunity to take “field trips” to various—even impossible--places from inside the body to around the world to across the galaxy.

The internet also makes it possible to distribute podcasts. This non-visual source of material (or visual, if a vodcast) can be helpful by increasing the ways in which material is learned, and may be especially beneficial for people who learn best by listening (Anderson, 2011; Lee & Chan, 2007; Lee, Miller & Newnham, 2009; McKinney, Dyck & Luber, 2009; Molina, 2006; Robinson 2007a, 2007b; Robinson & Ritzko, 2009; Robinson, Stubberud & Blom-Ruud, 2010; Vogt, Schaffner, Ribar & Chavez, 2010). Because podcasts are so easy to produce through free software and readily available equipment, instructors can make customized podcasts for their students, and students can make them for their classmates. While the mobility of podcasts, which can be listened to on portable devices almost anywhere, is thought to be a great benefit, some studies have found that many students listen to podcasts on their computers (Andersen, 2011; Evans, 2008; Lee et al., 2009; Lonn & Teasley, 2009; Walls, Kucsera, Walker, Acee & McVaugh, 2010; O’Bannon, Lubke, Beard & Britt, 2011).

Students have many more choices of materials than they did only decades ago. While instructors may prefer one type of material, students may have different opinions. Likewise, the materials instructors assume are the most desired by students, may not, in fact, be used by them in the expected ways and to the expected extent. The choice of materials may also vary by demographic indicators such as location and gender. This study examines the different types of materials students prefer, from traditional paper textbooks to internet materials. The results are presented in the following section.

## **METHODOLOGY, RESULTS AND ANALYSIS**

Business students in a Norwegian college and a small campus of an American university were asked about their preferences for course materials. Out of 84 total students, 41 were female and 43 were male, and 28 attended the Norwegian school while 56 attended the American school. In a simple survey, they were asked to check off which of the listed materials they would like to use for their classes, with no limit on the number of materials they could check. These materials included paper textbooks, e-books for computers, e-books for mobile devices, videos, podcasts, simulations, interactive online lessons and notes (such as the presentation file used during a class lecture) posted on the online course management system. They were also asked to provide “other” materials they would like to use, but no suggestions were made.

Despite differences in the overall infrastructure of the schools (the Norwegian school provided greater wireless internet access) and the general habits of the students (most students at the Norwegian school normally used a laptop during class while those at the American school did not), only one statistically significant difference was found between the preferences of the students at the two schools. Students at the American school were more likely (76.8% vs. 53.6%) to prefer paper textbooks (Table 1). This may be related to the habits of the students regarding laptop use, as students at the American school may have found paper textbooks to be more practical in the classroom, given the lack of wireless internet in many classrooms. Although the

difference was not found to be statistically significant, 50.0% of students at the Norwegian school wanted e-books for computers compared to 35.7% of students at the American school. This would also be logical if students at the Norwegian school liked to use e-books on their laptops during class time. Notes posted online were the most popular material among students at both school, with 9 out of 10 students indicating that they wished to have access to this type of course material. Students at the Norwegian school noted that they preferred to have access to these files before the lecture so that they could follow along on their own laptops, and make annotations directly in the files. Although podcasts were not one of the most commonly chosen materials overall, over one-fourth of students expressed a desire for this type of learning material, suggesting that they are useful to a sizeable group of students. The same could be said of the other materials as well. Videos, simulations and interactive online lessons were desired by 30-40% of the students.

**Table 1: Choice of Material by School**

Resource	Total	Norway	USA	Chi-square	P<
Notes posted online	90.5%	89.3%	91.1%	.07	.793
Paper textbook	69.0%	53.6%	76.8%	4.71	.030*
Video	42.9%	35.7%	46.4%	.88	.350
E-book for computer	40.5%	50.0%	35.7%	1.58	.209
Simulation	38.1%	42.9%	35.7%	.40	.525
Interactive online lesson	33.3%	28.6%	35.7%	.43	.513
Podcast	27.4%	32.1%	25.0%	.48	.489
E-book for mobile device	21.4%	10.7%	26.8%	2.86	.091

Men were shown to be more likely to prefer e-books for mobile devices (30.2% vs. 12.2%), as shown in Table 2. This was the only sex-based difference that showed statistical significance. While men were more likely to express a desire for e-books for mobile devices, e-books for computers were chosen by similar proportions of women (39.0% and men (41.9%). Some students voluntarily wrote that they would choose e-books as long as they were cheaper than paper and that cost, not format, was the most important consideration.

**Table 2: Choice of Materials by Sex**

Resource	Women	Men	Chi-square	P<
Notes posted online	95.1%	86.0%	2.00	.157
Paper textbook	68.3%	69.8%	.02	.884
Video	39.0%	46.5%	.48	.488
E-book for computer	39.0%	41.9%	.07	.791
Simulation	34.1%	41.9%	.53	.467
Interactive online lesson	34.1%	32.6%	.02	.877
Podcast	26.8%	27.9%	.01	.912
E-book for mobile device	12.2%	30.2%	4.10	.044*

Given that there were few differences based on location or gender, further analysis was conducted based on the type of materials preferred by students. Table 3 shows the comparison between students who did and did not state that they wanted to work with simulations. The results show that students who stated that they wanted to work with simulations were also more

likely to prefer videos (62.5% vs. 30.8%) and interactive online lessons (50.0% vs. 23.1%). Notes posted online were still the most preferred type of material, followed by paper textbooks, with no statistically significant differences between the two groups on these items.

Resource	Total	No	Yes	Chi-square	P<
Notes posted online	90.5%	90.4%	90.6%	.01	.971
Paper textbook	69.0%	65.4%	75.0%	.86	.355
Video	42.9%	30.8%	62.5%	8.14	.004*
E-book for computer	40.5%	28.8%	59.4%	7.66	.006
Interactive online lesson	33.3%	23.1%	50.0%	6.46	.011*
Podcast	27.4%	21.2%	37.5%	2.66	.103
E-book for mobile device	21.4%	13.5%	34.4%	5.15	.023

Of those who preferred interactive online lessons, 57.1% preferred simulations compared to 28.6% of those who did not choose interactive online lessons (Table 4). The connection between simulations and online lessons is logical given that both would involve interactive experiences on a computer. While video was also preferred by more simulation users, there was not a statistically significant difference between those who did and did not chose interactive online lessons. One explanation for this is that videos tend to be passive, whereas simulations and interactive online lessons both require active participation.

Resource	Total	No	Yes	Chi-square	P<
Notes posted online	90.5%	89.3%	92.9%	.28	.599
Paper textbook	69.0%	62.5%	82.1%	3.37	.066
Video	42.9%	39.3%	50.0%	.88	.350
E-book for computer	40.5%	37.5%	46.4%	.62	.432
Simulation	38.1%	28.6%	57.1%	6.46	.011*
Podcast	27.4%	32.1%	27.4%	.48	.489
E-book for mobile device	21.4%	17.9%	21.4%	1.27	.259

While 90% of all participants indicated a desire for notes posted online, 100% of those who chose e-books for mobile devices indicated a desire for this type of material, perhaps suggesting an overall preference for materials that can be accessed “on the go” (Table 5). Not surprisingly, 77.8% of those who stated they would like to have e-books for mobile devices also wanted e-books for computers—a preference indicated by only 30.3% of people who did not state they wanted e-books for mobile devices. Similarly, 41.2% of those who chose e-books for computers also chose e-books for mobile devices, compared to only 8.0% of those who did not choose e-books for computers (See Table 6). Statistically significant differences were also found for video and simulations, with those who chose e-books of either type being about twice as likely as those who did not choose e-books to state that they wanted these other types of materials. Together, these findings suggest that there is a distinct group of students who enjoy learning through the use of computers and electronic devices.



**Table 5: Choice Of Material By E-Books For Mobile Devices Preference**

Resource	Total	No	Yes	Chi-square	P<
Notes posted online	90.5%	87.9%	100%	2.41	.120
Paper textbook	69.0%	69.7%	66.7%	.06	.805
Video	42.9%	36.4%	66.7%	5.30	.021*
E-book for computer	40.5%	30.3%	77.8%	13.23	.001*
Simulation	38.1%	31.8%	61.1%	5.15	.023*
Interactive online lesson	33.3%	30.3%	44.4%	1.27	.259
Podcast	27.4%	22.7%	44.4%	3.36	.067
E-book for mobile device	21.4%	10.7%	26.8%	2.86	.091

**Table 6: Choice Of Material By E-Book For Computer Preference**

Resource	Total	No	Yes	Chi-square	P<
Notes posted online	90.5%	94.1%	90.5%	.88	.348
Paper textbook	69.0%	72.0%	64.7%	.50	.478
Video	42.9%	32.0%	58.8%	5.95	.015*
Simulation	38.1%	26.0%	55.9%	7.66	.006*
Interactive online lesson	33.3%	30.0%	38.2%	.62	.432
Podcast	27.4%	28.0%	26.5%	.02	.877
E-book for mobile device	21.4%	8.0%	41.2%	13.23	.001*

Another distinct group of students was comprised of those who preferred audio-based material. As shown in Table 7, those who stated they would like to listen to podcasts were also significantly more likely than non-podcast listeners to choose video as a desired type of material (82.6% vs. 27.9%). In fact, videos were the second-most popular source of material for those who wanted podcasts, whereas paper textbooks ranked second for non-listeners. This suggests a preference for audio material in that podcasts and videos both provide sound, whereas the others do not.

**Table 7: Choice of Material by Podcast Preference**

Resource	Total	No	Yes	Chi-square	P<
Notes posted online	90.5%	88.5%	95.7%	.99	.321
Paper textbook	69.0%	70.5%	65.2%	.22	.641
Video	42.9%	27.9%	82.6%	20.44	.001*
E-book for computer	40.5%	41.0%	39.1%	.02	.877
Simulation	38.1%	32.8%	52.2%	2.66	.103
Interactive online lesson	33.3%	31.1%	39.1%	.48	.489
E-book for mobile device	21.4%	16.4%	34.8%	3.36	.067

This preference for audio material is clearer in the comparison of podcast listeners and non-listeners than in the analysis of video preferences shown in Table 8, suggesting a broader group liked multimedia materials. Those who expressed a preference for video were also more likely to desire e-books for computers (55.6% vs. 25.0%), e-books for mobile devices (33.3% vs. 12.5%) and simulations (55.6% vs. 25.0%). The difference between those who did and did not choose videos was especially great in regard to podcasts, where 52.8% of those who wanted videos wanted podcasts, compared to 8.3% of the other students.

**Table 8: Choice of Material by Video Preference**

Resource	Total	No	Yes	Chi-square	P<
Notes posted online	90.5%	85.4%	97.2%	3.33	.068
Paper textbook	69.0%	64.6%	75.0%	1.04	.302
E-book for computer	40.5%	29.2%	55.6%	5.95	.015*
Simulation	38.1%	25.0%	55.6%	8.14	.004*
Interactive online lesson	33.3%	29.2%	38.9%	.88	.350
Podcast	27.4%	8.3%	52.8%	26.44	.001*
E-book for mobile device	21.4%	12.5%	33.3%	5.30	.021*

E-books and simulations are primarily visual materials, whereas podcasts and videos provide audio. Although the survey did not ask students about their preferred learning styles, these results may show that this group of students was comprised of audio learners. Regardless, notes posted online were overwhelmingly viewed as a desired material for this group. Paper textbooks ranked second for both video watchers and those who did not choose video.

The overall results of this study show that customized notes posted online for students were desired by almost all students. Seen in a positive light, it relieves students from taking notes (allowing them to devote more attention to the instructor) and ensures they have access to correct materials free from mistakes and misunderstandings that could occur when students take their own notes. On the other hand, it could also be a way to allow students to pay less attention as they do not need to write the notes themselves. The popularity of notes and textbooks does not mean that other materials should be ignored, as these were clearly important to a significant segment of students.

## CONCLUSIONS

Analysis of the results of this study shows that differences in preferences for particular materials are like to be based more on the student's preference for a certain type of material than on a student's sex or school. Few differences between location and sex were statistically significant. On the other hand, more differences were found when comparing preferences based on previous preferences. For example, one group seemed to be comprised of "doers." They preferred course materials such as simulations and interactive online lessons that allowed them to be active rather than passive. People who preferred simulations were also more likely to indicate a desire for videos and interactive online lessons. The students in this group may have been primarily kinesthetic learners.

Another group, likely composed of audio learners, preferred to listen to materials, particularly through podcasts. They were more likely than those who did not choose podcasts to prefer videos as well, with 82.6% of those wanting podcasts to also want videos, compared to only 27.9% of those who did not want podcasts. Similarly, among those who wanted videos, 52.8% also wanted podcasts, compared to only 8.3% of those who did not express a preference for videos. The large differences between the groups in these two analyses suggest that those who want audio material have different overall preferences from those who do not desire audio material in the form of podcasts or videos.

Previous studies have shown that most students who listen to podcasts do so on their computers rather than on their mobile devices (Andersen, 2011; Evans, 2008; Lee et al., 2009; Lonn & Teasley, 2009; Walls, Kucsera, Walker, Acee & McVaugh, 2010; O'Bannon, Lubke, Beard & Britt, 2011) perhaps because they view their mobile devices as instruments for personal entertainment, not for education (Andersen, 2011). This would be consistent with findings by Robinson & Stubberud (2011) that some communications methods (such as Facebook) ranked high for personal communication, but low for school communication. Similarly, e-books for computers were named as a desired material more often than e-books for mobile devices. While small screen sizes may be one factor in this difference, there may also be a feeling that mobile devices are for personal and social "play" and not for accessing course materials, which may feel more like work. Future research should examine the relationships students have with their devices and the way they possibly compartmentalize parts of the lives and their communication methods.

Students have different needs and preferences, leading to contradictory findings in studies regarding the use of new technologies such as podcasts (Andersen, 2011). The results of this study show that different groups of students like different types of learning materials, from low-tech paper to high tech podcasts, videos and e-books. Some researchers (Kennedy, Judd, Churchward, Gray & Krause, 2008; Margaryan, Littlejohn & Vojt, 2011) have concluded that instructors should examine student preferences for materials and technologies. The results of this study suggest that this is a wise suggestion. It should also be acknowledged that groups of students may prefer different types of learning materials, and it is the duty of the instructor to determine how to best serve his or her particular students. While many prefer traditional paper texts, a growing segment find newer technologies to be more engaging, making this goal a "moving target."

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# LINKING STUDENT EFFORT TO SATISFACTION: THE IMPORTANCE OF FACULTY SUPPORT IN CREATING A GAIN-LOSS FRAME

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## ABSTRACT

*The purpose of this research is to examine the contribution of Prospect Theory (Kahneman & Tversky, 1979) to our understanding of college student satisfaction. Specifically, this research examines how student effort can be framed as either a gain or a loss based on student perception of faculty support, and consequently, how that gain or loss frame mediates the relationship between student effort and satisfaction. The results from a class of graduating college seniors suggest gain-frame perception of costs provides a new and important explanation of student satisfaction beyond that of traditional higher education models. The author also suggests the practical importance of creating a gain frame which connects student effort with academic satisfaction.*

## INTRODUCTION

Student satisfaction within higher education has been a topic of considerable research over the past several decades. Student satisfaction has been linked to measures of student success including student learning (Kuh et al., 2006) and student retention (Tinto, 1993) and, thus, has become one tool for schools seeking to improve student outcomes. Measures of student satisfaction have also been used by accrediting agencies, governing boards, and funding agencies as one indicator of institutional effectiveness. Retention offices consider student satisfaction when predicting student persistence, and alumni offices consider student satisfaction when predicting alumni giving. As such, universities and academic programs have numerous incentives to identify predictors of student satisfaction.

The “gain-loss” framing of costs and its associated influence on satisfaction have also been the subject of considerable study, although not within higher education research. Whether considering the impact of insurance rebates and deductibles (Johnson, Hershey, Meszaros & Kunreuther, 1993) or the importance of gain-loss framing in examining the satisfaction in close relationships (Berger & Janoff-Bulman, 2006), the way in which costs are framed has been shown to impact perception and satisfaction. The focus of this paper is to extend the topic of cost framing to satisfaction as it relates to college students. Specifically, this research examines

how student perception of faculty support frames student effort as either a gain or loss, and how that gain or loss frame mediates the relationship between student effort and satisfaction.

Insights from Prospect Theory (Kahneman & Tversky, 1979) and the work of Berger and Janoff-Bulman (2006) are used to develop a “gain-frame” hypothesis linking student effort to satisfaction, while a review of student satisfaction literature is used to develop hypotheses linking other college experiences to satisfaction. Correlation analysis, controlling for differences in levels of faculty support, is used to estimate the effect of faculty support on the effort/satisfaction relationship. Finally, multiple regression analysis is used to estimate the degree to which the variables account for variance in student satisfaction.

Utilizing survey results from a university’s class of graduating business administration and accounting seniors, this study provides evidence that the gain-loss frame of faculty support mediates the relationship between student effort and satisfaction; further, the study provides evidence that the independent variables correlate in the expected direction with satisfaction and provide a significant explanation for the variation in satisfaction. Based upon these results, the author provides suggestions as to the theoretical contribution of Prospect Theory (Kahneman & Tversky, 1979) to our understanding of student satisfaction. The author also suggests the practical importance of creating a gain frame which connects academic satisfaction with students doing more, rather than doing less.

## **THEORETICAL FRAMEWORK**

Satisfaction has been linked to performance both within and outside of higher education research. The examination of organizational satisfaction has a long history within management research (Locke, 1976) and the existence of a relationship between job satisfaction and job performance has been largely established (Iaffaldano & Muchinsky, 1985; Judge, Thoresen, Bono, & Patton, 2001). Similarly, extensive research links student satisfaction with performance (Astin, 1993; Pascarella & Terenzini, 2005; Kuh et al., 2006). Establishing those conditions and experiences that are associated with satisfaction is important to organizations seeking to foster satisfaction.

The primary purpose of this study is to examine the usefulness of Prospect Theory (Kahneman & Tversky, 1979) as a way to expand upon the existing scholarship related to college student satisfaction. Prospect Theory has provided significant insights to research across numerous disciplines. In its most simple form, Prospect Theory suggests that people experience, or “feel,” losses more severely than they experience similar-sized gains. Prospect Theory helps explain why consumers prefer insurance rebates over lower premiums, why investors, in trying to avoid losses, hang on to declining stocks too long, and why gain-frame messaging influences health behaviors. Johnson et al. (1993) examined insurance rebates and deductibles and found that consumers placed a higher value on policies with rebates (gain frame) than policies with deductibles (loss frame) even though the consumers were economically worse off with the rebate



policies. In the field of behavioral finance and economics, Prospect Theory is used to discuss risk aversion and how framing of outcomes as gains or losses results in biased decision making (Kahneman & Tversky, 1984). And, in the healthcare field, Rothman and Salovey (1997) examined the impact of framing health recommendations as gains or losses, and found that the frame impacted subsequent client treatment decisions.

More recently, and extending the work of Clark and Grote (1998), Berger and Janoff-Bulman (2006) effectively applied Prospect Theory, and the concept of “framing” costs as gains or losses, to understand the connections between effort and satisfaction. Conducting a study on the link between effort expended within a close relationship, and satisfaction with that relationship, Berger and Janoff-Bulman found the connection was not a simple positive or negative association; rather, they determined that individuals “frame” relationship effort as gains or losses depending upon whether they feel their efforts are appreciated by their partners. Subjects who felt their efforts were appreciated by their partners framed their effort as a “gain”, and consequently, the higher their effort, the higher their sense the gain, and the higher their relationship satisfaction. Conversely, subjects who felt their efforts were unappreciated by their partners framed their effort as a “loss” and, consequently, the higher their effort, the higher their sense of loss, and the lower their satisfaction. Simply put, the way in which costs are framed (appreciated or not) affects perceptions of those costs (gains or losses).

To date, the application of Prospect Theory and framing to the discussion of student satisfaction is limited. One exception is an extension of Berger and Janoff-Bulman’s (2006) work which examined the connection between college student perception of financial expenditures and educational satisfaction levels (Fredrickson, 2011). In that research, a gain-frame of college expense, specifically, the perception of expenditures as an investment, was positively associated with satisfaction. While this earlier study connected student gain-loss perception of financial expenditures to satisfaction, it did not frame student effort as a gain or loss, nor capture the dynamic of what student experience would create that gain-loss frame.

The focus of this current research is to examine how student perception of faculty support frames student effort as either a gain or loss, and how that gain or loss frame mediates the relationship between student effort and satisfaction. Applying Berger and Janoff-Bulman’s (2006) findings of appreciation and the effort/satisfaction link to a higher education setting, this current study examines how student perceptions of faculty support “frames” student effort as either a gain or a loss. The association between effort and satisfaction is anticipated to be higher for students who perceive higher levels of faculty support. For these students, effort will be framed as a gain; and, the higher the effort, the higher the gain, and the higher the satisfaction. For students who perceive lower levels of faculty support, effort will be framed as a loss; and, the higher the effort, the higher the loss, and the lower the satisfaction. However, the mere expenditure of more effort is not expected to be associated with satisfaction. These expected relationships between effort expended, perceptions of faculty support, and expressed satisfaction levels can be articulated with the following proposition:

*Proposition 1: Satisfaction with one's education is associated with a gain-frame perception of effort, but not with effort directly.*

As mentioned earlier, higher education research exists on student experiences in college that affect outcomes such as satisfaction. Student satisfaction has been associated with the degree to which students perceive the college environment “to be supportive of their academic and social needs” (Kuh et al., 2006, p. 40). Chickering and Gamson (1987; 1991) distilled from research several principles of good practice in education at the undergraduate level, two of which include encouraging student-faculty contact and setting high academic expectations. Institutional environments where academic performance expectations are set at “reasonably high levels” are related to student satisfaction (Kuh, 2003, p. 1). And, recent national surveys of student satisfaction revealed academic advising and instructional effectiveness as important aspects of students' educational experiences (Noel-Levitz, 2009). The relationships between these educational experiences and student satisfaction can be expressed with the following propositions:

*Proposition 2: Satisfaction with one's education is associated with the experience of supportive faculty.*

*Proposition 3: Satisfaction with one's education is associated with the experience of knowledgeable and approachable advisors.*

*Proposition 4: Satisfaction with one's education is associated with the experience of good teaching.*

*Proposition 5: Satisfaction with one's education is associated with the experience of appropriately challenging curriculum.*

Finally, the overall research model for this study can be articulated with the following proposition:

*Proposition 6: Satisfaction with one's education can be predicted with measures of faculty support, curriculum, advisement, instruction, and student effort.*

## **REVIEW OF PRIOR RESEARCH**

In the following section, a review of research is provided, and hypotheses regarding the model are developed.

## Effort

Research outside the scope of college student satisfaction has demonstrated that the connection between effort and satisfaction is complicated. Considering a personal cost/benefit economic perspective, we might assume individuals would be more satisfied when fewer costs are incurred per benefit received. Clark and Grote's (1998) examination of costs (time and effort) and relationship satisfaction revealed mixed results, including both positive and nonsignificant negative associations. Within higher education research, the results are similarly mixed. Kuh (2009) suggests that while student engagement (which broadly includes the concepts of time-on-task and student effort) is linked to satisfaction, the strength of the relationship varies significantly. Based on these mixed findings, the mere expenditure of more effort is not anticipated to be associated with satisfaction.

*H<sub>1</sub>. Student effort is not associated with satisfaction.*

## Framing Student Effort as a Gain

While research within higher education (Fredrickson, 2011) has only begun to connect student satisfaction with the concept of gain-loss framing, research outside the scope of college student satisfaction suggests that gain-loss framing is important in identifying the connection between effort and satisfaction. As mentioned earlier, Berger and Janoff-Bulman (2006) were able to demonstrate that loss-gain framing helps explain the connection between effort expended and satisfaction within close relationships. For them, perceived appreciation served as a proxy for the loss-gain framing. Applying the concept of appreciation within close relationships to a higher education setting, this research proposes student perceptions of faculty support as the mediating variable; consequently, the association between effort and satisfaction for students is anticipated to be higher for students who feel supported by their faculty.

*H<sub>2</sub>. With perceived faculty support used as a proxy for gain-loss framing, gain-frame effort is associated with satisfaction.*

## Faculty Support

Research related to faculty support and student satisfaction suggests that positive student-faculty relationships are associated with student satisfaction (Amelink, 2005), overall student educational satisfaction (Belcheir, 2001, p. 8), and academic development (Pascarella & Terenzini, 1991, p. 102). Outside of higher education research, partner appreciation has been associated with satisfaction (Berger & Janoff-Bulman, 2006).

*H<sub>3</sub>. Support from faculty is associated with satisfaction.*

### **Academic Advisement**

Academic advising has been shown to be an important predictor of student satisfaction in past research. According to Kuh et al. (2006, p. 60), the quality of academic advising was the “single most powerful predictor of satisfaction...for students at 4-year schools.” Further, academic advising was rated as “the most important aspect of their educational experience” by students at four-year public colleges (Noel-Levitz, 2009, p. 3).

*H<sub>4</sub>. Advisor knowledge and approachability is associated with satisfaction.*

### **Instructional Effectiveness**

Research related to college teaching has linked student satisfaction to instructional effectiveness. Positive classroom learning experiences, including being intellectually challenged, are associated with student satisfaction (Volkwein & Cabrera, 1998). The results of student satisfaction surveys at four-year public colleges and universities indicated instructional effectiveness as the second most important aspect of student’s educational experience (Noel-Levitz, 2009, p. 3).

*H<sub>5</sub>. Instructional effectiveness is associated with satisfaction.*

### **Curricular Challenge**

Research related to curriculum and student satisfaction suggests the rigor of the curriculum is important, and that setting expectations at “reasonably high levels” is associated with student satisfaction (Kuh, 2003, p. 1).

*H<sub>6</sub>. Curricular challenge is associated with satisfaction.*

### **Overall Model**

The overall model will be tested with the following hypothesis:

*H<sub>7</sub> Satisfaction can be predicted with measures of faculty support, curricular challenge, instructional effectiveness, academic advisement, and student effort.*

## METHODOLOGY

### Data Collection

A cross-sectional survey design was used for this research. The subjects were spring 2010 graduating seniors from the business administration and accounting programs at a state university in the upper-Midwest region of the U.S. Data were collected via the survey function of an online course management shell. Graduating students (n=82) were contacted by email and informed that due to their upcoming graduation, they had been enrolled in an online course shell for the sole purpose of administering the graduating senior survey. The graduating senior survey is an assessment requirement for graduating seniors. Completed surveys were received from 81 respondents. Of the 74 students who selected response categories that reflected full-time status (10-12 credits or more per semester), the majority of respondents were female (51.4%) and business administration majors (89.2%).

### Measures

Individual questions addressing specific behaviors and perceptions were used to measure the constructs of this study, and are described as follows.

#### Satisfaction

An index was created to measure the construct of satisfaction and was computed as the mean score of the student's responses (1 = strongly disagree; 5 = strongly agree) to three items from the survey instrument: 1) "I am satisfied with my education at (university name);" 2) "Overall, in evaluating my experience in the Business Administration /Accounting program at (university name), I am satisfied with the education I have obtained;" 3) "Overall, in evaluating my experience in the Business Administration /Accounting program a (university name), I would recommend this program to friends or family interested in Business Administration/Accounting." The reliability of the satisfaction construct was measured through Cronbach's coefficient alpha (Cronbach, 1951). Nunnally (1978, p. 245) suggested that alphas in the range of .70 are adequate for basic research. The alpha for the composite measure of satisfaction was .772 (n=74) based on standardized items.

#### Faculty Support

Student assessment of faculty support was measured through student responses (1 = strongly disagree; 5 = strongly agree) to the following question: "While a student at (university

name), the quality of support from the Business Administration/Accounting faculty has been strong.”

### **Student Effort**

A ratio was created to measure student effort and was computed as student responses to hours studied per week divided by enrolled credits. Student responses to the question “About how many hours do you spend in a typical week preparing for class (studying, reading, writing, doing homework, and other academic activities?)” were coded as follows: 0 = 0 hours; 7=1-7 hours; 14=8-14 hours; 21=15-21 hours; 28=22-28 hours; 35=29-35 hours; 42=36-42 hours; 49=more than 42 hours. Student responses to the question “On the average, about how many credits are you enrolled in per semester?” were coded as follows: 12=10-12 credits; 15=13-15 credits; 18=16-18 credits; 21=19-21 credits; 24=more than 21 credits.

### **Framing Student Effort as Gain or Loss using Faculty Support as Proxy**

Gain-frame measure of student effort was created by separating students into two groups: those students whose response reflected higher levels of faculty support and those whose response reflected lower levels of faculty support. Based on a frequency distribution of student responses, approximately half of the respondents (n=36) reported perceived faculty support as “4” or less, and were recoded as “0” while the remaining respondents (n=38) reported perceived faculty support as “5” and were recoded as “1.” (See discussion on faculty support, above, for more details on faculty support scale.)

### **Curricular Challenge**

Student assessment of the program’s degree of curricular challenge was measured through student responses (1 = strongly disagree; 5 = strongly agree) to the following question: “While a student at (university name), the Business /Accounting curriculum has been appropriately challenging.”

### **Instructional Effectiveness**

Student assessment of the instructional effectiveness was measured through student responses (1 = strongly disagree; 5 = strongly agree) to the following question: “While a student at (university name), the quality of teaching and instruction from the Business Administration/Accounting faculty has been good.”

### Academic Advisement

Student assessment of the academic advisement they had received was measured through student responses (1 = strongly disagree; 5 = strongly agree) to the following question: “While a student at (university name), my Business Administration/Accounting advisor has been knowledgeable and approachable.”

### Gender

Student gender was assessed by student responses (1 = male; 2 = female) to the statement “My Gender”.

## RESULTS

Before testing the hypotheses using all data as one sample, a test for equality of means was used to identify any significant difference in responses between males and females, and results are included in Table 1. No significant differences emerged in responses between males and females. Consequently, the data were treated as a single sample for the remaining analyses.

Table 1. Test of Differences Between Males and Females.				
Variable	Gender			
	Male (n=36)	Female (n=38)		
	Mean (S.D.)	Mean (S.D.)	<i>t</i> (df)	<i>p</i> -value*
Faculty Support	4.44 (.695)	4.37 (.675)	.478 (72)	.634
Instruction	4.22 (.681)	4.18 (.652)	.245 (72)	.807
Curricular Challenge	4.08 (.841)	4.29 (.611)	-1.211(72)	.230
Academic Advisement	4.03 (1.25)	4.36 (.762)	-1.359 (72)	.178
Student Effort	1.20 (.721)	1.22 (.640)	-.150 (72)	.881
Satisfaction	4.33 (.569)	4.40 (.503)	-.563 (72)	.575
Note: *=two-tailed test of significance				

Analyses of correlations were used to test univariate hypotheses ( $H_1$ ,  $H_3$ ,  $H_4$ ,  $H_5$ , and  $H_6$ ), and results are included in Table 2. Table 2 reveals the correlation between satisfaction and faculty support was highly significant ( $r=.299$ ,  $p<.01$ ) ( $H_3$ ) as were the correlations between satisfaction and curricular challenge ( $r=.553$ ,  $p<.001$ ) ( $H_6$ ), instruction ( $r=.535$ ,  $p<.001$ ) ( $H_5$ ), and academic advisement ( $r=.407$ ,  $p<.001$ ) ( $H_4$ ). We also see that more student effort is not associated with higher satisfaction ( $H_1$ ).

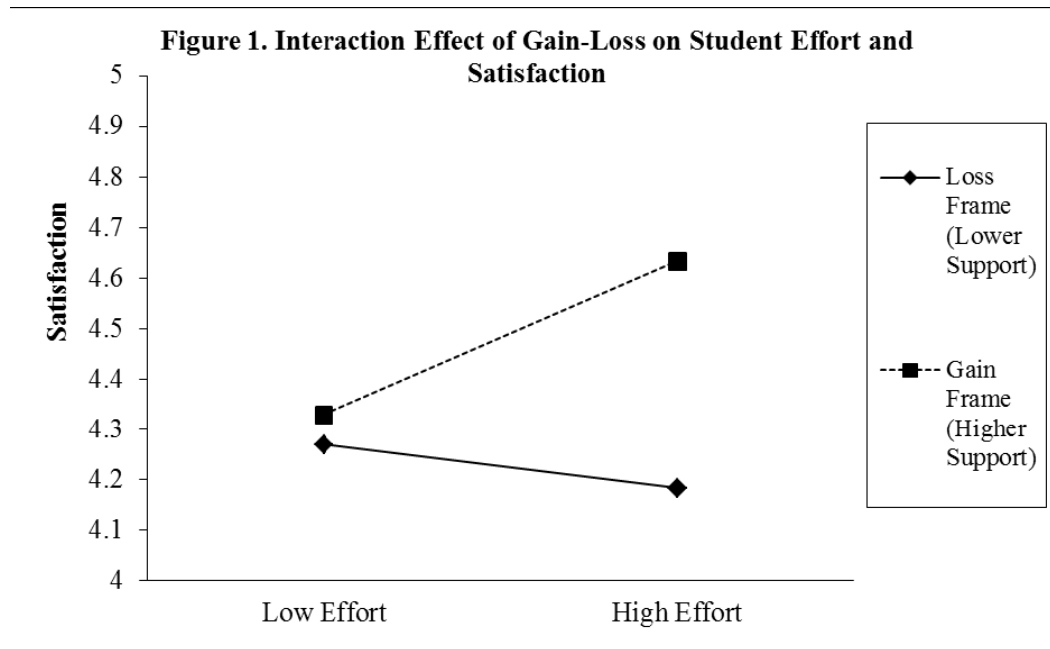
**Table 2. Correlations, Means, and Standard Deviations**

Variable	1	2	3	4	5	6
1. Satisfaction	<b>1.000</b>					
2. Faculty Support	.299**	<b>1.000</b>				
3. Student Effort	.123	.139	<b>1.000</b>			
4. Curricular Challenge	.553***	.310**	.257*	<b>1.000</b>		
5. Instruction	.535***	.545***	.125	.456**	<b>1.000</b>	
6. Academic Advisement	.407***	.331**	.072	.307**	.287*	<b>1.000</b>
Means	4.37	4.41	1.212	4.19	4.20	4.20
Standard Deviations	.534	.681	.676	.734	.662	1.037
N	74	74	74	74	74	71

Note: \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$

A comparison of correlation coefficients was used to test the association between gain-frame measure of student effort and student satisfaction ( $H_2$ ). A comparison of the correlation between effort and satisfaction was conducted separately for those students whose response reflected higher level of support ( $n=38$ ) versus lower level of support ( $n=36$ ). The correlation coefficient between effort and satisfaction for students with lower levels of perceived support was negative but nonsignificant ( $r = -0.077$ ,  $p = .657$ ) while the correlation coefficient for students with higher levels of perceived support was positive and statistically significant ( $r = .322$ ,  $p = .049$ ). The difference in correlation coefficients between students with perceptions of higher support and students with perceptions of lower support was significant at  $p < .10$  ( $Z = 1.70$ ,  $p = .09$ ) ( $H_2$ ). A further demonstration of the moderating effect of faculty support on the relationship between student effort and satisfaction was available through a regression analysis (Aiken & West, 1991). A regression was run on the dependent variable of student satisfaction, with student effort as the independent variable, faculty support gain-loss (binary) frame as a moderating variable, and the product of student effort and gain-loss frame as an interaction term. The results of this two-way interaction are visually depicted in Figure 1 (Dawson, 2011). The negative slope between effort and satisfaction for students with lower levels of faculty support basically reflects the negative correlation ( $r = -0.077$ ,  $p = .657$ ) discussed earlier between effort and satisfaction for students with lower support. Similarly, the positive slope between effort and satisfaction for students with higher levels of faculty support reflects the positive correlation ( $r = .322$ ,  $p = .049$ ) discussed earlier. Combined, these results suggest that there is a moderating effect of faculty support on the student effort/satisfaction relationship.





Multiple regression analysis was used to determine the degree to which the entire variable set accounted for the variance in student satisfaction. Table 3 provides the regression results and shows a good fit ( $R^2 = 46.0\%$ ) of the variance in satisfaction scores and a model that was highly significant ( $F(5, 65) = 11.080, p \leq .001$ ) ( $H_7$ ). The variables which emerged as statistically significant predictors of satisfaction, in order of coefficient size, include: instruction ( $b = .427, p = .001$ ), curricular challenge ( $b = .301, p = .006$ ), and academic advisement ( $b = .231, p = .023$ ). Faculty support and student effort did not emerge as statistically significant predictors of satisfaction. The mediating impact of faculty support on the student effort/satisfaction relationship established earlier helps explain these findings.

Table 3. Multivariate Regression Predicting Satisfaction.			
Variable	Standardized Coefficients	t -Statistic	P-value
Intercept	-	5.760	.000
Instruction	.427	3.596	.001
Curricular Challenge	.301	2.821	.006
Academic Advising	.231	2.325	.023
Faculty Support	-.105	-.934	.354
Student Effort	-.052	-.661	.511
Dependent variable: Satisfaction; Total model $R^2 = .460$ ; Total model adjusted $R^2 = .419$ ; Total model F value = 11.080; Total model $p > F = .000$ .			

## DISCUSSION AND SUGGESTIONS FOR FUTURE RESEARCH

The results of this study suggest faculty support is important in interpreting student effort and satisfaction. For those students who felt higher levels of faculty support, the association between effort and satisfaction was positive and statistically significant. For those students who felt lower levels of faculty support, the association between effort and satisfaction was negative and nonsignificant. The difference in correlations between the higher support group and lower support group was significant.

Importantly, these results suggest that working harder is not associated with satisfaction, and, thankfully, working less hard is not associated with satisfaction, either ( $H_1$ ). Rather, when feeling supported by faculty, effort and time spent studying and preparing for class is framed as a gain. Those students who felt highly supported by faculty framed the effort they expend studying and preparing for class as a “gain” and, as such, the greater the effort expended, the greater the gain, and the greater the satisfaction ( $H_2$ ). For Berger and Janoff-Bulman (2006), perceived appreciation was what framed effort as a gain or loss. In this study, perceived support from faculty framed effort as either a gain or a loss.

Beyond the hypothesized association between faculty support, student effort, and satisfaction, the independent variables of faculty support, instruction, curricular challenge, and academic advisement each had statistically significant correlations in the expected direction with satisfaction. The regression analysis provided evidence that this set of variables makes a statistically significant contribution to the prediction of satisfaction. Combined, the variables explain approximately 46 percent of the variance in satisfaction scores. Yet, without this further examination of how faculty support interacts with student effort to create a gain or loss frame, the regression analysis would be incomplete.

In the end, the hypothesized association of a gain-frame perspective of student effort and student satisfaction was supported. Insights from Prospect Theory (Kahneman & Tversky, 1979), specifically the addition of a gain-frame variable to the traditional higher education research model on student satisfaction, contributed to our understanding of student satisfaction. When time spent preparing for class is framed as a gain, effort is positively associated with educational satisfaction. For programs and universities concerned with student satisfaction, these results suggest the importance of the teacher-student connection in the learning process. Faculty support serves a pivotal role in framing student’s perception of time spent preparing for class. This research builds on the concept of appreciation within human relationships and applies the concept of framing within Prospect Theory to student satisfaction.

One limitation of this study is that the design of the research was cross sectional. As such, other interpretations of the data cannot be precluded, for example, higher satisfaction might produce a sense that faculty are more supportive. Another limitation of this study is that all subjects had majored in business administration or accounting, and the results may not apply to a broader spectrum of majors. Several suggestions can be made for future studies. Our

understanding of the ways in which faculty support frames student effort as gains or losses would benefit from future research. One suggestion would be to develop a more robust measure of student-felt support. Future research may also seek to determine whether the gain-frame perception of effort on satisfaction applies in other contexts, including students from other majors and other institutional types. Finally, future studies may benefit from longitudinal research designs that allow for determination of causal relationships.

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