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USING A COMPETITIVE GAME TO AID STUDENT LEARNING OF DATABASE NORMALIZATION: REFLECTIONS AFTER THREE YEARS

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Abstract

The classical technique used to find and correct problems in the design of databases is normalization. Recognizing that understanding and applying normalization is difficult for many students, we have designed a system for teaching these concepts which focuses on necessary concepts and then reinforces them with an engaging in-class game, the “normalization shootout,” which pairs students against one another in a single-elimination tournament. Analysis of student opinions substantiate that students both enjoy the interactive game and believe it helps them learn normalization concepts. Analysis of student tests scores, comparing scores of those who participated in the game versus those who did not, also substantiates that the game facilitates student learning.

Introduction

Throughout our own progression through grade school, high school, and then post-secondary education, each of us participated in numerous games teachers used to help make our learning fun while still teaching concepts or reinforcing our knowledge. Whether it was an in-classroom mock baseball game with one side of the room competing against the other or some other type of competition, those games often motivated us to do our very best and kept us engaged in the classroom. At the time we were playing the game, we were perhaps focused on the fun and were not fully aware that playing the game was actually reinforcing our learning.

As educators, we value student participation in the classroom atmosphere. Our philosophy matches that of Anderson et.al., (2007) in that we want students alert and

engaged throughout the class and that we want broad participation rather than a small number of vocal students. After reflecting on the value that educational games can provide, we developed the “normalization shootout” game that can be used to challenge students to learn database normalization concepts. Use of this game was first reported in *Issues in Information Systems*, in an article which included an explanation of the concepts being covered related to normalization and the use of the game. (Fanguy and Kleen, 2005).

In this article, a brief background on games and student learning is provided first, followed by a brief description of the “normalization shootout” game. (A more detailed description of the game can be found in the above 2005 publication.) An analysis of three years of student test scores and student feedback from surveys is also included.

Games and Student Learning

Becker (2001), Cook and Hazelwood (2002), Dunphy, Meyer, and Simmons (2003), Lawrence (2004), Ruben (1999), Siegfried (2002), and Wheatley (1999), are among the numerous researchers who have shared findings supporting the value of using games as teaching tools, at literally all grade levels from kindergarten to structured post-secondary and other adult-learner environments. The use of games to facilitate student learning is not new. For example, in 1999 Ruben provided a 30+ year overview of the impact games can have on teaching and student learning.

The literature contains numerous examples of uses of games in post-secondary business and information systems education. For example, whether it is management education (Wheatley, 1999), economic

education (Gremmen and Potters, 1997), accounting education (Cook and Hazelwood, 2002), or selling, negotiation and wealth creation skills (Dunphy, Meyer, and Simmons, 2003), games have been identified as effective teaching strategies in higher education. To further illustrate the continued popularity of games as teaching tools, Aldrich (2007) reports that quick, interactive simulations that often require less than 20 minutes of student participation or interaction are being embraced by organizations such as Cisco Systems and the Canadian Standards Association to meet training needs of businesses. These very short games are called “mini-games.” Greer (2005) further notes that PC-based learning simulations have been used for approximately two decades, and new educational games are constantly being developed for purchase.

Within the computer science and information systems fields, games have also been identified as effective teaching tools. Minesweeper and asteroids games have been used in teaching programming applications (Becker, 2001); “Chomp” has also been used to teach programming concepts (Siegfried, 2002). The importance of information, supply chain management, and modeling have also been taught using “The spreadsheet beer-like game” (Tiger, Benco, and Fogle, 2006). Server architecture concepts also have been taught and strengthened through competitive games (Lawrence, 2004).

Whether searching the K-12 education literature, post-secondary education literature, or business and industry training literature, one can find much support for the use of games as teaching tools to help students gain an understanding of and reinforce understanding of knowledge and concepts related to many different disciplines.

The “Normalization Shootout”

After covering the concepts of normalization (functional dependencies, closures, and keys) and explaining and studying examples to ensure not only an understanding of the theory but also of the

practical application of normalization concepts, we reinforce the student’s understanding by pairing students against one another within a “Normalization Shootout.” The shootout is a game that engages the students by challenging them to answer questions focused on normalization concepts faster than a classmate against whom they are competing in a match. Once a round of matches is complete, the winners advance to a subsequent round in a single-elimination tournament-style series of matches. To encourage students to participate, bonus points are awarded to those who win a round and advance to the next round of the tournament. (The awarding of bonus points to winners is not required when using the game in your classroom.)

Physical Structure of the Game

In each match, a student must correctly answer 3 out of 5 multiple-choice questions faster than his/her opponent. Five basketball hoops are set up in front of answer choices A, B, C, D, and E. Once a question is presented, opponents shoot a child-sized basketball into a hoop which represents their answer for the question at hand. (Suction balls, nerf balls, or sponge balls could be substituted for the children’s basketball and hoops the authors use in their version of the game.) To ensure that those who are not skilled in basketball have an equal “shooting” chance, competitors are positioned near the answer hoops. To ensure that someone does not rapidly shoot off five balls to each of the five answer hoops to simply earn a correct answer from a random guess, the first shooter must wait for his/her opponent to shoot a hoop before being allowed a second shot. The only exception is when an opponent is taking too long in answering.

To take advantage of the technology in the classroom, the instructors have the normalization questions for the tournament organized into a PowerPoint presentation. If a SmartBoard is also available, a simple touch of the screen advances to the next question.

Progression of Concepts During the Game

Different concepts are emphasized in different rounds of the game. The game concludes with a “challenge” round.

Round One: Questions related to identifying closures (3 questions), keys (1 question), and the highest normal form (1 question) are included in each of the first-round matches. The sequence is progressively more challenging because closure is used to define a key and keys are used to define normal forms.

Round Two: Question difficulty increases in the second-round matches. Questions related to the identification of the highest normal form and key (4 questions) and identification of a valid decomposition (1 question) are included.

Additional Rounds: Additional rounds can be added as necessary to narrow the remaining competitors to about three students. These students are named winners of the shootout and have an opportunity to earn yet additional bonus points through the final challenge round.

Challenge Round: Each participant in the final challenge round receives a set of three more challenging normalization questions. While other challenge round competitors are sequestered in another room, each final participant must present his/her answers to the class. Correctly explaining how the answers were determined earns the student additional bonus points.

Game Effectiveness

Evidence suggests that students participating in the shootout have a much firmer grasp of normalization—its foundations and definitions—as well as a better ability to apply the concepts to actual database problems. Students also help teach concepts to others in the class.

Students as Teachers

During the challenge round, students explain their answers to more difficult

problems to the class; this allows students to gain insight from those who have demonstrated more knowledge about normalization. Sometimes hearing it explained from the student’s point of view helps other students grasp a concept. A fellow faculty member observing the game noted that those students not involved in the immediate round being played were studying the board intently and mentally quizzing themselves on each question in preparation for the actual match in which they would participate.

Student Understanding of Normalization Concepts

We have carried out the Normalization Shootout since Fall 2004 and have found it to be an effective teaching tool. A comparison of database design test scores for students by level of participation in the normalization shootout game reflects higher average scores for those who played versus those who did not play (see Table 1). Analysis of percentage difference in end-of-semester retake scores for students completing the course also show that those who advanced in the normalization shootout game earned higher scores, especially in the area of identification of the key (see Table 2).

Students’ Opinions of Game Usefulness

We have also surveyed students each semester to gather their opinions of the “Normalization Shootout.” As shown in Figure 1, students indicated a high level of agreement that they enjoyed the game, studied for the game, would study for the game if the class played it again, found the game helped them to understand normalization concepts, and thought it was an effective use of class time. Few basketball “shooting” problems were identified. While the graph illustrates the combined scores of all six semesters’ data, the scores have been noticeably consistent for each of the questions in each of the six semesters the game has been used in the classroom.

Conclusion

As many authors have previously studied and reported, games can be effective learning tools if designed carefully. The “normalization shootout” we use in our database class as one of the tools to assist students in learning difficult concepts allows students to learn from each other, contributes to retention of that knowledge, and enhances understanding of the material. Students are engaged in the class and broad participation is achieved. Both the students’ testing scores and survey feedback indicate positive outcomes. We believe the “normalization shootout” is an effective tool that others may also find useful in their classrooms. A creative teacher could use a comparable game to teach concepts in a different information systems class or even in management, marketing, finance, accounting, or economics classes.

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Table 1

**Comparison of Database Design Test Scores for Students
by Level of Participation in Normalization Shootout Game**

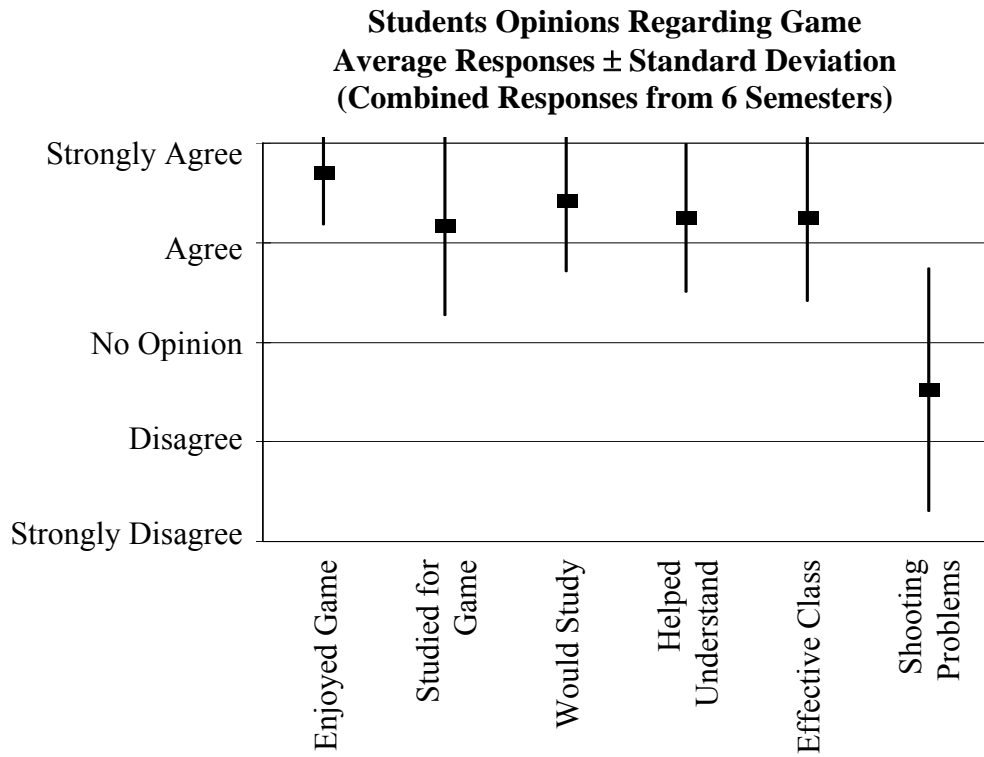
Semester	Students Who Played			Students Who Did NOT Play		
	Number	Average	Std Dev	Number	Average	Std Dev
2007 Spring	4	74.5%	8.4%	2	66.3%	10.8%
2006 Fall	6	78.3%	9.2%	1	60.9%	0.0%
2006 Spring	4	81.0%	9.3%	2	66.3%	16.9%
2005 Fall	11	74.3%	9.6%	2	82.6%	0.0%
2005 Spring	13	82.6%	9.1%	0		
2004 Fall	9	79.0%	12.6%	5	65.2%	17.3%
Summary	47	78.6%	10.0%	12	68.1%	13.9%

Table 2

**Percentage Difference in Retake Scores for Normalization Examination
for Students Completing Course Fall 2004-Spring 2007**

Topic	Students who Did NOT Advance or Did not Participate	Students who Advanced in the Game
Functional Dependencies	-3.2%	-3.0%
Highest Normal Form	-5.0%	-1.5%
Identify the Key	2.4%	23.9%
Decomposition	0.4%	2.4%
Total Score	-1.4%	4.8%

Figure 1



DEVELOPING TEAM SKILLS IN INFORMATION TECHNOLOGY PROFESSIONALS

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Abstract

According to the Bureau of Labor & Statistics, six of the 30 occupations projected to grow the fastest percentage wise by 2014 are in the IT profession. Predictions are that the number of new jobs in the IT arena will increase by slightly over one million between 2004 and 2014. 3.4 million IT jobs existed in 2004. The literature increasingly stresses the need for IT professionals to possess strong soft skills including communication and teamwork. This study focuses on the highly-desired team skills and presents a suggested approach to developing those skills. This paper is designed to provide guidance to educators and career counselors to help equip entry-level IT professionals with the ability to work in the exceedingly collaborative IT environment. The information presented includes identification of personal and interpersonal skills necessary for successful team participation; the value placed on these skills by IT professionals; and suggestions for development of the requisite skills.

IT Personnel Shortage

Information technology is still the fastest growing sector in the U.S. economy with more than a million new jobs projected to be added between 2004 and 2014 (Luftman, 2008.) In 2001, when the dotcom bust hit, some 270,000 IT personnel left the technology field never to return (Chabrow, <http://www.cioinsight.com>, 2008.) Compounding this workforce reduction is, according to the Bureau of Labor and Statistics (2007), in 2010 40% of the workforce is set to retire. At the same time enrollment in IT and computer science programs at American universities has declined from 23,000 in 2002 to slightly over 12,000 in 2005 (Chabrow,

<http://www.cioinsight.com>, 2008.) Although enrollments have seen a slight increase since 2005, the numbers are not sufficient to address the growing marketplace need which experienced job growth in the IT field of 8.5% during 2007 and shows no sign of slowing (Chabrow, <http://www.cioinsight.com>, 2008.)

An additional challenge is finding employees with the desired combination of skills. The most productive IT specialists possess a mix of technical as well as non-technical skills (Dillon, 1999.) According to a survey conducted by Adventus the mix of skills is critical with 81% of managers reporting a belief that inappropriate qualifications are responsible for project failures (Skills shortage behind project failures, 2004.)

The IT industry realizes that corporations and academic institutions must take action to resolve these critical issues (SIM, 1998.) Comprehensive research is necessary to determine how industry and academia can ensure that the right kinds of training are available.

Over the past three decades, IT literature has reported studies dealing with the importance of non-technical skills. A 1974 study concluded that people, organizational, and systems skills were more important than technical skills (Henry, Dickson, & LaSalle, 1974.) In 1980 another study found behavioral skills to be more important (Benbasat, Dextr, & Mantha, 1980), a study that was validated by Vitalari (1985.) Again, in the mid-1990s research indicated that business, soft, and analytical skills were more important than technical skills (Lee, Trauth, & Farwell, 1995.)

Effective IT Team Characteristics

IT personnel work predominantly in team environments. Systems are too large to allow the luxury for personnel to function as isolated individuals. As such, they must be able to function effectively as a team. The question then comes to bear: what skills are necessary for team leaders and team members? According to Whetten and Cameron (2007), there are seven important attributes of an effective team: 1) members are interdependent on each other; 2) members work more efficiently together than alone; 3) teams create their own magnetism because they function so well; 4) teams sometimes change leaders; 5) members care for and nurture one another; 6) members cheer for and bolster the leader and vice versa; 7) there is a high level of trust among each of the members.

LaFasto and Larson (2001) identified four teamwork factors that distinguish effective team members: openness, supportiveness, positive personal style, and action orientation. Without proper individual team member characteristics, individuals cannot function effectively as a team, and the team's resulting productivity will be seriously compromised. Individuals will be incapable of participating with one another effectively in a team environment if they lack self-awareness of their emotional intelligence or tolerance for ambiguous situations. They will be vulnerable to significantly frustrating stress if they lack the skill to manage their Type A competitiveness, impatience, and hostility. Inadequate problem solving skills, either analytical or creative, could also present obstacles to successful team participation. These personal skills are requisite for the development of critical interpersonal skills: communicating supportively, gaining and using power and influence, motivating others, and managing conflict. Possession of these interpersonal skills prepares team members for development of group skills (Whetten & Cameron, 2007.)

The question then becomes: do IT personnel recognize the full import of interpersonal skills? The answer to this question will subsequently help determine

what course of action should be taken at the academic level to better prepare IT students for the workplace.

The Study

The data for this study was collected through web-research of IT job descriptions, site interviews with CEOs and other executives at five Arkansas-based IT companies, focus groups of IT managers from various divisions within the IT companies, and a web-based survey of 325 IT professionals with varying levels of knowledge, skills, and abilities.

The web research and CEO interviews produced the job categories. The focus group sessions with IT managers resulted in the identified skills. The identified skills were then rated by IT professionals in the web-based survey. The rating scale used was a five point Likert scale: extremely important (5), very important (4), important (3), somewhat important (2), and not important (1.) The skills presented in this paper are a subset of a much larger study.

Identified Skills

Sixteen skills were identified in addition to team work that are important to an effective team. Ten are directly related to communication skills: the ability to listen effectively, verbally communicate, visualize and conceptualize what is being communicated by another member, provide constructive criticism, understand a communicated business culture, communicate effectively with other teams, understand issues from the customer's point of view, provide leadership, mediate conflict, and exercise good interpersonal skills. The remaining six are personal skills that an individual needs in order to be a valuable member of the team: problem solving ability, time-management skills, investigative aptitude, stress-management capability, organizational skills, idea-initiation capacity, and problem-solving skills.

Identified IT Job Categories

Eight job categories were identified in the study:

- *Computer programmers* code, test, and maintain applications. This category includes both mainframe and client/server programmers who develop and maintain application software.
- *Computer support specialists* provide technical support to clients and end users either in person or over the telephone.
- *Internet specialists* design, develop, and maintain web sites. There are two basic categories of Internet specialists: webmasters responsible for all technical aspects of a website, and web developers responsible for website design and creation.
- *Systems/business analysts* interact with clients and end users to study business problems/opportunities and design technical solutions. The IT industry hires entry-level people as systems analysts provided they possess the proper mix of non-technical skills.
- *Computer engineers* design and develop hardware and software. Software engineers differ from computer programmers in the complexity of design, the tools utilized, and the purpose for the software they develop. Computer engineers write system software rather than application software.
- *Database administrators* are responsible for the design, development, testing, and coordination of databases. The complexity of this position depends on whether the environment is mainframe or microcomputer-based.
- *Network specialists* are responsible for the planning, analysis, design, modeling, installation, evaluation, and support of an organization's distributed computing needs – LAN, WAN, WiFi, and Internet connections.
- *Telecommunications analysts* are responsible for the interaction between computer hardware and telecom-

munication equipment. This career path is highly complex and technical.

Because of the size and complexity of current IT systems, the IT professionals in all of these categories work predominantly in teams.

Findings

The ratings for each of the skills broken down by category are located in Tables 1 through 8. The higher the rating the greater the importance the skill was viewed to have for a professional within the particular category. A rating of 4.5 was considered to be approaching the “extremely important” level and is denoted by a dark grey shading. A rating of 4.0 to 4.49 was considered to fall in the “very important” category and is denoted by a lighter grey shading. A rating between 3.0 and 3.99 falls in the “important” scale and a rating between 2.0 and 2.99 falls in the “somewhat important” scale. It should be noted, however, that only mediation skills have a rating below 3 (see tables 1, 3, 6.)

Interestingly, computer programmers, the group most often identified to work in teams, is the category where the fewest skills are identified as “very important” or above (see table 1.) It is also worth noting that two skills are fairly consistently rated at the bottom of the scale: mediation skills and leadership. Mediation skills is ranked 17th in all eight categories. Leadership is ranked 16th in six of the categories (see tables 1-6) and 15th in yet another (see table 7.) Of the seventeen skills, five are rated as “very or extremely important” in all eight categories: problem solving, listening, team work, time management, and verbal communication. Two more are rated equally as high in all categories except computer programmer: “be the customer” mentality and interpersonal skills.

Recommendations

With the exception of computer programmers, the IT professionals who responded to the survey appear to have a good grasp on the importance of personal skills

necessary to be an effective team member. The fact that the ratings are so high confirms the need for IT students to enter the workforce with a strong personal and interpersonal skill set in place, thus indicating the importance academicians must place on providing the appropriate training mechanisms for student success in the IT environment.

Organizational behavior courses are an excellent place to incorporate personal skill development if it is not already included in the course. The classroom experience allows individuals a way to benchmark their current skill levels. By comparing themselves to others and engaging in role plays and other exercises in a non-threatening training or classroom environment, students can be motivated to increase their understanding and development of the personal, interpersonal, and group/team skills that will produce increasingly higher levels of performance.

Professional development mini-series workshops, either in one-hour segments throughout the semester or in a one-to-two-day seminar, could be offered to develop these personal and team skills. In a non-classroom setting, incentives to participate may be necessary to encourage students to attend. The local student chapter of AITP could also host speakers from industry extolling the value of non-technical skills. Students all too often believe that technical skills are the most important for obtaining a job in the IT environment – a myth that is debunked time and again by industry leaders.

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Skills	Rating
Problem Solving	4.55
Team Work	4.34
Listening	4.31
Visualize and conceptualize	4.23
Time Management	4.22
Verbal Communication	4.04
Constructive Criticism	3.98
Understand Business Culture	3.94
Inter-team Communication	3.89
Investigative Skills	3.88
“Be the Customer” Mentality	3.83
Organizational Skills	3.83
Interpersonal Skills	3.81
Stress Management	3.78
Idea Initiation	3.58
Leadership	3.48
Mediation Skills	2.82

Table 1: Computer Programmer

Skills	Rating
Team Work	4.55
Visualize and conceptualize	4.55
Organizational Skills	4.55
Problem Solving	4.46
Listening	4.36
Time Management	4.36
Verbal Communication	4.36
Understand Business Culture	4.27
Inter-team Communication	4.18
“Be the Customer” Mentality	4.09
Constructive Criticism	4.09
Idea Initiation	4.09
Interpersonal Skills	4.00
Stress Management	3.82
Investigative Skills	3.73
Leadership	3.46
Mediation Skills	2.91

Table 3: Internet Specialist

Skills	Rating
Problem Solving	4.71
Listening	4.59
“Be the Customer” Mentality	4.41
Time Management	4.29
Team Work	4.24
Understand Business Culture	4.24
Investigative Skills	4.24
Stress Management	4.24
Verbal Communication	4.18
Inter-team Communication	4.18
Visualize and conceptualize	4.12
Organizational Skills	4.12
Interpersonal Skills	4.06
Idea Initiation	4.06
Constructive Criticism	3.94
Leadership	3.77
Mediation Skills	3.53

Table 2: Computer Support Specialist

Skills	Rating
Problem Solving	4.63
Listening	4.53
Verbal Communication	4.46
Team Work	4.41
Time Management	4.33
Investigative Skills	4.30
“Be the Customer” Mentality	4.29
Visualize and conceptualize	4.23
Understand Business Culture	4.20
Interpersonal Skills	4.16
Constructive Criticism	4.08
Inter-team Communication	4.07
Organizational Skills	4.06
Stress Management	3.96
Idea Initiation	3.92
Leadership	3.82
Mediation Skills	3.22

Table 4: Systems/Business Analyst

Skills	Rating
Problem Solving	4.67
Listening	4.42
Team Work	4.42
Time Management	4.42
Constructive Criticism	4.42
Idea Initiation	4.27
Verbal Communication	4.17
“Be the Customer” Mentality	4.17
Investigative Skills	4.17
Inter-team Communication	4.17
Interpersonal Skills	4.17
Understand Business Culture	4.00
Visualize and conceptualize	3.83
Organizational Skills	3.83
Stress Management	3.67
Leadership	3.58
Mediation Skills	3.00

Table 5: Computer Engineer

Skills	Rating
Listening	4.59
Visualize and conceptualize	4.47
Investigative Skills	4.47
Problem Solving	4.41
Team Work	4.41
Verbal Communication	4.25
“Be the Customer” Mentality	4.23
Organizational Skills	4.21
Understand Business Culture	4.18
Interpersonal Skills	4.18
Time Management	4.12
Inter-team Communication	4.12
Constructive Criticism	4.00
Idea Initiation	3.88
Leadership	3.88
Stress Management	3.65
Mediation Skills	3.24

Table 7: Network Specialist

Skills	Rating
Team Work	4.48
Listening	4.45
Time Management	4.24
Problem Solving	4.21
Verbal Communication	4.17
Visualize and conceptualize	4.14
“Be the Customer” Mentality	4.07
Interpersonal Skills	4.07
Stress Management	4.07
Constructive Criticism	4.00
Understand Business Culture	3.96
Organizational Skills	3.93
Idea Initiation	3.93
Investigative Skills	3.90
Inter-team Communication	3.90
Leadership	3.62
Mediation Skills	2.97

Table 6: Database Administrator

Skills	Rating
Problem Solving	4.71
Team Work	4.57
Verbal Communication	4.57
Inter-team Communication	4.57
Listening	4.43
Time Management	4.43
Understand Business Culture	4.43
Interpersonal Skills	4.43
Visualize and conceptualize	4.29
“Be the Customer” Mentality	4.29
Organizational Skills	4.14
Stress Management	4.14
Leadership	4.14
Idea Initiation	4.00
Constructive Criticism	3.86
Investigative Skills	3.73
Mediation Skills	3.57

Table 8: Telecom Analyst

COMPARISON OF STUDENT ACHIEVEMENT WHEN TEACHING EXCEL AND ACCESS USING DIFFERENT TYPES OF LEARNING ENVIRONMENTS

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Lea Anne Smith
University of Central Arkansas

Introduction

As technology changes so does education. To accommodate learners in today's society, educational institutions have migrated to various forms of educational delivery. Learners now have the ability to take one or more classes online, or get a degree online without experiencing traditional classroom instruction. This change in instructional delivery has raised many questions and spawned many debates concerning which instructional delivery method provides a more stringent and successful learning environment.

Methodology

To add to the debate and explore this question, the authors analyzed class data for three instructional delivery methods used at the University of Central Arkansas for MIS 2343 - Desktop Decision Support Technologies.

The course content of MIS 2343 includes instruction in Microsoft Office2007 - Excel and Access. The three different instructional delivery methods include: 1) the traditional instructor-led classroom (face-to-face with required attendance for testing), 2) the hybrid classroom (optional student attendance based on their need for instruction with online testing), and 3) the online learning environment (no scheduled class meetings with online testing).

The data for this study was taken from three sections of MIS 2343 from the Fall 2007 semester.. Each of the three different instructional delivery methods was represented in the study.

Data for the three sections was analyzed and compared. Data items for each section included number of students, number of

students who dropped the course, and minimum, maximum and average final grade percentage.

The Methods

In this section of the paper, each of the researchers speaks in her own words concerning the method(s) that they used for course delivery of MIS 2343.

Traditional Instructor-Led Delivery Method (Lea Anne Smith)

The instructor-led method is by far the best method to communicate new concepts to students. Students have a set time during the week with which they have the instructor's complete attention to ask questions and get advice on how to best solve problems encountered with the software or assignments. The instructor is also better able to make the best use of the delivery method to the students using the three keys learning methods: visual, auditory, and kinetic.

While I fully believe this is the best method available for the student to receive the full breadth and depth of the course, the downside of the method is conflicts with required class attendance. This schedule at times makes it difficult for the student to attend based upon other obligations that the student may have. Typically with this type of instruction, the student may fall behind if they miss one class. This may force them to the "online delivery" method of having to learn the concept without having the benefit of instruction.

I have found that I am more apt to spend extra time with the online class since I feel that they are not getting the benefit of my undivided attention during class time. So

while the face-to-face class does get that attention. The online course actually gets more of my planning and answering time due to how the class is structured.

I believe that students benefit more from an instructor-led class, but it is not always a possibility for the student to make such a forced time commitment based on other obligations.

Hybrid Delivery Method (Carla Barber)

The reason I chose the hybrid method was because of all of the bored and/or blank faces I would see in class during the instructor-led method. At the end of each semester that I had taught this course as a face-to-face class, my written evaluations from the students always had comments from more than 50% of the class that they felt as if this course should be conducted as an online course. Although the material is plainly given in the textbook and their comments were favorable towards me, they just felt as if the course didn't need to be instructor led. As an instructor, you feel their frustration and look for any means to make it better especially if they took a similar course in high school.

While the class was put on the schedule as a regular class, my department chair told me that I could handle the class any way I chose at my discretion. The structure of the class was based on the following:

1) No attendance was required, so students could attend based on their need for instruction.. I would be in the classroom during the scheduled class time to help those that felt they needed it.

2) Tests, quizzes, and homework were all handled online, utilizing WebCT and a testing software provided by Paradigm called SNAP. This online testing software had online homework assignments that the students could complete and the software would grade the assignment. It also had the ability to make objective and application tests/quizzes.

Pros of this Method:

1) Those students that were self-starters felt comfortable with the software, felt as if

the book gave enough instruction, enjoyed it more and for most, their grades reflected this.

2) Meeting in the classroom during the scheduled class time was an option for those students that had difficulty interpreting the textbook, following my instructions, or problems with the software. It also allowed the instructor to use class time for the grading that this course requires if no students needed help during a class period.

Cons of this Method:

1) Those students that are not self-starters tended to have more difficulty interpreting the textbook or my instructions and tended to fall behind in completing the assignments by the due date.

2) Even though the instructor was in the classroom for the regularly scheduled class period, most students did not take advantage of it. For the majority of the semester, I had the same five to eight students come in for help and guidance. Yet there were many more students who could have benefited from it, if they had just taken the initiative. However, students frequently came by my office to ask for help.

3) Some of those students felt as if they had paid for a course where they had to "teach" themselves.

Online Course Delivery Method (Lea Anne Smith)

With the online course delivery method, I am better able to reach a larger student population with online course delivery. Students who find it difficult to get into a class because of a time conflict, will often take the online version of the course. This delivery method makes the course more flexible for the student and the instructor.

I find by using a course content package such as WebCT that I have a more reliable way to reach my students. Most students have more than one email address and WebCT allows a common "electronic" meeting ground for the students and instructor through its internal email system.

The downside to this delivery method is that the students basically teach themselves.

Since not everyone processes information the same way, a lot can be lost using this method. Students also find it more difficult to complete coursework on time if they do not have an instructor to give it to. Even with setting up calendar entries, students still found it difficult to manage their time efficiently.

Another downside to this method is the communication factor. Communication largely takes place via email. Concepts are difficult to express and comprehend using email as the communication medium. There were many times when email questions would end with a phone conversation or office visit. The only advantage that I can see to primarily using email as the conversation method is that students had virtual access to the instructor throughout the day versus using set office hours.

In conclusion, with the use of this method it largely depends upon the commitment of the student to the course and ability of the instructor to communicate key aspects of the course. While it is explained that this is an online course, students need to be made aware that it often makes the content more difficult to understand and concepts more difficult to explain via the online delivery method.

The Testing Software

In this section of the paper, each of the researchers speaks in her own words about the testing software that they used for course delivery of MIS 2343.

Testing Software (Lea Anne Smith)

SNAP 2007 by Paradigm is the text-based testing software that was used in both of my face-to-face and online sections of MIS 2343. (The same testing software was used in the hybrid course discussed below).

The software was still in development at the time of integration into the course. The overall consensus of the students was that they did not like the testing software and how it graded them on their skills. They felt limited in the choices that they were able to make in solving a problem, and at times were very

frustrated with technical issues that kept arising.

I also felt the same frustrations that the students felt. Technical issues seemed to arise frequently and were difficult to trouble shoot. The grading program often marked an answer as incorrect if the student used a technique other than the one that the program was expecting (ex. student used ALT-I-C instead of clicking on the Insert menu).

I loved the ability to have assignments automatically graded. I liked the fact that the students were getting exposure to testing software and how it can be inflexible in its grading. I felt that the students were getting some very valuable experience with how the real world will test their skills and trouble shoot problems. Overall, I would use the testing software again. I would, if given the choice, like to run it through a pilot class before converting all classes over to the software.

Testing Software (Carla Barber)

We chose an Excel 2007 and Access 2007 textbook published by Paradigm. This textbook has a testing software program, SNAP 2007, that had great potential but wasn't completed. We went through the semester waiting for different applications and modules to be added for us to utilize. This created frustration for the students as well as the instructor.

Having used testing software in the past, frustration is still on par for the students. It seems that they tend to "panic" when using this kind of software and tend to dislike it. The reason this testing software was chosen was in part for ease of testing and grading assignments and in part, because the instructor knows that at times on the job, this type of software could be used at employment agencies and using the testing software gives the students exposure.

Findings

The data collected for the study can be found in Table 1 located at the end of this paper. The table contains the instructional

methods (instructor-led, hybrid, and online), number of students enrolled at the end of the semester, number of drops, class average, class minimum, and class maximum. An analysis of the data indicates the following:

- 1) The instructor-led method had the highest class average, minimum, and maximum.
- 2) The online method had the lowest class average and maximum.
- 3) The hybrid method had the lowest class minimum.
- 4) The online method had the highest number of drops.
- 5) The face-to-face and hybrid methods were tied with the lowest number of drops.
- 6) There is a difference of 13.15% points between the class average for the instructor-led method and the online method,
- 7) There is a difference of 10.99% points between the class average for the hybrid method and the online method,
- 8) The percentage of students who dropped in the instructor-led and hybrid methods was 2.9%.
- 9) The percentage of students who dropped in the online method was 28.13%.

These findings support the hypothesis put forth by the instructors with the inception of the three instructional delivery methods. Findings prove that anxiety and frustration over material is much higher without having the traditional instructor method used. This is best expressed in the variance in drop rates between the different types of methods.

Conclusion

The conclusion of this study is that the online method generated a much higher drop

rate and a lower class average than the other methods. The instructor-led and hybrid methods generated similar results.

Recommendations

The first recommendation is that the instructor should offer an instructor-led orientation for the students during the first week of the semester for the students enrolled in the sections that will use the online method. The comments made by the instructor during the orientation should be posted on WebCT. The instructor should also stress to the online students the importance of checking WebCT daily, being quick to contact the instructor if a question or problem arises, and turning in work on time.

The second recommendation is that the instructor could offer an initial class meeting with the students, as well as, campus-based testing times. Anxiety reaches its peak during preparing for and taking a test online. Students might feel more at ease if they took the test in a traditional classroom setting. This arrangement would also allow students to discuss issues with their instructor.

The third recommendation is that an orientation should be provided that will discuss the differences between all three instructional delivery methods. Students need to understand that there is more responsibility required for students enrolled in an online class.

The final recommendation is that this study should be replicated with a larger sample size across multiple semesters in order to validate these findings.

Table 1 – Data For Three Instructional Delivery Methods

Instructional Method	No. of Students	No. of Drops	Class Average	Class Minimum	Class Maximum
Instructor-Led	34	1	78.07%	53.68%	94.53%
Hybrid	34	1	75.81%	0.76%	94.00%
Online	23	9	64.82%	2.92%	90.25%

**BENEFITS VS. BURDENS: WITH RESPECT TO IT AUDITING
(SAS 70 REPORTING) – AN ORGANIZATIONAL CHANGE PERSPECTIVE
FOR WEB HOSTING COMPANIES**

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Abstract

This research examines changing information security requirements for small web hosting companies and the strategies these service providers are developing to meet the ever-growing challenges and federal privacy mandates presented by user organizations employing such services. This is a topic of significant importance because small web hosting service providers must concurrently offer information to their customers, and user organizations while protecting its data from unauthorized access, use, or disclosure in a seemingly growing regulatory business climate. Sharing information through the Internet is now a prevailing practice (Panda, 1999) with security breaches affecting 90% of all businesses each year and costing some \$17 billion (Austin & Darby, 2003). To investigate how small web hosting companies are changing in response to their clients and user organizations ever increasing demand for more information access over the Internet and the inherent security risk associated with these demands, this paper examines a theoretical framework by analyzing the tradeoffs a SAS 70 IT audit yields and concludes with a suggested methodology.

Keywords

IT Security, EDP Audit, Web Hosting Security, Information Security Audit, SAS 70, Organizational Change, Managerial Cognition, Sarbanes Oxley, Graham Leach-Bliley.

**Information Technology Role in Today's
Increasingly Regulated Business
Environment**

The role of IT in business can be viewed as a process of supporting the business operations, supporting managerial decision-making and supporting strategic competitive advantage. This can be done on many levels but cost reduction is the most significant. The role of IT is useful when automation of processes can reduce labor and other overhead costs allowing competition on price.

As Carr (2003) posits, "The operational risk associated with IT are many—technical glitches, obsolescence, services outage, unreliable vendors or partners, security breaches, even terrorism-and some have become magnified as companies have moved from tightly controlled, proprietary systems to open, shared ones. Today, an IT disruption can paralyze a company's ability to make products, deliver its service, and connect with its customers, not to mention foul its reputation. Yet few companies have done a thorough job of identifying and tempering their vulnerabilities. Worrying about what might go wrong may not be as glamorous a job as speculating about the future, but it is a more essential job right now."

The operational risk associated with financial reporting processes for most organizations are intricately linked with IT systems. Few companies manage their data manually and nearly all companies rely on electronic management of data, documents, and key operational processes. In order to keep cost of the operations down and ultimately increase the shareholders wealth, many companies have decided to outsource some of their IT operations. Thus increasing

IT's role in the cost cutting process as well as in the internal control oversight.

Chief information officers (CIO) are administratively accountable for the privacy, security, access, accuracy and the reliability of the systems that manage and report the financial data. Systems are deeply integrated in the initiating, authorizing, processing, and reporting of financial data. As such, they are in fact linked to the overall financial reporting process and need to be assessed, along with other important process for compliance with Sarbanes-Oxley Act. Although the Sarbanes-Oxley Act signals a fundamental change in business operations and financial reporting, and places responsibility in corporate financial reporting on the CEO and CFO, the CIO role is noteworthy in management's assessment of internal control under Section 404 and in supporting the financial statement certification process. That, of course, does not diminish CEO's and CFO's responsibilities. Under Section 302 of the Sarbanes-Oxley Act, the CEO and CFO are personally and legally responsible for the effectiveness of internal control over business processes and the related information systems that record, store, and process the results of such processes into financial statements (Cannon, 2005).

The Need for Regulating and Overseeing Businesses and Their Vendors

With regards to several major business scandals which resulted in a precipitous decline of public trust in accounting and reporting practices, on July 30, 2002, President George W. Bush signed into law The Sarbanes-Oxley Act of 2002. A major provision in the Act is that it establishes a new quasi-public agency, the Public Company Accounting Oversight Board, which is charged with overseeing, regulating, inspecting, and disciplining accounting firms in their roles as auditors of public companies. The Act also covers issues such as auditor independence, corporate governance, internal control assessment, and enhanced financial disclosure (AICPA.org, 2002).

Perhaps, the most contentious aspect of Sarbanes-Oxley Act is Section 404, which

requires management and the external auditor to report on the adequacy of the company's internal control over financial reporting. This stipulation is quite costly, since it mandates companies to implement, document and test important financial manual and automated controls all of which requires sometime enormous billable hours by an auditor.

IT department managers at publicly traded companies are well aware of control and compliance issues surrounding the Sarbanes-Oxley Act. Compliance with Sarbanes-Oxley Act refers to all aspect of businesses, domestic and outsourced ones. Public companies that outsource data center responsibilities have to manage their operations and are ultimately responsible for adherence to the same standards as if the operations were conducted in-house. In recent years it has become increasingly popular for companies to outsource many of their business support processes with growing concerns for the potential loss of control and therefore compliance violations. Companies wanting to address this concern while taking advantage of the benefits of outsourcing including cost efficiencies and increased internal focus might consider evaluating outsourced provider in the three critical areas of people, processes and technology; businesses can position itself to not only take advantage of the cost savings of outsourcing, but also ensure that regulatory compliance mandates are met.

Statement on Auditing Standards 70 (SAS 70) Defined

The Statement on Auditing Standards (SAS 70) is an auditing standard created by the American Institute of Certified Public Accountants (AICPA) that is utilized among publicly traded organizations to certify that they have put internal security controls in place to protect sensitive information. A SAS 70 examination signifies that a service organization has had its control objectives and control activities examined by an independent auditing firm which should provide reasonable assurance that the controls are functioning in a manner consistent with stated policies, and are in compliance with applicable laws and

regulations. It is a guide that allows service organizations a means of disclosing their controls to user organizations which represent reasonable assurance of compliance with regulations and provide a degree of confidence in the service provider's ability to conduct business securely.

A SAS 70 audit is intended to assist service/user organizations and their auditors by describing illustrative control objectives and controls that service organizations may have in place. When such controls are present and operating effectively, they may enable auditors of user organizations to assess their control risk which is affected by the service organization(s). This and other ancillary audits are gaining recognition in the corporate world largely due to the Sarbanes-Oxley (SOX) Act passed in 2002. This legislation was designed to restore investor confidence following several highly publicized corporate financial scandals ranging from bankruptcies to internal control breakdowns. "Overall, the SAS 70 is a demonstration of both the legal and business commitment to greater levels of reliability, availability and security" (Cronin, 2007).

In today's quick paced economy, it is necessary to assure a business of the security and integrity of their data particularly when outsourced to a third party organization. The SAS 70 audit is an internationally recognized auditing standard that provides reasonable assurance by examining, documenting, and preferably testing internal controls within service organizations. Companies that execute and maintain accountability of transactions that impacts the user organization financial reporting are candidates for the SAS 70. Outsourcing of services is a viable alternative to many organizations because of its cost savings and gained expertise in the particular area of interest. The SAS 70 service auditor reports are used by user organizations, customers, prospective customers, and financiers to gain an understanding of the control environment of outsourcing companies.

A user organization is a company that seeks outsourcing services by a third party that directly impacts financial reporting controls. They have responsibility and accountability by

the Sarbanes-Oxley Act, for designing and evaluating internal security controls between the two organizations to ensure they meet the desired objectives. A key factor in determining if a user organization is effected by the new legislation is if they are required under the General Accepted Accounting Principles (GAAP) to include transactions processed by the service provider in their own financial statements (Deloitte, 2007). The SAS 70 is the accepted format under the Securities Exchange Committee (SEC) regulations for a user organization to analyze controls put in place by the service organization to ensure that there are controls in place, and they are working appropriately. The SAS 70 "has long provided the financial auditors of user organizations a standard by which they can understand the design and effectiveness of service organization controls and design tests of user organization control" (Deloitte, 2007).

Statement on Auditing Standards 70 (SAS 70) Reports

SAS 70 is a guide that allows service organizations to disclose their control activities and processes to their customers and their customers' auditors in a uniform reporting format. A formal report including the auditor's opinion, called a service auditor's report, is issued to the service organization at the conclusion of a SAS 70 examination. This report is an auditor to auditor communication between the service and user organization.

There are two different types of reports that are a result of a SAS 70 audit, a Type I and a Type II report. A Type I service auditor's report includes the service auditor's attestation of the fairness of the presentation of the service organization's description of controls that had been placed in operation and the suitability of the design of the controls to achieve the specified objectives (SAS70.com, 2007).

A Type I audit concentrates on the controls that are in place at a specific date in time and does not include testing the effectiveness of the controls in place. The depth of this audit is very limited, as it states

the presentation and design of controls in place in terms of their ability to meet defined control objectives, but does not test its effectiveness. These reports occur over a one day period so they have limited value to a user organization. A Type II service auditor's report is the most thorough report of a SAS 70 audit because it contains a description of the controls in place, and also includes a description of the auditor's tests of control effectiveness for a minimum of a six month period. The Type II examination of the SAS 70 begins the same as Type I, but goes a step further into testing and observing. Type II analyzes the controls and also observes them in action rather than the Type I that just describes the controls in place. The Type II service auditor's report will state "whether the controls that were tested were operating with sufficient effectiveness to provide reasonable, but not absolute, assurance that the control objectives were achieved during the period specified" (SAS70.com, 2007). A Type II service auditor's report is more common and also the preferred choice of SAS 70 because it is a more in depth analysis of not only what controls are in place, but how effective those controls are to meet the desired objectives.

Types of SAS 70 Reports for Web Hosting Companies

SAS 70 reports represent an increasingly popular way for Web Hosting providers and outsourcing service firms to calm their client or user organization's financial responsibility and compliance concerns. There are two types of SAS audits, both of which offer a report as the most essential product. Type I audit also referred to as a "Report on Controls Placed in Operation" and Type II audit also referred to as a "Report on Controls Placed in Operation and Tests of Operating Effectiveness" (AICPA.org, 2007). Type I audit includes: a description of detailed controls, whether the specified controls are suitably designed to achieve broader control objectives, whether the specified controls had been placed in operation as of a specific date and an auditor's opinion attesting to the information in the report, but containing a specific disclaimer of

opinion on the operating effectiveness of the controls.

The Type II audit goes a step beyond the Type I report. In a Type II audit, the service provider's controls are tested over a six-month period of time to determine if they are in fact operating effectively. A Type II report includes the same assessment as a Type I report, while also including a thorough description of the tests applied and their results.

Service provider can, by their own choice, request either one of the reports. However it is important to understand that if service providers elect to obtain only Type I audit, which lacks the level of due diligence offered by a Type II audit as well as does not state whether the controls described by the service provider are operating effectively, the user organization's auditors cannot be reasonably assured that the service provider's control mechanisms actually work.

SAS 70 has grown in significance in recent years as companies strive to comply with heightened regulatory requirements. Federal legislation enacted in the wake of corporate accounting scandals and by public concern over the security and privacy of personal information has delineated new rules for the handling and reporting of data. The Health Insurance Portability and Accountability Act of 1996, the Gramm-Leach-Bliley Act of 1999, and particularly the Sarbanes-Oxley Act are examples of legislation that have had a strong impact on companies' auditing in addition, the popularity of outsourcing among today's businesses further drives the need for SAS 70 auditing (SAS 70.com). According to an article written by Christopher L. Schellman, co-founder of SAS 70 Solutions,

"Many public companies, as part of their respective efforts to achieve compliance under Section 404, discovered that certain financial reporting controls that they relied upon were actually maintained by outsourced third-party service providers." (Schellman 2005)

That is to say, to be considered compliant a company must verify that its service

provider's controls, in addition to its own, are effective.

Compliance with Sarbanes-Oxley Act can become quite expensive. A survey conducted by Financial Executive International in 2004 found that the average cost of compliance in the first year with Section 404 was over \$3 million. Although SAS 70 auditing can potentially help reduce costs by eliminating the need to send or use internal company auditors to assess rather service providers can provide auditors with a copy of their service providers' SAS 70 audit reports (FEI 2004). By successfully completing a SAS 70 audit, service providers can offer customers a valuable tool for planning and streamlining the audit of their financial statements.

From the business perspective, having a SAS 70 audit completed signifies a commitment to quality by providing information about the internal controls and security practices of the service organization.

The Sarbanes-Oxley Act

The Sarbanes-Oxley Act of 2002 is responsible for the increased presence of a SAS 70 in the business climate. Its purpose is to protect the public and investors by improving the reliability and accuracy of corporate disclosures. This legislation was enacted as a direct result over public concern about the security and privacy of personal information and the misrepresentation of financial information by large corporations.

The SAS 70 audit is now becoming an industry standard on what is expected from organizations as it relates to internal controls in compliance with Sarbanes-Oxley. The Act regulated several areas in the business setting for publicly traded companies; an independent auditor must review the companies' financial information, it requires that public companies must evaluate and openly disclose their financial statements, management must report annually on the effectiveness of internal controls, CEO's and CFO's must certify and be held personally responsible for the integrity of financial reports, and added criminal and civil penalties for violations of the law dealing with securities fraud (tech-faq.com, 2007). In

addition to these new mandates for publicly traded companies, the Public Company Accounting Oversight Board (PCAOB) was established, whose role is to oversee auditors of public companies and pressure them to become and remain compliant with regulations to ultimately help protect investors by ensuring a fair and independent audit process.

One of the most important and widely recognized sections of the Act is Section 404, as it relates to the SAS 70. It compels publicly traded companies to expand the use of SAS 70 to ensure the accuracy and effectiveness of the internal controls over financial reporting. Section 404 is responsible for holding CEO's and CFO's personally liable for the effectiveness of internal controls. The responsibility extends to controls in place at service organizations, forcing the CEO's and CFO's to analyze that the controls are functioning adequately as originally intended. The SEC has interpreted Section 404 as follows "In situations where management has outsourced certain functions to third party service providers, management maintains a responsibility to assess the controls over the outsourced operations" (Deloitte, 2007). The SAS 70 audit is designated by the SEC as an acceptable method for management to review the security controls in place for service organizations. As a result, SAS 70 is a preferred method to provide user organizations with the necessary information on internal security among service organizations. Section 404 encourages publicly traded companies and service organizations to expand the use of SAS 70 audits to remain compliant with new regulations and holds management responsible for financial reporting misrepresentation. The Sarbanes-Oxley Act has required organizations to comprehensively analyze important security controls in place to ensure accurate reporting, or face civil and criminal penalties as a consequence.

Sarbanes-Oxley Business Implications and Requirements: An Organizational Communication Agent

While there is a clear need to have legislation present, the downside is that there

has to be changes implemented and new systems created to comply with the new reporting and financial control requirements which are very costly. Publicly traded companies must in some cases undergo extensive changes in how earnings are reported, audit their business and improve process transparency. Public companies are required to change their financial reporting structure in numerous instances, which presumably benefits the investors. Depending on the nature of the business, an audit of this scope could take hundreds, possibly thousands of hours to complete, which is an enormous yet arguably necessary commitment from an organization to ensure thorough audit controls are in place and operational to ensure reasonable effectiveness.

SAS 70 Audit Scope

This audit tends toward being more comprehensive to any other audit simply because of the scope of the audit and the amount of abundant information available in the service auditor's report. The key components of assessing internal control for the SAS 70 audit consists of risk assessment, control environment and activities, information and communication, and monitoring of controls put into place (Nickel, 2007). The analysis of these areas should theoretically allow the auditor to gain a better understanding of the environment and culture of the organization.

The scope of the SAS 70 should be carefully planned and coordinated between the service organization and the user organization to ensure that all areas necessary are covered by the audit. It is essential that the two organizations communicate and coordinate the scope of the audit to be effective. Because of the unique nature of what information is generally covered in a SAS 70 audit there should be procedures, policies, and controls in place to monitor what the scope and outcome of the audit. This audit is specialized and can be a time consuming process, consequently, the entire organization normally does not go through the audit. Auditing the entire organization is not feasible given the amount

of detail required and the scope of the audit. Instead, the identified areas that are being used to outsource activities related to the user organization are usually candidates for auditing. By mandate only a Certified Public Accountant (CPA) or an accounting firm is authorized to conduct a SAS 70 and issue a service auditor's report which is largely an IT audit report.

Advantages to Service Organizations

Although SAS 70 will increase a service organizations costs and responsibilities, it is an indicator of assurance that the company has reasonably effective controls over its operations.

“A SAS 70 demonstrates that the infrastructure, applications and processes have passed rigorous, independent third party testing and have an environment that incorporates the processes and controls that are necessary for effectively hosting and/or exchanging corporate data and financial information” (Cronin, 2007).

This audit can build trust with existing customers, as well as attract new customers, because it portrays a company committed to quality improvement. Another positive attribute to the audit is that it will help the organization identify internal controls weaknesses and/or breaches. The SAS 70 process will allow the organization time (usually 6 months) to evaluate what security controls they have put in place and if they are in fact effective. When a service organization has committed the resources necessary to obtain a SAS 70 audit it is typically not necessary to repeat that process for other user organizations or clients, resulting in cost savings. Service organizations and service providers required by law to demonstrate that they have adequate controls when they obtain and process data belonging to their customers are using SAS 70 audits to satisfy such requirements. The SAS 70 is a useful tool to help communicate to customers that the necessary steps have been taken to implement and test security controls which are requisites to protecting and reporting accurate information.

Advantages to the User Organization

While there are many advantages to the service organization, a SAS 70 ultimately will benefit the user organization because they will gain a greater understanding of the service organizations internal controls. The service auditor's report is chock-full of information describing the service organizations specific controls, and in the case of a Type II audit, whether these controls are effective. SAS 70 reports are a useful tool for the user organizations' auditors when planning financial statements (www.tech-faq.com, 2007). Given this benefit, it is no longer necessary for the user organization to send their own auditors into the service organization since the service provider has already undergone a SAS 70 audit by an independent auditor. The service organization has taken the first steps in helping the user organization make a decision to use their services because they have taken proactive steps in implementing and testing their internal controls. Most importantly, user organizations are able to gain valuable understanding and assurance of the internal controls in place to protect its information and data.

SAS 70 As A Marketing Tool

Although there are some widely criticized shortcomings in the SAS 70 audit process, it still holds some measure of credibility in the business culture. The audit can put one company at an advantage over another, as evidence of that, some organizations incorporate the overview section of their SAS 70 directly into their marketing material. The ability to provide a SAS 70 report has become a marketing tool to some organizations because it signals an organization committed to quality by implementing and maintaining internal security controls. A SAS 70 represents to some extent a measure of assurance that a service organization is committed to illustrate their services is consistent, safe, and reliable and that they are compliant with the emerging regulatory mandates (Cronin, 2007).

SAS 70 symbolizes that the organization has taken the time and resources necessary to analyze the security controls to reduce the likelihood of financial loss or corruption of secure information, which user organizations expect from a service provider. In fact, with the growth from the Sarbanes-Oxley Act, user organizations are now expecting service organizations to provide them with a service auditor's report that attest to the reasonable assurance of their IT security controls. Some companies have effectively used their SAS 70 report as marketing tool to suggest the organization has implemented security controls and have tested the reliability and effectiveness of which those controls were designed to operate. Often such marketing tactics may suggest a good-housekeeping-seal-of approval, although a user organization should not assume that an unqualified opinion is synonymous with effective controls; it is the responsibility of the user organization to determine whether the controls were suitably designed to achieve specified control objectives.

SAS 70 Criticisms

A SAS 70 audit arguably holds various advantages both for the service organization as well as the user organization, but there are some flaws to the audit that is gaining attention and criticism for being an outdated audit. There are some fundamental problems that many believe need to be addressed to encourage consistency among a SAS 70 audit. One potential problem that the audit has is that there is no predetermined set of standards that the audit must have which result in inconsistencies or allow an auditor to omit information that might be of importance. SAS 70 audits is not a standardized checklist of items that must audited, therefore one service auditor's report of an organization could be completely different if another auditor conducted the same audit. This leaves room for human judgment and error(s) which could potentially give a service and user organizations a false sense of security that the internal controls is effective. A Type II audit goes into tremendous detail, but it does not

guarantee absolute compliance with Sarbanes-Oxley only reasonable assurance.

Moreover the timing of the audit could lead to potential problems if the service organization and the user organizations' reporting period differ. If the audit is conducted in June and the user organizations' fiscal year ends in December, there is potentially a period of 6 months that is not accounted for. If the controls are lax in that time frame, it could compromise the accuracy and reliability of the financial statements of the user organization (Schneider, 2004). Yet another potential problem of the audit is only a CPA or an accounting firm is permitted to conduct the audit, which arguably, accountants educational training usually lacks the use of technology involved in security controls. Understanding how outsourcing services use of technology may affect user organizations' financial statements is an integral part of security controls audit.

Another concern centers on how much of the audit is required to be revealed. The service organization is only required to report the failures of the SAS 70 test and does not have to include the scope that the audit covered, which could lead to potential problems for the user organization (Schneider, 2004). All of which brings into question how to ensure the SAS 70 audit will serve the needs to both the user and service organizations.

SAS 70 IT Auditing and Organizational Change

A conceptual model provides a theoretical foundation for a study and guides research toward critical questions (Van De Ven, 1989). The Conceptual Model (Figure One) synthesizes recent organizational change literature to include ideas from the rational, learning, and cognitive theories on organizational change (Rajagopalan & Spreitzer, 1997). The model illustrates the dynamic interplay of endogenous, exogenous, managerial, and learning factors inherent in the organizational change process. The model acknowledges the direct effects of the environment and organization on changes in

strategy; recognizes that changes in the content of strategy must match the requirements of a firm's environmental and organizational contexts in order to be successful; acknowledges the crucial role played by managerial actions in creating an environmental and organizational context conducive to a firm's strategies; depicts managerial learning as a continuous reshaping of managerial cognition that develops as outcomes from changes in strategy begin to emerge; and, acknowledges that changes in the content of strategy result from both variations in contextual conditions and from variations in managerial cognition and actions (ibid.)

Employing an organizational change model to study the audit process from an information security perspective is appropriate because while corporate IS security models have historically emphasized the role of management in setting, maintaining, and implementing security policies, procedures, and standards, businesses are also developing organizational structures and operational procedures surrounding technologies (Segev et al., 1998). This has included setting up basic safeguards such as insurance, audits, system application controls, physical protection systems and surveillance devices as well as developing contingency and disaster recovery procedures. In a recent case study of Bank of America an employee noted, "the key to security ... lies not with the technology, but with the organization itself" (ibid. p. 85).

The first step in this research was to integrate information security and privacy issues found during the SAS 70 engagement into the conceptual model. These constructs capture an organization's external and internal information security environments, manager's perceptions about information security, changes to organizational processes resulting from increased security concerns, and organizational outcomes resulting from IT security initiatives. The research began by performing a qualitative content analysis of the existing literature. The literature review took the form of first noting the ideas of consideration in each research paper or article then organizing these topics into the related constructs (Detert et al., 2000).

To validate the classification of issues discussed in extant literature and to ensure no important information security issues was omitted; interviews will be conducted with several information security senior executives directly responsible for the information security strategies of their organization. The initial organization of topics will be presented to each interviewee in separate one-hour meetings and their feedback will be used to further refine the research. Table 1 summarizes the findings. Particular emphasis will be given to those issues specifically applicable to web hosting services.

Proposed Questions for Future Research

A number of interesting research questions emerge from this conceptual analysis. Sarbanes-Oxley legislation is an excellent example of current legislation mandating organizational change. The author believes that a proactive information security strategy would provide substantial positive benefits. The first proposed research question explores this idea: *What are the advantages and disadvantages of having a proactive (internally driven) versus reactive (externally driven) strategic approach to the information security issues related to SAS 70 audits?*

Second, based on audit interviews management is concerned with the negative consequences of security breaches, but that security issues are considered secondarily, which exposes the organization to considerable risk. The second research question is: *How can executive awareness of security issues and best practices related to SAS 70 audits be raised and how can security personnel better communicate the level of threats?*

Third, while discussing security implementations, the management indicated that they encounter substantial resistance among organizational members. Executives often demand to be excluded from even simple security measures like having to regularly change their passwords and others within the organization find ways to circumvent controls. For those trying to successfully protect information assets this is very frustrating

because even though they are held responsible for systems security, they usually have little direct authority to enforce security policies. The third research question addresses this issue by asking: *What are the characteristics of an organization's culture that must be adhered to in order to establish and maintain successful governance of its information security strategies related to requisite organizational change needed to address SAS70 audit results?*

Conclusion and Suggested Methodology

To investigate the research questions posed, the author suggest using a case study approach of a web hosting service provider in the throes of a SAS 70 audit; culled information observed, recorded and analyzed for stages of patterns in relation to internal and external influences. This case study will involve unstructured interviews and ethnographic methodology (meaning the subject is allowed to express themselves in their own words).

Examining the implications of a SAS 70 audit from this perspective accommodates people's situated use of technologies making no assumptions about the stability, predictability, or suggested changes needed to address audit findings. This study of information security controls employed by web hosting services providers and evaluated via the SAS 70 audit process is important because "...As corporations continue to cede control over their IT applications and networks to vendors and other third parties, the threats they face will proliferate. They need to prepare themselves for technical glitches, outages, and security breaches, shifting their attention from opportunities to vulnerabilities" (Carr, 2003). Perhaps the requisite benefit of a SAS 70 audit is not fully realized without adequate commensurate organizational change. Further the SAS 70 process is a tool which focuses attention on risks and vulnerabilities encountered by end-users when using technologies as they were designed, they also can and do circumvent inscribed ways of using the technologies – either ignoring certain properties of the

technology, working around them, or inventing new ones that may go beyond or even contradict designers' expectations and inscriptions (Orlikowski, 2000).

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Figure 1: Conceptual Model

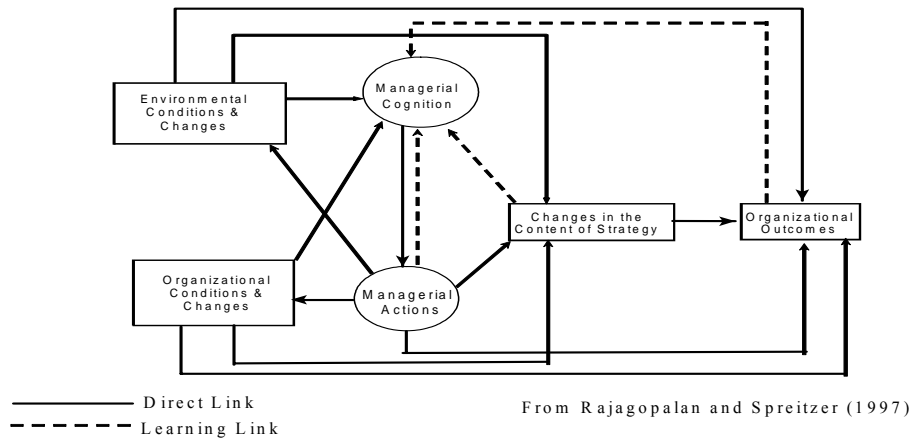


Table 1: Information Security/Privacy Concerns

CONSTRUCT	IDEAS ABOUT INFORMATION SECURITY
Environmental Conditions & Changes	<p>Current and pending legislation</p> <ul style="list-style-type: none"> • Sarbanes-Oxley Act • Gramm-Leach-Bliley Act of 1999 • Health Insurance Portability and Accountability Act (HIPAA) • U.S. Patriot Act of 2001 • Corporate Information Security Act of 2003 • Children’s Online Privacy Protection Act • Identity Theft Prevention Act • Privacy Act of 2003 • Federal Information Security Act of 2002 • Other International, Federal, State, and Local laws/regulations <p>Technology vulnerabilities</p> <ul style="list-style-type: none"> • Generally inadequate technology standards for secure computing • Wi-Fi protocol security flaws (Housley & Arbaugh, 2003; Schmitt & Townsend, 2003) & Wireless Equivalent Privacy (WEP) vulnerabilities (Cam-Winget et al., 2003) • Information systems threats (Hulme, 2004) • Viruses, trojans, worms, denial-of-service attacks • Unauthorized data access/disclosure • Electronic criminal acts (Sullivan, 2004) • Identify theft/internet fraud/Phishing • Other fraudulent schemes • Other employee criminal acts
Organizational Conditions & Changes	<p>Secure distributed corporate data</p> <ul style="list-style-type: none"> • Across supplier/outsourced networks • Across N-Tier & remote networks such as mobile computing <p>Data assurance</p> <ul style="list-style-type: none"> • Internal security controls/audit requirements • Enforcement of Human Resource and other company policies • Organizational Culture • Internal Software Vulnerabilities • Software bugs/errors/omissions/back doors

<p>Managerial Cognition</p>	<p>Current Managerial Concerns (Melymuka, 2003)</p> <ul style="list-style-type: none"> • Economic growth, profit margins, and competitive threats • Supplier/customer relations • Legal penalties • Shareholder concerns <p>Perceived Security Priorities for the Future (InformationWeek, 2003)</p> <ul style="list-style-type: none"> • Raise user awareness of policy and procedures • Train/retrain/attract qualified staff • Security review and assessment • Data ownership and classification standards • Incident response teams
<p>Managerial Actions</p>	<p>Managerial oversight (Segev et al, 1998)</p> <ul style="list-style-type: none"> • Setting, maintaining, and implementing security policies, procedures, and standards • Increased hiring of certified security professionals • Increased training <p>Installation of security hardware & software (CSO, 2004)</p> <ul style="list-style-type: none"> • Biometrics/smart cards/other access controls • Firewall applications/VPNs/ intrusion detection and prevention systems • Certificate authorities/encryption • Secure e-mail/web filtering/enterprise security management <p>Acquisition of security services (CSO, 2004)</p> <ul style="list-style-type: none"> • Consulting/managed security services • Digital forensics/disaster recovery/business continuity • Penetration testing and other outside audit services <p>Installation of physical security devices (CSO, 2004)</p> <ul style="list-style-type: none"> • Integrated systems/monitoring equipment • Alarms, burglar/fire electronic, CCTV & surveillance systems • Perimeter security/Access Controls <p>Other managerial actions</p> <ul style="list-style-type: none"> • Wireless/mobile security
<p>Changes in the Content of Strategy</p>	<p>Risk Management (Segev et al., 1998)</p> <ul style="list-style-type: none"> • Contingency/disaster recovery plans • Continuity plans • Insurance/Audits <p>Development of new business units</p> <ul style="list-style-type: none"> • Centralized IT Security Council (Fisher, 2004) <p>New business groups (Segev et al., 1998)</p>

Organizational Outcomes	Customer Retention (Culnan & Armstrong, 1999) Loss Prevention <ul style="list-style-type: none">• Reduce unauthorized access/service attacks• Reduce loss of data/unauthorized disclosure• Improve data accuracy• Litigation avoidance Improved Business Processes (Fonseca & McCarthy, 2003) Public Perception
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Notes

INTEGRATING MULTI-MEDIA TECHNOLOGY INTO BUSINESS COURSES

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Abstract

As technology continues to change the way that people work and play, it has challenged institutions of higher education to redesign the delivery course methods for their students. The course content taught in the classroom, the tools used to deliver the course content and to enhance learning and the ways in which courses are delivered have changed. Camtasia Studio software has allowed the instructors to become more involved in the “teaching” of Distance courses.

“For the first time since beginning to teach Internet course I feel like a real teacher again” (Creighton, 2007)

Purpose

The purpose of this paper is to share some new technology and techniques we have used over the past year to enhance our delivery of course content and engage our students in the learning process.

Introduction

Technology continues to effect education at many levels. It tends to change the content of what is taught in the classroom changes, the tools used to deliver learning changes and the course delivery methods changes. As the old saying goes “the only constant is change”.

Many colleges and universities are offering courses and in some cases complete degrees via the Internet. There is resistance by colleges and departments to convert traditional face-to-face courses to be offered via the Internet.

In 1998 the administration requested that each college and department begin developing

Internet and other distance learning courses. The College of Business at Northwestern State University began teaching Internet courses in the spring 1999 semester with BUAD 1800, Microcomputer Applications I (now CIS 1800). Since that time the COB has continually developed more and more courses and is currently offering an average of 12 courses and 23 sections each semester using the Internet. For the fall 2006 and spring 2007 semesters, NSU had an average of 397 sections, 217 different courses, an average enrollment of 8,502 and 1,687 students using this technology. (D. Williams, personal communication, September 7, 2007)

The Office of Electronic and Continuing Education provides assistance to faculty members in their redesign of course materials for electronic delivery or other types of distance learning delivery. Its seeks “to provide access to all student who seek an educational experience through traditional and non-traditional methods of teaching.” (Northwestern State University of Louisiana, 2007, p. 120)

Development and Implementation

How can we produce a course that is not considered to be a correspondence course? For several semesters the COB faculty members have struggled with the concerns of converting a face-to-face course into an electronically delivered course? How can we maintain the integrity of the course and provide a quality learning experience to the students? In January of 2007 we participated in a professional development seminar titled “Engaging Students in Technology” by Corinne Hoisington. The presenter used Camtasia to create her presentation for our seminar. The

faculty members were very excited about using this software to enhance their face-to-face course delivery as well as their Internet course delivery. In March of 2007 we decided to purchase 20 licenses for the software, Camtasia. Thus we embarked upon our journey of using Camtasia to develop a variety of slide shows to use in CIS 1800, Microcomputer Application I, and BUAD 4800, Microcomputer Applications II, to help improve the quality of learning in these classes.

In the CIS 1800 class we have developed the following videos for students to use whether they are Internet or traditional face-to-face students.

Word	Excel	PowerPoint
Word Hints	Estimated Income demo	Introduction to PowerPoint
Modified Block Letter	Estimated Income with Charts	10 Rules of PowerPoint
Block Style Letter	Linking & Special Formulas	Multimedia
Leftbound Report	If Statement demo	
Newsletter	Absoluter References	
Tables		
How to Make Flyers		

Camtasia Studio was originally developed in the late 1980's and has gone through many changes. It currently requires at least Windows 2000, Windows XP or Vista, DirectX 9 or later, 2.5 GHz processor minimum, at least 500 MB RAM, Windows-compatible sound card, microphone and speakers, 60MB HD space for installation. We recommend the latest processor possible and 2 GB Ram. Users will need a video player such as Microsoft's Widows Media Player or Real Player.

Example 1 is the typical start up screen to create the type of lessons and demonstrations the training videos the authors have been using. The top choice is for actually producing

a video demonstration of some lesson, i.e. working through an Excel problem or discussing a Block Style letter. The second choice works well with PowerPoint, turning the finished product into a video that can be played on just about any computer. While both of these choices will need a compatible payer and speakers, the audience (students) don't even have to have PowerPoint or demonstration software to view the videos.

The following are examples of various uses developed and implemented in the past few semesters, including the fall 2007 semester.

Example 2 is the Blackboard view of the first Excel assignment for the microcomputer class.

Example 3 is a screen shot of the Introduction to Excel video. This video covers the worksheet step by step for the students. This ability to demonstrate each step, especially formulas, has reduced the number of questions/email from the Internet students.

Notice the control buttons at the bottom left of Example 3. Students can play the video simultaneously while working the problem in Excel. They can back up, fast forward, that is, view the demonstration at their own pace.

The only major problem that developed in the fall 2007 Internet courses using these instructional videos was that about 20% of the students had difficulty in playing the videos on their home computers. Several were able to download Codecs to fix the problem, but some (including one author) using the same instructions were never able to view the videos. To remedy this situation, all videos will be available through You Tube.

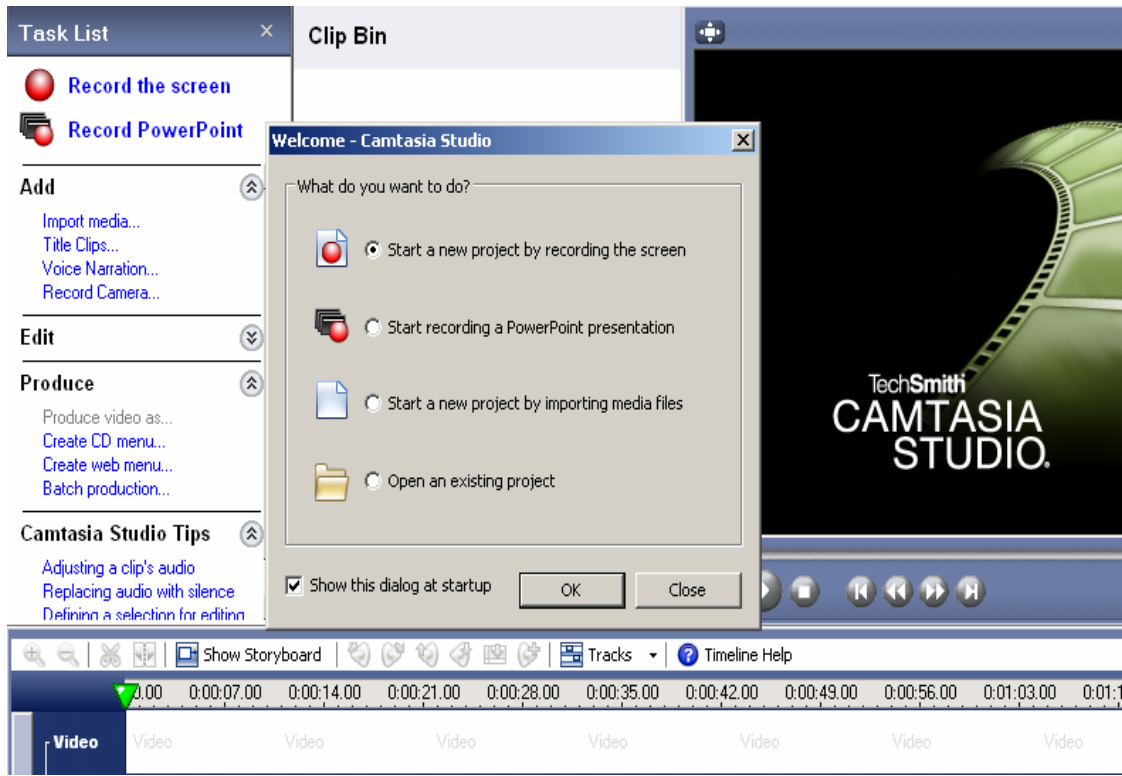
For the spring 2008 semesters, the authors will explore the possibility of making the videos Ipod compatible.

Future research should be conducted on comparing the different methods on delivering the training videos. That is, comparing regular video to Ipod and/or You Tube presentations.

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University Catalog, Northwestern State University, Volume LXXXXI, 2006-2007, p. 120.

Example 1 – Camtasia Studio Start-Up Screen



Example 2: Blackboard View of Excel Assignment 1.

Notice number 1 on the list: Introduction slide video. Students click on the link to the video “Estimated Income Excel 2007 demo.wmv” to view training video. See Example 3.

Excel Assignment 1

Item Folder External Link Course Link Test Select:

1 Introduction slide video
[Estimated Income Excel 2007 demo.wmv](#) (6.77 Mb)
Watch this slide first! You need speakers!

2 Excel Assignment 1 - Income Statement (Data)
[Estimated Income Statement 200x.xlsx](#) (9.199 kb)

The following exercise is located on p. 13 - 18 in the Purple workbook. You can load in the attached file [Estimated Income Statement 200x](#) first to begin the work. It is highly recommended that you play the video "Estimated Income Statement 2007 demo.wmb " and follow along. You can stop the video and then resume as you keep up with the activities. Using File Save As, save the file to your drive as Lastname Firstname Estimated Income Statement 2007.

3 Excel Assignment 1 - Income Statement (Submission)

When you complete the LF Estimated Income Statement 2007 , put it here!

>> [View/Complete Assignment: Excel Assignment 1 - Income Statement \(Submission\)](#)

4 Chart Video Demo
[Chart demo for Estimated Income 2007.wmv](#) (5.388 Mb)
Run this video while completing the charts from the purple book.

Example 3 – Screen shot of Introduction to Excel training video.

Notice the control buttons at the bottom left of the screen shot. Students can play the video simultaneously while working the problem in Excel. They can back up, fast forward, that is, view the training video at their own pace.

The video allows the instructor to type in the various formulas (see ?'s), demonstrate copying cells, demonstrate formatting and any other activity that will complete the spreadsheet.

The screenshot shows an Excel spreadsheet with the following data:

10	SALES:			
11	Mallard	4200	4400	4800
12	Pintail	4000	4500	5000
13	Scaup	1500	2000	1700
14	Teal	0	0	2500
15	Total Sale	?	?	?
16				
17	COGS*(55'	?	?	?
18				
19	NET SALES	?	?	?
20				
21	EXPENSES:			
22	Payroll	2250		
23	Lease	750		
24	G&A	800		
25	Direct	975		
26	Total Expe	?	?	?
27				
28	NET PROF	?	?	?
29				

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Notes

BEST METHODS FOR TEACHING PRINCIPLES OF MANAGEMENT INFORMATION SYSTEMS

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Abstract

Teaching concepts of information system to general business students through a course like Management Information Systems (MIS) can be challenging in today's fast-changing environment of information technology. Such a course must provide, not only an understanding of the development, applications, and management of information systems, but also some experience on these concepts taught in the classroom. The later requires innovative ideas and changing modes of instruction, which might include activities for students such as hands-on practice with common IT tools and technologies, case studies, group projects, and group presentations.

The mode of instruction used in an undergraduate MIS course may not be suitable to that of a graduate course. Graduate students are more likely to have experience working in workgroups within organizations and are more likely to have some experience participating in system development activities than undergraduates. Graduate students are likely to participate in system development activities sooner after graduation than undergraduates. Graduate students have a more immediate need to learn about system development activities and a less immediate need to learn about information processing tools which are covered at the undergraduate and pre-college level.

This paper focuses on finding a suitable mode of instruction for a graduate-level MIS course that would provide necessary knowledge to future managers in a changing IT environment. Our results, based on an in-class survey of students towards completing such a course, show strong preferences towards learning MIS concepts, integrated case studies, and systems development methodologies and low preference towards learning basic Office productivity tools.

Introduction

Management Information Systems (MIS) is a course that is commonly taught in a business school, to provide an understanding of general concepts of information systems (IS), both to undergraduate and graduate students. The course provides an overview of IS hardware and software as well as important concepts and issues related to development and management of business information systems. In most cases, the contents taught from a typical textbook do not stimulate students' interests, and typically students are required to engage in activities that supplement the concepts outlined in the textbooks. However, how the course should be taught in the graduate level as compared to the undergraduate level, is still a debatable issue.

Typically in an undergraduate course, the text is supplemented with few Microsoft Office productivity tools such as Excel, Access, and PowerPoint. However, use of these tools in the graduate level may not be appropriate, as most graduate students typically have significant experience in using

these tools. We have tried several different approaches of teaching the graduate-level MIS course using supplements such as case projects, Office tools, group projects, and group presentations.

Literature Review

The contents and methods of teaching a fundamental course on MIS has been an issue of research for many years. Benbasat, et. al [1] outlines the results of a study which analyzes skills perceived as useful by information systems (IS) managers and systems analysts in IS organizations of different levels of maturity. These IS skills were examined under two major subgroups of generalist/managerial and specialist/technical skills as well as under more detailed categories of organizations, people, society, systems, computers, and models skills. Based on they findings, they made recommendations concerning graduate IS curriculum. Leidner and Jarvenpaa [2] contend that fundamental changes to the teaching and learning process such as mapping of technologies to learning models is necessary to transform the educational environment and processes of management programs.

Alavi, et. al [3] describes the design and delivery of a graduate-level course in management at two universities via advanced information technology, which was used to enable collaborative learning, teaching with transcontinental student teams and multiple instructors, and integration of external expertise. This partnership enriched student learning and expedited faculty and institutional development.

Chan, et. al [4] suggest that due to increasing importance of Web-based solutions, pedagogical challenges exist in MIS programs regarding the development of student knowledge and skills in Human-computer interaction (HCI) as well as tools and technologies needed for the development of information systems. Chetan, et. al [5] used videoconferencing technology in a large MIS class where, traditionally, lecture had been used. Even though 85% of the students who participated in the classes were non-MIS

majors, students in the videoconferencing section perceived it to be more useful, challenging, attractive, and clear compared to where it was not used. Money [6] argued that people learn from a variety of experiences and from the observation of the actions of others. He used social cognitive learning theory to explain what should be the structure of an MIS educational experience, and applied a group support system (GSS) in an MIS classroom to experience the methods of systems analysis and design.

Hackney [7] suggested the use of cases as a teaching tool in IS education. Cases can allow students to develop high-order reasoning skills, bring real world examples into the classroom, allow students to learn by doing, bring organizational impacts, social values, and ethical issues to the forefront of discussion, and include realistic content, objectives and knowledge transfer. Foltz, et. al [8] even proposed to have a uniform guideline for the objectives and the topics to be included in a MIS course, which is commonly taught in a business school.

Ratings of MIS Concepts, Integrated Case and Office Tools

To gain an understanding of which approach is most suitable for developing appropriate knowledge for the graduate students, we have performed a survey towards the completion of such a course. In the survey, students were asked to rate their experience on various modes of teaching that are used in the course. The survey, which is included as Appendix A, was given to 36 graduate students in an MIS Principles course. Students were asked to rate different learning models using a 0 to 10 scale. The interpretation of the different ratings is given below.

Rating Scale

- 0 Totally Unimportant — should be completely ignored
- 1 Extremely Unimportant — a definite waste of time
- 2 Very Unimportant — probably a waste of time

- 3 Unimportant — perhaps a waste of time
- 4 Of Little Importance — contributes very little or not at all
- 5 Neutral — doesn't matter if included or not
- 6 Of Some Importance – might contribute to class
- 7 Important — contributes to success of class
- 8 Very Important — should be included in class
- 9 Extremely Important — one of the most important success factors
- 10 Essential — can not succeed without it

The summary results of the survey are given in Appendix A. The overall average rating for all learning methods was 5.84. Specific interpretations are given below.

Ratings of the Topics Considered

	<u>Mean</u>
Learning MIS Concepts	8.6
Use of Integrated Case	7.2
Overall mean Rating	5.84
Team participation	5.5
Student Presentations	5.0
Learning Office Tools	3.0

The two categories receiving the highest ratings (**Learning MIS Concepts** and **Use of Integrated Case**) were superior to other methods by statistically significant margins. When compared to the overall rating of all categories, **Learning MIS Concepts** had a margin of +2.7 rating points which represented a t score of + 7.16. When compared to the overall rating of all categories, **Use of Integrated Case** had a margin of +1.3 rating points which represented a t score of + 3.51. Since the critical t value for a two-tail test (assuming equal variances) was 1.97, both of these learning methods are statistically superior to the other methods.

The two categories receiving the lowest ratings (**Student Presentations** and **Learning Office Tools**) were rated as inferior to other

methods by statistically significant margins. When compared to the overall rating of all categories, **Student Presentations** had a margin of -.84 rating points which represented a t score of -2.22. When compared to the overall rating of all categories, **Learning Office Tools** had a margin of -2.79 rating points which represented a t score of -7.17. Since the critical t value for a two-tail test (assuming equal variances) was 1.97, both of these learning methods are statistically superior to the other methods.

Ratings Among the Office Tools

Although graduate students give low ratings for Learning Office Tools as an aggregate category, the disdain for Office tools is not uniform. Certain Office tools receive significantly higher rankings than other Office tools. Listed below are the rankings for individual Office tool packages.

	<u>Mean</u>
Access	5.28
Excel	4.53
Project	3.69
Visio	3.03
Rating for Office tools	3.06
Powerpoint	2.92
Outlook	1.58
Word	1.14

The two tools receiving the highest ratings (**Access** and **Excel**) were ranked higher than other methods by statistically significant margins. When compared to the overall Office rating of 3.06, **Access** had a margin of +2.22 rating points which represented a t score of + 6.0. **Excel** had a margin of +1.47 rating points which represented a t score of + 4.0. Since the critical t value for a two-tail test (assuming equal variances) was 1.994, both of these Office tools were judged to be statistically superior to the other Office tools.

The two tools receiving the lowest ratings (**Outlook** and **Word**) were ranked lower than other methods by statistically significant

margins. When compared to the overall Office rating of 3.06, **Outlook** had a margin of -1.47 rating points which represented a t score of - 4.35. **Excel** had a margin of -1.92 rating points which represented a t score of - 5.92. Since the critical t value for a two-tail test (assuming equal variances) was 1.994, both of these Office tools were judged to be statistically inferior to the other Office tools.

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Appendix A—Summary statistics

Ratings of the Topics Considered

	<u>mean</u>	<u>std. dev</u>
MIS Concepts	8.56	1.05
Office Tools	3.06	1.60
Word	1.14	1.10
Excel	4.53	1.48
Access	5.28	1.54
Powerpoint	2.92	1.40
Project	3.69	1.60
Outlook	1.58	1.25
Visio	3.03	1.54
Other	0.61	1.29
Integr. Case	7.17	0.94
Team	5.53	1.05
Presentations	5.00	1.12

Recommended Hours for the Topics Considered

	<u>mean</u>	<u>std. dev</u>
MIS Concepts	25.9	3.62
Office Tools	7.64	4.13
Word	0.36	0.54
Excel	3.25	1.38
Access	3.44	1.59
Powerpoint	0.78	0.96
Project	1.33	1.01
Outlook	0.46	0.59
Visio	0.89	0.67
Other	0.19	0.58
Integr. Case	9.92	2.08
Team	8.06	1.80
Presentations	7.50	1.34

Appendix B

Survey of Topic Preferences in Graduate MIS Course

Rate the importance of learning MIS Concepts using a scale from 0 to 10 (see scale below) and state number of classroom hours that should be spent on learning MIS Concepts.

	Rating	hours
MIS Concepts	_____	_____

Rate the overall importance of learning Office tools (Excel, Access, Project, etc.) using a scale from 0 to 10 (see scale below) and state number of classroom hours that should be spent on office tools.

	Rating	hours
Office tools	_____	_____

Rate the importance of each Office tool from 0 to 10 (see scale at end) And state number of classroom hours should be spent on each.

	Rating	hours
Word	_____	_____
Excel	_____	_____
Access	_____	_____
Powerpoint	_____	_____
Project	_____	_____
Outlook	_____	_____
Visio	_____	_____
Other (_____)	_____	_____

Rate the importance of the integrated case (Pacific Consulting) using a scale from 0 to 10 (see scale at end) and state number of classroom hours that should be spent on working on an integrated case.

	Rating	hours
Integrated Case	_____	_____

Rate the importance of working in an analysis and development team (using a scale from 0 to 10 -- see scale at end) and state number of classroom hours that should be spent on working on teamwork concepts and techniques.

	Rating	Hours
Team Participation	_____	_____

Rate the importance of the student presentations to the class using a scale from 0 to 10 (see scale at end) and state number of classroom hours that should be spent on student presentations to the class.

	Rating	Hours
Student presentations	_____	_____

Rating Scale

- 0 Totally Unimportant -- should be completely ignored
- 1 Extremely Unimportant -- a definite waste of time
- 2 Very Unimportant -- probably a waste of time
- 3 Unimportant -- perhaps a waste of time
- 4 Of Little Importance -- contributes very little or not at all
- 5 Neutral -- doesn't matter if included or not
- 6 Of Some Importance -- might contribute to class
- 7 Important -- contributes to success of class
- 8 Very Important -- should be included in class
- 9 Extremely Important -- one of the most important success factors
- 10 Essential -- can not succeed without it

DETERMINING BEST METHODS FOR DEVELOPING PROGRAMMING COURSES

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Abstract

The best content and structure for teaching programming courses depend on the objectives of the courses, the backgrounds of the students, and the resources available for teaching the courses. Methods for teaching “Fundamentals of Programming” to undergraduate students will not work well for “Advanced Programming” at the graduate level. The methods that work best in a face-to-face environment might not be best in an online environment. The content and structure that work best in a classroom where only the instructor has a computer won’t be the best for teaching in a programming lab environment. This paper describes different practices to teach programming. The paper aims to evaluate different practices for teaching programming in order to find the combination of resources which meets the needs of a particular learning situation.

The authors investigate the use of the *Solver* feature of Microsoft Excel to evaluate strategies for selecting topics to be included in graduate programming courses.

Introduction

Teaching programming is a way to lay the foundation for learning logic and algorithmic thinking. It also encompasses specific skills which can be applied to a variety of jobs in the information technology field. Programming can be taught in different ways. One approach

is to teach programming is through use of mini-languages. Mini-languages consist of small queries, control structures and the commands which help to develop the basic knowledge of programming (Mendelson, Green, & Brna, 1990). Teaching programming using mini-languages help the students to develop the logical approaches which can be applied towards any problem[1].

Another technique to teach programming is through visualization. Concepts are taught using real world examples that the target students can identify with. A full range of multimedia technology including animation, sound and video are used to immerse the student in an environment where learning is fun. The practice of displaying concepts visually reinforces learning. Gaming themes can be used for formative assessment. Students can use game activities such as “spot the error” and “predict the output” to evaluate programming strategies and techniques. These activities enhance thinking skills, help to develop logical thinking and test knowledge and creative skills [2].

Another way to teach programming is through algorithms. Algorithms take problems as inputs and return solutions to the problems, after evaluating a number of possible solutions [4]. Using algorithms makes it easy to visualize entire programs since algorithms are symbolic representations of code. Ultimately, conversion to actual code is required.

Pseudocode is sometimes used as a detailed step in the process of developing a program. It allows designers or lead programmers to express the design in great

detail and provides programmers a detailed template for the next step of writing code in a specific programming language” [5].

A Specific Problem in Developing Programming Courses

The faculty teaching programming courses at University of Houston – Clear Lake wanted to enhance the quality of programming courses offered in the graduate MIS program. The faculty wanted to offer courses which would cover all of the expected topics and also stand out with unique quality.

A very brief survey of topics covered in programming at various universities found that most advanced programming courses begin with very quick reviews of structured programming and object-oriented programming. Specifically, this survey found the following information concerning advanced windows programming courses:

Topics covered	Hours
Programming concepts	6
Object-oriented programming	3
Review of File Handling	3
Graphic User Interfaces	6
XML and/or data structures	3
Database interfaces	3
“Advanced” Topics	6

For advanced Web Programming courses, the survey found the following:

Topics covered	Hours
Object-oriented programming	3
Review of File Handling	3
Basics of Web Programming	6
XML and/or data structures	3
Database interfaces	3
Authentication and Security	6
Storage and memory mgmt.	3
“Advanced” Topics	6

The topics covered in the survey of Windows programming classes account for 30 in-class hours. The topics covered in the survey of web-based programming classes account for 36 in-class hours. In a 15-week

semester with 3 hours of classes per week, there are 45 hours of in-class instruction to allocate. This leaves considerable flexibility in the allocation of class time to various topics.

At the University of Houston – Clear Lake the faculty of our graduate program in Management Information Systems decided to teach our courses at a technical level high enough prepare our students to pass Microsoft certification exams in programming. We chose exam 70-306, which is part of the MCAD/MCSD certification track, as the standard for our Windows-based programming class. For our web-based programming class, we chose exam 70-315, which is also part of the MCAD/MCSD certification track. These exams were chosen because they require a high level of skill, they are externally maintained and managed, they are readily available, and they are recognized and accepted in the information systems community.

Students are not required to take these certification exams. Within our courses, grades are determined by final exams scores and performance on programming projects. Students are encouraged to take the certification exams by certain incentives within the grading system. Points are added to final exam scores for students passing a certification exam while they are taking our graduate courses. By doing this, we are able to encourage students to take certification exams and correlate student performance in the course with performance on the certification exams. We have found significant positive correlation between performance on certification exams and performance within our courses.

In order to select topics for our courses, the faculty determined what is considered as standard material within other graduate programs. We also determined what was required to provide adequate preparation for taking the selected certification exams. Our experiences lead us by trial-and-error to select sequences of topics which satisfied our dual goals of teaching material expected by the academic community and teaching material which is covered on the certification exams we

selected. The method described in this paper represents an attempt, after the fact, to formalize the selection of topics used in our courses. This method can be used by others to achieve their own goals which might be very different from ours.

The information we developed from our survey of what is taught at other universities served as constraints to an optimizing process using the Selector method of the Microsoft Office Excel package. The objective function was constructed to maximize the “Effective Coverage” of topics on the selected certification exams subject to the constraints of meeting the coverage expectations of other universities.

The objective function to be maximized in this project is the weighted average of coverage for topics on the certification exams constrained by meeting expected hours of coverage based on survey of expected topic coverage. A formalized statement of the problem would be:

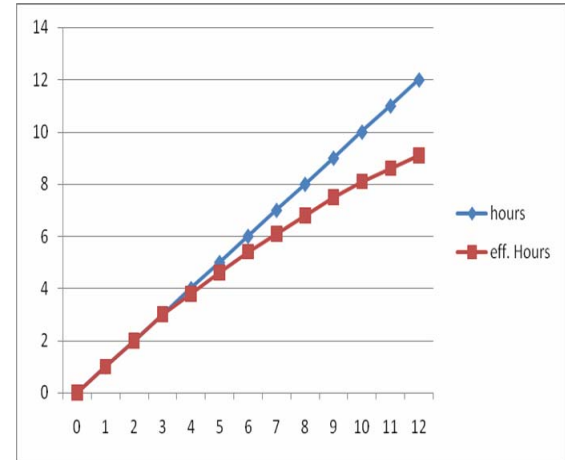
$$\text{Maximize Eff. Coverage} = \sum_i \sum_j c_{ij} * EF(x_i)$$

subject to : $x_i \geq \text{expected coverage}_i$
for all i

where i is the index for topics taught and j is the index for topics used on the relevant certification exam. This function is maximized subject to constraints which assure that the minimum expected coverage will be given.

The objective function components, $EF(x_i)$ are non-linear functions of time spent on topics within the courses. The non-linearity was used to represent diminishing marginal returns for time spent on a particular topic. If organized properly, the initial treatment of a topic should yield high returns of understanding. Once terms are defined and basic principles are explained, students should be able to apply their understanding to follow simple exercises or solve simple problems. Additional information adds to the overall understanding of the topic, but not at the same rate (marginal return) as the initial amount. The chart below shows the relationship

between amount of time spent on a topic and the effectiveness of coverage for that topic.



Eff. Coverage as function of Hours Spent

The first solution to this problem (shown as appendix 1 of this paper) provided justification for the course offerings chosen by the faculty for the Windows-based and web-based advanced programming courses. In addition to the coverage determined by our survey of other graduate MIS programs, we added the following coverage to our Windows-based course.

Topic	Change in Hours
Database applications	from 3 to 6
XML and data structures	from 3 to 6
Interoperability with COM	from 3 to 9
Other Advanced topics	from 0 to 3

This allowed our effective coverage function to increase from 20.6% to 31.6% in our Windows-based course compared to the coverage provided by the “standard” topics from the survey.

In addition to the coverage determined by our survey of other graduate MIS programs, we added the following coverage to our Web-based course.

Topic	Change in Hours
Storage considerations	from 3 to 6
Other Advanced topics	from 0 to 6

This allowed our effective coverage function to increase from 23.4% to 32.2% in our web-based course compared to the coverage provided by the “standard” topics from the survey.

The next problem we looked at was the “cross-over effect” problem. Time spent studying the basics of XML in a Windows-based course should provide some advantage to students who subsequently take the web-based course. Similarly, Studying database applications in a web-based course should provide some advantage to students who subsequently take the windows-based course. We could not count on this cross-over effect because we did not control the sequence in which students took these two courses. We decided that since web-based programming is inherently more difficult than Windows-based programming, we would require our students to take Windows-based programming before they enrolled in web-based programming. This meant that we could count on web-based programming students to have been exposed to all of the material taught in the Windows-based course. This meant that the time we spent on each topic in the web-based course could take advantage of information learned in the Windows-based programming course. That also meant that our goal of preparing students to succeed on externally verified certification exams could be achieved by combining the topics taught in the two courses.

With the cross-over effect in mind, we resolved the problem of maximizing “effective coverage” giving partial credit for coverage in the web-based course for learning achieved in the pre-requisite Windows-based course. This solution is shown as Appendix 2 of this paper.

The second solution which recognized cross-over learning from the pre-requisite Windows-based course to the subsequent web-based course resulting in the following changes:

Windows-based course

Topic	Change in Hours
Object-oriented programming	from 3 to 6
XML and data structures	from 6 to 3

Web-based course

Topic	Change in Hours
Database applications	from 3 to 6
Storage considerations	from 6 to 3

Although these changes did not seem immediately significant, the overall value of effective coverage increased from 31.9% to 40.1%. Much of this increase was due to a recognition that if everyone has taken the same pre-requisite course, part of the content taught in that course can be credited toward topic coverage of subsequent courses. It is worth noting that the percentage of students passing certification exams has risen from approximately 40% before enforcing the pre-requisite course to over 50 % after the enforcing of the pre-requisite course.

Conclusions

The best content and structure for teaching programming courses depend on the objectives of the courses, the backgrounds of the students, and the resources available for teaching the courses. The authors were able to formulate the problem of determining course content as an optimization problem and use the *Solver* feature of Microsoft Excel to find solutions to this problem. The solutions indicated a potential improvement in effective coverage of topics covered on Microsoft certification exams from 32% effective coverage to 40% effective coverage. This increase in effective coverage correlates with an increase in passing rates from approximately 40% to over 50% after making a change in our curriculum.

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- 3 Learning Programming Using Program Visualization Techniques by Lynne P Baldwin and Jasna Kuljis
- 4 Wikipedia –algorithm
- 5 A program design tool to help novices learn programming by Stuart Garner.

Appendix 1

Initial Solution with no credit for crossover learning

Target Cell (Max)

Cell	Name	Original Value	Final Value
Win Programming		20.6	31.6

Adjustable Cells

Cell	Name	Original Value	Final Value
x10	Lang_Struct	6	6
x11	Obj-Orient.	3	3
x12	File Handling	3	3
x13	Win_GUI	6	6
x14	XML	3	6
x15	Win_Adv_GUI	6	6
x16	Database	3	9
x17	Security	0	0
x18	Interop	0	3
x19	Other Adv.	0	3

Target Cell (Max)

Cell	Name	Original Value	Final Value
Web Programming		23.4	32.2

Adjustable Cells

Cell	Name	Original Value	Final Value
x20	Lang_Struct	3	3
x21	Obj-Orient.	3	3
x22	File Handling	3	3
x23	Web Basics	6	6
x24	XML	3	3
x25	Web_Adv_GUI	6	6
x26	Database	3	3
x27	Security	6	6
x28	Storage	3	6
x29	Other Adv.	0	6

Appendix 2

Pre-requisite Solution with 50% credit for crossover learning

Target Cell (Max)

Cell	Name	Original Value	Final Value
Win Programming		31.6	31.4

Adjustable Cells

Cell	Name	Original Value	Final Value
x10	Lang_Struct	6	6
x11	Obj-Orient.	3	6
x12	File Handling	3	3
x13	Win_GUI	6	6
x14	XML	6	3
x15	Win_Adv_GUI	6	6
x16	Database	9	9
x17	Security	0	0
x18	Interop	3	3
x19	Other Adv.	3	3

Target Cell (Max)

Cell	Name	Original Value	Final Value
Web Programming		32.2	48.8

Adjustable Cells

Cell	Name	Original Value	Final Value
x20	Lang_Struct	3	3
x21	Obj-Orient.	3	3
x22	File Handling	3	3
x23	Web Basics	6	6
x24	XML	3	3
x25	Web_Adv_GUI	6	6
x26	Database	3	6
x27	Security	6	6
x28	Storage	6	3
x29	Other Adv.	6	6

Notes

A COMPARISON OF THREE MANAGED SECURITY SERVICES PROVIDEERS ON ASSOCIATED DIMENSIONS OF SERVICE WITH A BACKGROUND OF SECURITY ISSUES AND CORRESPONDING SECURITY SOLUTIONS

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Background

As the prevalence and popularity of the Internet and associated technologies continued to grow during the mid- to late-1990s, it was simply a matter of time before the world of business and marketing merged with the burgeoning “information superhighway.” In the last ten years, the world has seen a surge in online business activity that even the earliest architects of the World Wide Web could not have imagined; the day of purely physical marketplaces is nearly at an end. The vast majority of business entities now do at least a portion of their business on the Internet; business models split between online and in-person business – the proverbial “bricks-and-clicks” operations – continue to gain popularity, and the number of purely online businesses also continues to rise by the day. Information between buyer and seller is shared almost seamlessly, and borders to complete efficiency in business fall every day.

However, the increased popularity of online business transaction has come with a price; for every advancement that has made conducting business more efficient and convenient, a corresponding step has been made by outside agents with malicious intent towards one or all participants in a business transaction. As the infrastructure that makes e-commerce possible continues to develop, so also develops the myriad of ways said systems can be exploited. As these phenomena have continued to increase in occurrence, an entire new industry has been born to help combat the threat that such agents pose to both the business community and the greater public interest.

This industry, however, is typically a costly one; it requires large amounts of capital

to be able to build the type of security infrastructure that is required for today’s businessperson to protect themselves from today’s security threats. Smaller businesses, as well as businesses currently in the process of growing, do not always have enough capital to afford the cutting-edge security services that they need to safely do business in today’s online marketplace. It is out of this conundrum that the managed security services industry was born. Managed security services providers, hereafter referred to as MSSPs, perform a function similar to Internet service providers; however, instead of providing access to the Internet, they provide protection from the Internet’s many threats. These organizations provide their services for a fee (usually on a monthly basis), which allows organizations to focus on other aspects of doing business efficiently.

Methodology

The MSSP industry’s advent in recent years gives rise for the need for a more in-depth guide to the basic services, offerings, and options available from these companies. Obviously, a great deal of data must be gathered before even the framework of such a study can be created, much less the study itself.

The first step in conducting such a study was to patrol the e-commerce news world – primarily through Internet research – to obtain the names of some of the largest players in the MSSP industry. Said research resulted in a number of qualifying firms; however, only three could be analyzed, so more specific criteria were established. After firms were selected for comparison and axes were selected along which companies would be

evaluated, a general search was conducted of academic databases to help develop a general framework of the online security world against which the study would take place. More information on the specified criteria was obtained, and primary research was set to begin.

After contacting representatives from the companies being studied, said representatives gave out information regarding the location of more specific data regarding their service's offerings. As the research was being conducted by a student and not by a potential customer, representatives were not inclined to give out a great deal of information; however, plenty of information was available from the sources to which representatives directed researched. Once this data was obtained and analyzed, this secondary data was used as the foundation of the research conducted.

Scope

As there are a large number of MSSPs available to online businesses, not all said entities could be included in the survey. Survey subjects were selected according to their product offering's containment of a number of key features being analyzed. These criteria are: firewall and unauthorized user defense services, phishing/pharming defense services, denial-of-service defense services, risk and security profiling services, and additional features. Although not all studied companies' offerings contained these elements, all studied entities contained at least three of the study's criteria.

Problems and Solutions

Although the specific typology of malicious user attacks on computer systems is as varied as the attackers themselves, there are a number of basic categorizations into which malicious attacks may fall. In order to foster a greater understanding of the axes along which the MSSPs discussed herein are measured, a basic explanation of the malicious threat, as well as its corresponding security measure, will be provided. These analyses will be grouped together – the method of attack paired

with the typical response protocol to minimize the associated attack's effectiveness.

Unauthorized User Access

As long as there have been computer systems capable of storing and/or accessing sensitive, clandestine, or otherwise profitable data, there have been efforts by outside agents to access that data for a variety of purposes. The purposes of unauthorized access to off-limits information typically fall into three relatively exhaustive categories. First, outside agents may attempt to access information simply in order to possess it – to gain a profit from it, to gain some advantage from it, or to otherwise gain form possession of the information. Second, agents may attempt to access information in order to alter it in some way – to change the data favorably for the agent, to harm the violated business or some associated entity, or to simply disrupt the flow of business. Third, agents may attempt to access a business's infrastructure for the simple purpose of disrupting normal operations (McHugh 2).

There are a number of preventative steps that can be taken to guard against unauthorized intrusion into a company's online infrastructure. The first, and one of the most popular, is called a firewall. There are a number of different configurations a firewall can take; the simplest of these is simply known as a perimeter firewall. A perimeter firewall examines every piece of data attempting to pass through into a corporation's infrastructure and allows those meeting security requirements to pass. The second configuration, known as a dual-homed gateway, or a "DMZ," goes even further in the data filtering process; the company's servers are placed between two firewalls. The first firewall is placed between the company's servers and the external web environment in order to protect from attacks outside the company, while a second filter is placed between the company's servers and their internal network to protect from attacks from within the company. A third type of firewall, known as a distributed firewall, provides an extra layer of security; it examines packets

attempting to pass into company infrastructure, just as a perimeter firewall does. However, distributed firewalls are attached to every server or workstation in use, providing assurance that any sector of the infrastructure that serves as a gateway to the company's infrastructure is protected from attack (Frolick 30-31).

Firewalls can be classified further according to the sophistication with which they handle their duties; this distinction is measured by examining the level of the TCP/IP structure on which the firewall operates. At the lowest rung on the ladder of firewall sophistication is the network layer firewall; this type of firewall sits on the network layer of the TCP/IP structure and examines the incoming and outgoing addresses attached to individual pieces of data traveling across the Internet, and grants or denies access accordingly. However, this structure is significantly vulnerable, as any malicious agent who can fabricate such addresses can gain access into the system. One level up from the network layer is the application layer firewall; this type of firewall sits between the external Web environment and the entity's servers, monitoring traffic between the two entries. One of the greatest strengths of this type of firewall is that it can be programmed to follow specific rules. The dual-homed gateway offers the most intelligent traffic analysis, with firewall components resting on both the external Web environment and the company's internal servers whilst set guidelines or proxy application programs monitor Internet traffic (Hansen 10).

Fraud

One of the most prevalent types of information security violation in recent years is the phenomenon that has come to be known as "phishing" – that is, fraudulent contact of a customer or Internet user in an attempt to cull cash or valuable information under false pretenses. These attacks rely on the customer's willingness to volunteer the information that malicious agents seek; this willingness is usually built up by a convincing reason for the

request – for instance, a legitimate-sounding charity or a claim of a security update that seems legitimate. Another form of fishing – nicknamed "spear phishing" – focuses on boosting the user's trust in the requester by surrounding the request with contextual information; for instance, data about the customer's purchasing behavior can lead the customer to believe the requester is legitimate (Jagatic et al 96).

Another type of fraudulent data gathering involves a larger-scale version of phishing known as "pharming." Pharming involves a set of deceptive practices similar to phishing – convincing the user to accept a message's validity in order to motivate them to share sensitive information – but is done on a much grander scale. Typically, phishing attacks come in the form of emails; although bulk mailing can increase the number of users subjected to the attack, the strength of the attack is still limited by the fact that the "phisher" is requesting the information. Pharming takes the concept a step further; "pharmers" create a copy of a legitimate Web site – such as PayPal – in order to direct traffic to the fake site and thus gather sensitive information as the user interacts with the Web site as if it were the authentic counterpart (Laudon 264).

Savvy on the part of the end user is likely the greatest line of defense with regard to prevention of phishing/pharming attacks; however, there are more technical ways to prevent loss of data through these processes. Many services provide lists of suspected phishing email addresses and suspected pharming Web sites; in addition, some sophisticated programs will actually alert the user if an email or Web site is a suspected forgery. Technology is still developing to combat this burgeoning threat, but an informed business entity has a number of services available to help prevent loss from such attacks.

Denial-of-Service Attacks

Another type of security breach gaining popularity is known as a denial-of-service attack, hereafter referred to as a DoS attack.

The basic purpose of a DoS attack is to flood a system with so much irrelevant traffic that it becomes impossible to access, thereby harming both a Web site's customers and the Web site's management. DoS attacks have increased significantly in sophistication; originally, a DoS attack was initiated from a single source. However, recent years have seen a new type of DoS attacks – the distributed denial-of-service attack, hereafter referred to as a DDoS attack. Whereas traditional DoS attacks were launched from a single source, DDoS attacks can be launched from multiple sites, making them that much more difficult to prevent (Houle 3).

There are two separate types of DoS attacks: a flooding attack and a logic attack. A flooding attack is precisely what it sounds like – a “brute force” attack on an organization's infrastructure using simple meaningless Web traffic to clog said infrastructures information pathways and make it impossible to retrieve information. A logic attack is more calculated than a flooding attack; logic attacks are aimed at specific weak points that have been discovered by malicious agents and which have been identified as critical locations for a strike. The associated defense mechanism associated with a DoS attack is known as an intrusion detection system, hereafter referred to as an IDS; these systems consist of three components: sensors, analyzers, and user interfaces. Sensors typically collect data from locations throughout the infrastructure, and analyzers receive data from sensors in order to determine when and where an attack has taken place. Finally, a user interface is the component of the IDS which receives input regarding the appropriate course of action from the user (Molsa 808-819).

Risk Profiling Tools and Services

Many MSSPs offer solutions designed to help a business entity discover its strengths and weaknesses regarding Internet security; as such tools are often invaluable to a subscribing business, the presence or absence of such services will be an additional evaluation criteria when weighing the features of the three MSSPs to be evaluated.

Additional Features

Any noteworthy feature or component of one of the analyzed MSSPs not fitting into one of the above criteria will be analyzed without regard to the presence or absence of said feature in any of the other MSSPs in question.

Subjects

Three different MSSPs were chosen for analysis. The first is VeriSign – VeriSign is an established name in the online security industry and was a rational choice for inclusion in the survey. The second is Counterpane, another managed security services firm. The third provider is Perimeter, an MSSP serving both financial institutions as well as traditional firms. Each provider's offering will be evaluated on the criteria listed above.

VeriSign

Unauthorized User Access

VeriSign has a great deal of valuable elements which comprise their firewall management service; before going into detail regarding said systems, it is worth noting that VeriSign actually has two separate types of firewall services. For those comfortable having outside agents monitor their security devices, VeriSign offers a firewall management package which will be discussed below; however, for businesses who'd prefer to manage their own firewalls, VeriSign still provides a separate service offering. The company offers a firewall *monitoring* service which allows the client company to retain full control over their firewalls while still allowing a reliable outside agent to lend a hand in monitoring for significant events (VeriSign.com).

However, the standard firewall management service offers a much broader variety of services for their client companies. Companies' firewalls are maintained 24/7 by expert staff who keep a constant eye out for security and infrastructure health issues. However, despite the external management,

the client company still has complete control over their firewalls; clients can change rules and settings of the associated firewalls in any way they wish they wish, and have constant access to all information being gathered by the firewalls. Patch management – the process of retrieving new software to fix vulnerabilities and inefficiencies in existing hardware or software – is performed by VeriSign employees, and the firewall management service allows clients to easily integrate new hardware onto their existing firewall. VeriSign’s Enterprise Security Portal – a type of digital dashboard available to VeriSign’s managed security services clients – allows a great deal of freedom in customizing the output for the company’s firewalls, and firewall logs and statistics can be forwarded for archiving and forensics purposes. In addition, data from other managed devices and from VeriSign’s Vulnerability Management Service can be combined with firewall log data to help spot important trends (Firewall Management Service 1-4).

Also relevant to VeriSign’s firewall management service is the concept of Secure Operations Centers (SOCs) and Teraguard – both of which will be discussed later in the “Additional Features” section on pages 7 and 8.

Fraud

VeriSign also has a number of important services designed to combat loss of profitability and consumer confidence due to phishing/pharming activity. VeriSign’s Anti-Phishing Service automatically searches millions of Internet-based sources to keep up-to-date with potential phishing sources; sophisticated text-search tools and image-based recognition technology scour the Web for potential phishing/pharming sites, and identifies trends among such sites in order to more effectively recognize the appearance of fraudulent sites and communications. All results gained from this process are sorted and prioritized according to client-selected criteria, and the most relevant cases are sent to VeriSign’s online case management center in order to determine the appropriate next course

of action. These sites are also monitored over time in order to further detect trends associated with these potential frauds. Rules for what criteria should be used to search for fraudulent communications relevant to a client company are set by the client company and are tailored specifically to the industry in which the client company operates. Outstanding phishing cases are viewable by the management staff of client companies, and can be dealt with in-house or delegated to full-time VeriSign’s fraud security specialists. Once a fraudulent site and/or events has been identified, VeriSign’s phishing response team will conduct forensic operations and will continue to monitor the suspected fraud in five-minute intervals to watch out for any further activity (Brand and Fraud Anti-Phishing Services Datasheet 1-2).

Denial-of-Service Attacks

VeriSign’s managed security offering also contains an intrusion detection system, hereafter referred to as IDS, designed to help prevent and combat network intrusion in general and denial-of-service attacks in particular. As with their firewall management offering, client companies can configure the IDS according to their individual needs, and they have the ability to monitor any data being gathered by VeriSign at any time. VeriSign offers support in the creation of the initial policies to govern the IDS, as well as during periods of change in the programming of the IDS. VeriSign deals with the upgrading and patch management aspect of maintaining the IDS; also, as with the firewall management service, there are a number of customized reporting options using VeriSign’s Enterprise Security Portal which allow managers to customize which data they wish to view. In addition, the data displayed from the IDS can be correlated with data from other managed devices, as well as from VeriSign’s Vulnerability Management Service (Intrusion Detection Management Service 1-4).

Also relevant to VeriSign’s firewall management service is the concept of Secure Operations Centers (SOCs) and Teraguard –

both of which will be discussed later in the “Additional Features” section.

Risk Profiling Tools and Services

VeriSign’s security services package comes with access to a number of different risk profiling services; these services fit into two separate categories: Network Policy Compliance Management assessment and Host-Based Risk assessment. Network Policy Compliance Management tools include many elements which are used to ensure that client companies’ network access and availability always complies to their stated policies; for instance, Network Access Simulations are used to ensure that current network configurations allow users to access their desired information. Also, Configurations Change Assurance is used to ensure that possible network configurations changes will not disrupt network flow. Host-Based Risk assessment analyzes network security on a broader scope by going beyond simple network policy compliance and examining the total amount of risk to which clients’ infrastructure is exposed. Examples include Attack Simulation and Visualization, which is used to create a false “attack” to spot both weak and strong points in security architecture, and Executive Dashboards, which are used to create graphical data to give an overall picture of a client’s infrastructure security (Security Risk Profiling Service 1-4).

Additional Features

There are several other assets available to VeriSign clients that are worth mentioning. VeriSign’s Secure Operations Centers, hereafter referred to as SOCs, are highly secure buildings inside which manned activities performed by VeriSign are performed. These structures are created using secure construction, and are secured by tiered biometric (retinal scan, fingerprint, etc) identification systems and video surveillance. Backup systems such as uninterruptible power supplies and generator backup units ensure that data remains safe in the event of a disaster, and all mission-critical systems

within an SOC are fully redundant (Firewall Management Service 2).

Another noteworthy aspect to VeriSign’s offering concerns Teraguard – VeriSign’s information architecture; this data structure collects data from a wide range of different sources through its Security Defense Appliance, hereafter referred to as SDA. The VeriSign SDA resides on the customer’s network space and converts all data from security and network devices into a single stream of security events. The Teraguard application arranges these events according to set priorities, removes false positives, finds real threats, and takes appropriate action; this system helps VeriSign analysts to access cross-consumer security intelligence that would be impossible for a single organization to create (Firewall Management Service 3).

Counterpane

Unauthorized User Access

Counterpane organizes its services in a way that is wholly different from VeriSign; their firewall management service is part of an overall device management policy that Counterpane provides to its client companies. In addition to firewall management services, this component of the managed security package can also apply to intrusion defense systems and other security devices. This service has a number of different options, each configured to business owners with different levels of ownership of the devices they wish Counterpane to manage. The Basic Option is for business owners who *already own* the device they wish Counterpane to manage; in this case, Counterpane takes over the management of the device and renders the services associated with the device management service. The Comprehensive Option is aimed at business owners who *do not own* the required devices, but still wish to obtain the service the device provides. In this case, Counterpane provides a turnkey version of the device (without any maintenance or support agreements) to the subscribing business and takes over its management. Advantages of both options include complete

signature and patch management performed by Counterpane representatives as soon as such upgrades become available, as well as retuning of the associated security devices in response to observed attacks on the organization's infrastructure (Device Management 1-2).

Fraud

Although Counterpane has a number of preventive measures available to its clients, the emphasis on fraud and damage protection seems limited to barring unauthorized or malicious users from the infrastructure overall; no response package directly aimed at phishing/pharming attacks is readily offered.

Denial-of-Service Attacks

As the element of the package regarding device management is structured differently than that of other evaluated providers, many of the general IDS features associated with preventing DoS attacks are enumerated in the above section regarding unauthorized user access. However, Counterpane does offer a few specialized options for the prevention of DoS (and more specifically DDoS) attacks.

The DoS prevention package offered by Counterpane has the capacity to withstand attacks in the multi-gigabit-per-second range; the infrastructure filters data coming into the client company's infrastructure, filtering out malignant packets in an effort to prevent fraudulent or malicious traffic from reaching the company's infrastructure. Also, the service provides a caching component, which more efficiently stores overhead data (which often clutters a Web site and its associated circuits) to facilitate higher-speed, better quality data exchange. This service is rated as filtering out 99.9% of suspicious traffic; also, subscribers to Counterpane's managed security offerings have access to a 24/7 technical support from experts in the field of DoS attacks, in addition to constant access to audits of the service's performance through Counterpane's Web portal (DDoS Prevention 1-2).

Risk Profiling Tools and Services

Counterpane has a number of services aimed at helping subscribing businesses better discover their weaknesses. The primary body of risk profiling services is broken down into four categories. Audit Compliance Services are directed at helping subscribing businesses ensure their operation's compliance with important auditing practices – standard auditing guidelines such as Sarbanes-Oxley and HIPAA. Threat Prevention Services are, as a whole, structured around the idea of preventive maintenance – they seek to protect a company from possible future attack. These services range from more academically-minded studies of an organization's vulnerability to controlled “white hat” hackers attempting to discover every possible security weak point for the overall good of the company. Brand Protection Services are aimed at protecting that most valuable asset of all businesses – the integrity, appeal, and trust associated with the business's brand name; services offered in this area include analysis of customer loyalty and retention, as well as possible legal needs which need to be met in order to guarantee the security of the brand's trademarks and other legal documents. Due Diligence Services are services designed to help a company achieve security goals within its own organizational framework; these services are designed to help an organization demonstrate its best effort to meet security standards set by a company's security infrastructure or corporate security department. These reports are overall business solution focused, with the ability to access full technical detail whenever appropriate (Risk Management 1-2).

Additional Features

Counterpane offers an interesting service that is highly relevant to subscribing companies subject to a large number of regulatory compliance and auditing laws: the ability to have Counterpane independently manage logs for devices that produce them. This data can be easily compiled into a single database for more efficient data storage, can

be analyzed to provide a customized view of overall data trends, and can be adjusted to archive past data for use in other situations. A connection is maintained between the host's infrastructure and Counterpane's monitoring facilities, and devices can be monitored 24/7. The data can be exported to external devices, and the infrastructure, as well as cooling and maintenance devices are all redundant in the case of data disruption. This service can be applied to any number of devices, including firewalls, switches, routers, and other devices that produce a recorded stream of data regarding their operations (Counterpane.com).

Perimeter

Unauthorized User Access

Perimeter's firewall management service is managed as a part of a larger intrusion detection and prevention system; services specific to the firewall portion of said system include 24/7 monitoring by security experts at Perimeter, who note every potential security and/or connectivity issue and make an appropriate response – such as network troubleshooting or configuration changes – to the issue. As with other vendors, all the data produced from the security devices is viewable at any time, either for informational or compliance purposes, via a Web portal provided by Perimeter. This portal is configured to provide daily, weekly, and monthly reports on all important security events such as network access, security breaches, and changes made to firewall configuration at the client company's request (Perimeterusa.com).

Perimeter offers a Gateway Defender service as well; the service consists of a centralized, multi-million dollar security device consisting of firewall services as well as traffic control and intelligent intrusion defense services. All a client company needs to do to access the sophisticated security tool is remotely access the centralized location via direct private connectivity or a virtual private network connection (connecting to a secure network over the Internet), and they can

access the service (Perimeter's Gateway Defender Service 1-2).

Fraud

Perimeter has a multi-leveled system to prevent a client company's loss due to phishing-style attacks. Perimeter's phishing service (known as CounterPhish) operates 24/7, and boasts an impressive takedown time – the time between the detection of a phishing email and corresponding site and the shutdown of said site – of three hours. This process takes place over a number of steps – as soon as early reports of a phishing attack service, the attack is traced to determine the ISP responsible for the source; the ISP is contacted and informed of the attack, and the site is shut down. Once the fraudulent site has been shut down, the site will be monitored for thirty days, the case will be closed and a comprehensive report of the incident will be compiled and forwarded to the client company to either send to authorities or to keep for insurance purposes. Perimeter's DNS monitoring service constantly watches for newly registered domain names that resemble that of the subscribing company; also, Perimeter supplies detail process documentation to a subscribing company's employees so that they will always be informed of the proper course of action to take in the event of a phishing attack (CounterPhish Phishing Incident Response Service 1-2).

Denial-of-Service Attacks

Perimeter's IDS and DoS prevention systems are managed as part of a larger intrusion detection and prevention system, as noted above. However, Perimeter does have a number of services to help defend against DoS attacks. Intrusion detection systems are online 24/7 to detect malicious traffic; Perimeter manages configuration and maintenance of the device, keeping track of relevant logs created by the device as well as performing constant vulnerability testing to make sure the IDS is constantly functional against attack (Intrusion Management Services 1-2).

Of particular interest in the area of IDS offerings is Perimeter's ThreatSmart technology; this service combines a number of different approaches to intrusion detection into a single, multi-layered solution. The feature combines signature-based detection (a process which operates with high speed but can only detect previously defined attacks) with analysis-based detection (a process which can detect generally anomalous attacks but is significantly slower and requires more interpretation on the part of the operator) to achieve the benefits of both processes (Perimeterusa.com).

Risk Profiling Services

Perimeter offers a number of risk profiling services; these services are offered through Perimeter's Intelligent Vulnerability Monitoring. This service scans a subscribing company's network infrastructure for over 2000 known security vulnerabilities; if any weaknesses are detected through this service, the subscribing company will be given a detailed report containing suggestions on how the problem can best be fixed, with each solution rated by governing bodies such as CERT and NIST. If this vulnerability involves a network port, the report will also contain a detailed analysis of the specific areas of the network infrastructure which are threatened by the port's instability. Also, Perimeter will monitor the network 24/7 to ensure that all components are secure; in the event of a new vulnerability's discovery (in the overall computer world), the subscriber's network will be scanned to determine whether or not this vulnerability applies to them (Vulnerability Monitoring 1-2).

Additional Features

One potentially valuable aspect of Perimeter's security offering involves a technical support "help desk" which is accessible 24/7 and offers single point-of-contact support for a company's unique hardware and software configuration. The subscribing company can create custom scripts for commonly occurring problems, while

passing on more persistent problems to IT staff or third-party developers. This support package includes "how-to" help for common business applications such as Microsoft Office programs and Microsoft Outlook (Perimeterusa.com).

Conclusions

Research conducted has lent a great deal of credibility to the idea that products listed here have similar but not identical offerings with regard to the different aspects of their service; although the companies listed above were nearly identical with regard to the services they offer, each one is markedly different from the others in numerous different ways.

VeriSign seems to be the most complete provider; not only did it contain every element examined, but the depth and breadth of its services also seemed to be the most impressive. Coupled with the brand equity that VeriSign as a whole possesses, VeriSign would be a solid choice for any firm looking to outsource its operations. However, it does seem as if VeriSign's services are aimed at larger, more commercial entities.

Perimeter also has a prodigious list of services it offers – indeed, its list of managed security "solutions" is fifty strong; also, its technology seems to be among the most sophisticated, considering the substantial amount of cutting edge technology the venture seems to have at their disposal. As Perimeter states, they are designed to be used in a financial environment; this is a recommendation for the service if the business in question occupies that industry, but a strike against it if otherwise.

Counterpane is also a respectable entry, but it seems geared at smaller companies overall; also, it seems to be directed less at companies with high-security demands, as many of its services are mundane – i.e. log management and user profile management. Also, there isn't an abundance of firewall/intrusion detection information available for the company, so it seems to imply the service is aimed at smaller or less high-security-risk clients.

Overall, the providers in question all seem quite competent; the distinguishing factor in a decision regarding which service to utilize seems to hinge mostly on the type of business being conducted and the security environment being encountered.

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ASSESSING STUDENT PERCEPTIONS OF ONLINE BUSINESS PROGRAM QUALITY

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Online student enrollment in the United States for several years has been growing at a faster rate than overall higher education enrollment. Based on the 2006 Sloan Consortium study, the trend is continuing, with a one million increase in the number of students taking an online course in the fall of 2005 over 2004 (Allen & Seaman, *Making the Grade: Online Education in the United States-2006, 2007*). Growth in this marketplace makes online programs increasingly competitive. Both marketplace competition and requirements of accrediting agencies pressure online programs to provide educational quality equal or superior to traditional programs if long-term program success and credibility is to be assured.

Online educators are often asked to defend the quality of online programs and to compare how student achievement compares with that of traditional education. This paper (1) reviews literature relating to outcomes of online education and (2) analyzes the perceptions of program quality and satisfaction of students enrolled in a fully online business degree program in a southern metropolitan university. The university is classified as a Research II institution, with an approximate 12,000 student enrollment. This research is one phase of online program analysis being used to assess the business degree.

Select Literature Relating to Student Achievement and Trends in Online Education

Research has indicated that online students perform or feel they perform as well or better than traditional students (who are

often younger) and/or are very satisfied with their online education (Terry, 2000; Meyer, 2002; Driver, 2002; Dutton, Dutton, & Perry, 2001; Andriole, 1997; Leh, 2002; Hiltz, Zhang, & Turoff, 2002; Navarro & Shoemaker, 2000; Sener & Stover, 2000). Quality of education in the e-environment, however, depends upon quality controls in effect, as is true in the traditional environment (Chua & Lam, 2007; Singh & Pan, 2004).

E-learners report many advantages and disadvantages, or barriers, of online education, such as the following (Hoffmann, 2002; Northrup, 2002; McCall, 2002; Lee & Nguyen, 2007; Singh & Pan, 2004; Navarro & Shoemaker, 2000): (1) Advantages—Availability, Convenience, Flexibility, Interactivity, Expanded Learning Opportunities, Feedback, Learner Control, Equality of Participant, and Dependence on Evolving Technologies; (2) Disadvantages—Lack of Socialization with Peers, Lack of Face-to-Face Communication, Negative Impact on Team and Interpersonal Skills, Feelings of Isolation, Ease of Procrastination, Higher Program Costs, Degree Completion Times, and Home Distractions. In response to identified disadvantages of online instruction, research has reported increases in various types of both technical and soft skills among students in online versus traditional courses: increased writing skills (Meyer, 2002; Velayo, 2001, August; Wiesenber, 1999); increased critical thinking and transfer of learning (Meyer, 2002); improved team skills (Havice, Havice, & Isabell, 2000); and improved collaboration (Waterhouse, 2001, March; Wiesenber, 1999).

The literature evaluating the significance and characteristics of online education

continues to evolve. The e-learning phenomenon has evolved so extensively, however, that each study must be carefully evaluated considering the type of online instruction/technology used, the delimited time frame involved, and other relevant institutional and student characteristics. One must be cautious in applying research conducted under specific conditions to other institutions. Yet implementation and continued development of quality online education is a necessity in today's educational arena. The 2007 Horizon Report lists the following as the number one trend as most likely to have a significant impact on education in the next five years: the changing environment of higher education, which is resulting in increased need for distance education (The New Media Consortium and EDUCAUSE Learning Initiative, 2007).

Analysis of Student Perceptions

Students enrolled in the online business management program at the University of Arkansas at Little Rock were surveyed during fall, 2007, to determine the following:

- Reasons for enrolling in a fully online program.
- Factors or course characteristics that contribute to good learning experiences in online classes.
- Examples of positive learning experiences in the online classes.
- Comparison of satisfaction in courses in various areas of the curriculum (accounting, economics, finance, management, marketing, nonbusiness).
- Comparison of effort expended (time) in relation to traditional classes.
- Suggestions for program improvement.

The initial request for students enrolled in the program to complete a survey was distributed via e-mail during October; the survey was mailed to student home addresses and a second e-mail request was sent during November. A 40 percent rate of return was

achieved (57 responses from 143 enrolled in the program).

Demographics of Respondents

Fifty-five respondents indicated their sex—7 male (12 percent), 48 female (84 percent). Ages of the respondents were as follows: 9 (15.8 percent), under 25; 38 (66.7 percent) from 25-39; 10 (17.5 percent) over 39. Ninety-six percent of the respondents were juniors or seniors: 2 (3.5 percent), sophomore; 26 (45.6 percent), junior; 29 (50.9 percent), senior. Eighty-one percent had over five years of work experience: 2 (3.5 percent), less than one year; 5 (8.8 percent), from one to three years; 4 (7.0 percent) from over three to five years; 15 (26.3 percent), from over five years to ten years; 31 (54.4 percent), over ten years. Sixty-eight percent lived over 30 miles from campus, with thirty-three percent living over 90 miles from campus.

Reasons for Enrolling in Program

Students indicated varied reasons for enrolling in the online program. The reasons related to the following:

- Commute time to campus/expense involved.
- Conflict of personal life with on-campus course schedules.
- Convenience and flexibility of program delivery.
- Prestige of school versus that of other online programs.
- Program credibility.
- Program accessibility.
- Student friendliness.
- Work/travel restrictions.

These reasons for enrolling in the online program parallel those identified in the literature—availability, convenience, and flexibility.

Program Strengths and Positive Learning Experiences

Participants were asked to identify strengths of the online program and positive learning experiences. These responses greatly overlapped. Following are a sample of the program strengths and positive learning experiences identified:

- Audio/PowerPoint lectures.
- Audio/video of lectures.
- Limited distractions from other students.
- Calendar feature.
- Detailed syllabus/assignments.
- Ease of communicating with other students (virtual environment).
- Flexible time frame for assignments.
- Interactive experience with faculty/students.
- Instructor involvement/availability.
- Opportunity for networking with other students.
- Participation in weekly discussions.
- Positive responsiveness from instructors.
- Precise expectations/directions.
- Well organized classes.

Analysis of the detailed student responses revealed that students positively identified with (1) instructor involvement with students, (2) well structured, organized course delivery, and (3) opportunities for interaction with other students and instructors. These desired program components, when present, counteract the frequently cited disadvantages of online instruction—lack of socialization with peers, lack of face-to-face communication, and feelings of isolation, to name a few.

Satisfaction with Online Courses by Subject Area

Respondents were asked to rate their satisfaction with fully online classes taken at the institution using the following scale: 5, very satisfied; 4, satisfied; 3, neutral; 2,

dissatisfied; 1, very dissatisfied. Mean ratings by subject area are shown in Table 1.

Effort Expended in Online Courses

Respondents were asked to rate the amount of time spent on a fully online course (preparing and completing assignments) compared to a traditional face-to-face class using a scale of 1-5, with 1, spend much more time in an online class; 2, spend more time in an online class; 3, spend about the same amount of time in an online class; 4, spend less time in an online class; 5, spend much less time in an online class. The mean rating was 1.96 (see Table 2).

Seventy-one percent of the respondents indicated that they spent more time in an online class than in a face-to-face class. Frequently voiced by critics of online education is that online classes are easier and less time consuming than face-to-face classes. These students' perceptions indicated otherwise.

Overall Program Quality

The respondents rated the overall quality of the online program, using a scale of 1-5, with 1, needs major improvement; 2, needs improvement; 3, average; 4, good; 5, exceptionally good. The mean rating was 4.32.

These program strengths were identified:

- Ability to work at own pace and personally determine effort to expend.
- Accessibility from anywhere anytime.
- Accessibility to and interaction with professors.
- Anonymity in participation.
- Development of self reliance skills.
- Improvement of time management and self-discipline skills.
- Integration of real world virtual activities.
- Opportunity for group interaction.
- "Perfect" class attendance.
- Quick feedback.
- Use of discussion board.

Respondents provided these suggestions for program improvement:

- Avoid “busy work.”
- Offer all courses each semester.
- Provide flexible exam scheduling.
- Provide additional learning aid, such as audio lectures.
- Provide videotapes of face-to-face classes.
- Reevaluate the value of “chat.”
- Reevaluate value of group work and its integration into online courses.
- Require all instructors to “teach,” rather than treat the course as a correspondence course.

The limited number of suggestions for program improvement was evaluated as a positive reflection on the program.

Summary of Findings and Implications of the Research

This research study was designed to evaluate student perceptions of the quality of an online undergraduate program in Management. Results indicate that students are very satisfied with the method of program delivery, the structure of the courses, and the quality of learning. The identified program strengths and suggestions for improvement focus on the importance of the following:

- Effective course organization.
- Integration of course tools to promote learning among students with varied learning styles.
- Instructor relationships with students.
- Meaningful interactions among class members (including required discussions/chats).
- Structured teaming.
- Instructor timeliness.
- Flexible timing of course activities.

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Table 1
Rating of Satisfaction of
Online Courses by Subject Area

Subject Area	n	Mean Rating
Accounting	21	4.29
Economics	26	4.19
Finance	14	3.86
Management	50	4.30
Marketing	28	4.32
Nonbusiness	31	4.45

Table 2
Perceived Time Spent in an Online Class
Compared to a Face-to-Face Class

Time spent	Number of Responses
Much More Time in Online Class	21
More Time in Online Class	18
About Same Amount of Time in Online Class	13
Less Time in Online Class	3
Much Less Time in Online Class	0

Notes

A TEAM IMPROVEMENT PROJECT *(Chi-Mu Kaizen)*

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Introduction

Students learn best when they value what they are learning as relevant (McPherson, 1998). This pedagogical goal mirrors Dewey and Kirkpatrick (1996) posit that learning only occurs when human beings focus their attention, energies and abilities on solving genuine dilemmas; reflect on their experiences with an outcome of gaining skill set application as well as changes in behavior and attitudes (Harkavy & Benson, 1998). In thinking about this article, we thought about one of our team improvement (*chi-mu kaizen*) projects. This article describes an active learning project that explains how cultural diversity, information technology and social responsibility can be used to provide students with the knowledge needed for the process of building work teams.

Statement of the Problem

The affect of perception on communication can cause different people to interpret the same information in different ways (Hofstede, 1993; Allen, 2000). We used this often cited barrier to communication as the basis for collecting information and developing managerial case studies detailing, team building, cultural diversity and social responsibility.

Schermerhorn and Chappell (2000) recommended the use of case studies in active learning as a valuable method to use in identifying the effects of characteristics common to specific diverse groups. They expressed the belief that case studies can assist students to bring to life scenarios which foster the solution of problems identified in business environments. Examples include: barriers to

team effectiveness (communication and technological skill gaps), stereotyping (limited cultural understanding) and social responsibility (unethical business practices).

Thus, in-class discussion of core topics, theories and themes establish the foundation for helping students understand workable solution to identified problems. A salient fact when considering our audiences, which in many classes are a number of first generation students (first in their families to attend postsecondary institution) or students that have limited professional experience in the global workplace. With this in mind, we discuss case material to identify characteristics which negatively affect internal and external organizational resources. The learning experience is designed for students to think and consider various approaches in workplaces characterized by changing markets and shifts to become learning organizations (continuous learning and knowledge sharing).

Related Literature

The changing demographic of students enrolling in management courses challenges business instructors to be creative in course design while upholding accreditation standards. The 21st century workplace and workforce is a mosaic masterpiece comprised of a talent pool of people with different beliefs and skill sets. Ongoing academic and practitioners (AACSB, 2002, 2004; Bennis & O'Toole, 2005), discussions especially sources of problems identified such as: cultural diversity, information technology, social responsibility and work teams, given our changing global business environment, provides relevant opportunities to enhance students learning experiences. Arguably, it is

crucial to integrate forces (ex. societal, political and economic) that influence organizations into course material, assignments and class activities in management courses for students to develop conceptual, human and technical skills.

This reasoning is supported by business instructors because most critics of business programs point to the disparity between classroom and real world practice (Steven, 2004; <http://www.labor.gov>). Business students may have the required analytical skills for future business jobs, however, many lack and/or insensitive to factors in the business environment (AACSB, 2002).

The latter finding is problematic for students developing and/or enhancing managerial skills given the fundamental economic principle of meeting needs and expectations of humans by carrying out transactions given (environmental factors). Students must be able to make adjustments to fit environmental factors. For example, in the culturally diverse workplace; being sensitive to cultural issues and learning specific differences in customs and practices can minimize confusion and unnecessary embarrassment (Lehman & DuFrene, 2005).

Methodology and/or Procedures

We used a modified version of Bloom's taxonomy, (Environmental Factors = Learning Goals + Teaching & Learning Activities + Feedback & Assessment), an integrated course design to extend conceptual understanding to practical application of content knowledge. This is a flexible instructional approach that allows for modification and/or extension of content that focus on what students can and should learn given our changing business environment (Marzano, 2001).

The expected active learning outcomes were to help students: identify and articulate problems, develop analytical and technical skills, communicate with a variety of people such as executives, respondents and team members, write and present (Vice & Cranes, 2001). These outcomes are core skills that can be used to build a variety of instructional material for management courses.

Two challenges, a diverse population and working in teams were considered while preparing learning goals; both reflect the real workplace and workforce. Our thoughts focused semi-structured classroom and real workplace activities to engage students in identifying and solving problems that can be used with the stated learning outcomes to promote continuous learning and improvement. For example, the team project is designed for students to collaborate and work with others (diverse class/workforce). Students should learn how to be sensitive (culturally) to other perspectives while maintaining their own sense of identity and/or ethical guidelines. We used internal and external diversity efforts to spotlight the business practice of social responsibility. Using action oriented goals engage students to think and make significant contributions during discussion and other activities rather than simply being an individual in a diverse classroom. There must be interactions and discussions among a team (classroom/ workforce) for learning to become reality (Buckenmeyer, 2000).

The core objective was guided by the classic definition of active learning, students do something and then reflect on the meaning of what they do (Bonwell & Eison, 1991). We wanted students to experience the relevance of team building, cultural diversity and social responsibility by understanding they are interconnected; similar to information technology with respect to changes in one affects the other. To start the experience, in-class discussion focused on critiques of each other using course material and current events that featured different cultures and their business practices related to functional processes within an organization (ex. work teams and technological applications). Students had individual assignments (ex. interview an international businessperson and journal reviews) designed to build their resources (primary and secondary). This structure helped build rapport and collaboration during student led presentations before forming teams.

We then formed diverse (culture, age, gender, work experience, etc.), teams of five and completed mini written and oral

presentations using their collective resources. Teams were reminded to use the following credo (Our team exists to; We value; Our desired outcome(s) is/are; and We will measure our effectiveness when we), before and during each meeting (electronic and face-to-face) to accomplish their objectives. Overall, the activities were lively and well received by students with expected active learning outcomes achieved. These findings were significant because most management courses require team assignments; however, minimal time is allocated for discussion and application of approaches that may increase effective and/or efficient work teams. For example, minimal course material explores the relationship between a companies technological and business strategies. Both are forces that can be used to determine whether a company achieve and/or maintain its competitive advantage in the global economy.

As such, we arranged five training sessions for students at a company using Web-based tools to prepare project managers for an international assignment in Japan. The objective was to collect data and participate with an assigned project manager in order to write a collaborative research report. Students were to assume they would be traveling to Japan, as work teams, and needed information to perform their duties in a Japanese company. The added bonus, criteria for evaluation, one team would be selected for a paid internship with the company that had potential employment opportunities. A panel comprised of company representatives and the authors of this paper developed a set of performance evaluation criteria (ex. behavior and attitude, written and oral report) for selection of the winning team. The assignment was alive and relevant to students!

Examples of learning activities in the classroom used after the initial phase above included but were not limited too: reviewed material from the mini projects focusing various countries, ex. customs, communication (electronic and face-to-face), attitudes toward work teams, social expectation and behavior. Other assignments involved: additional review of literature targeting the Japanese workforce in comparison to other countries, using

assessment methods to determine and/or align technological and business strategies.

Workplace activities included: explanations (return on investment) focusing on the companies' usage of web-based tools as it related to strategic project objectives, collaboration with composing and posting messages on electronic discussion boards (this allowed threaded discussions with the companies' Japanese project managers) and opportunity to observe on-line training sessions required for project managers prior to international travel.

Feedback & Assessment

The project was a success. The panel was impressed with the overall performance of students; specifically their ability to apply course material in a real world application. Teams utilized their time and resources in a manner that demonstrated understanding the relevance of conceptual and practical application of managerial skill sets. Overall, minor suggestions were made to the team selected for professional employment opportunities. Their project provided data that targeted *siloism*, the selfish practice of keeping work related knowledge to oneself in order to prevent others from working as efficiently as possible (Youngblood, 2000). This behavior can be counterproductive for employees in a Japanese company and community (social responsibility), given their belief in *kaizen*. This is the process of making continuous improvement on a regular basis, which has long worked in Japan (Imai, 1986).

Data presented used course material that included: individualism and collectivism (cultural awareness and social responsibility), barriers to work teams (electronic and face-to-face communication) and methods for assessing technological and business strategies to form a basis of analysis for work teams prior to assignment in Japan. Students understanding of collaborative work were reinforced as it related to the benefits of team building, cultural diversity, technological applications (ex. utilization of discussion board to advance project) and social responsibility. During their visit at the

Japanese company, performance expectations were discussed with culture emphasis, ex. employees are taught to take a team and family approach to work, rather than individualized responsibilities. Thus, in a collectivistic culture (ex. Japan), social norms, duties and obligations are guided by a team mindset; whereas, in an individualism culture (ex. U. S.), personal goals supersede team goals (Hofstede,1993).

We believe our learning goals were accomplished. Clearly, the project was an engaging learning experience for students and authors of this paper. Our student population creates a multicultural environment that can enrich students and faculty experiences. Faculty must be aware of themselves and their students when planning and teaching their courses and communicating with students (Allen, 2000).

Findings from this project support active learning and the benefits (outcomes) provided for students. Specifically, the practice of building relationships (work teams) between the institution and business community; an alliance needed for continuous improvement of managerial and other skills required in today's business and/or information environment. Currently, we are working on a similar project for students with a Mexico based learning organization.

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Notes

COBOL: THE OLD GREY MARE AIN'T WHAT SHE USED TO BE

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Introduction

COBOL, developed in 1959, is a third-generation programming language and one of the oldest programming languages still in active use. Its name is an acronym, for Common Business Oriented Language, defining its primary domain in business, finance, and administrative systems for companies and governments.

Despite its age, COBOL is still kicking! An online article in IT World stated "You're wrong if you think COBOL programmers are doomed to go the way of the Edsel (COBOL, 2001)." Developers who know COBOL and the Internet can write their own job ticket because of the Internet's transition into a sprawling shopping mall selling everything from toothbrushes to tractors.

The latest standards, COBOL 2002, include support for object-oriented programming and other modern language features. It supports Unicode, XML generation and parsing, calling conventions to/from non-COBOL languages such as C, and support for execution within framework environments such as Microsoft's .NET and Java (including COBOL instantiated as Enterprise Java Beans Technology).

Statement of the Problem

Continuous improvement through analyzing the needs of employers and determining needed curriculum changes in the MIS curriculum is an ongoing task. The College of Business at Southern Arkansas University is undergoing its annual curriculum review to identify changes that are needed for the 2008-09 undergraduate catalog.

This year's discussion by MIS faculty is a lively debate that is focusing on the relevance of COBOL in the MIS curriculum. Currently, six hours of COBOL programming are

required in the major. MIS majors are also required to take Programming Languages and Logic, which teacher VB.NET, an object-oriented language.

The MIS faculty members took a long, hard look at the programming requirements to determine if COBOL II should continue to be the advanced programming requirement. An proposal to the department's curriculum committee last year was to change the name of COBOL II to Advanced Programming in order to prepare the way for a potential change in the course content.

Purpose and Methodology

The purpose of this study was to determine the relevance of COBOL in today's programming environment. Data was gathered from primary and secondary sources for this study. Anecdotal data was also used.

Related Literature

COBOL was initially created in 1959 by The Short Range Committee, one of three committees proposed at a meeting held at the Pentagon on May 28 and 29, 1959, organized by Charles Phillips of the United States Department of Defense (exactly one year after the Zurich ALGOL meeting). The Short Range Committee was formed to recommend a short range approach to a common business language. It was made up of members representing six computer manufacturers and three government agencies. In particular, the six computer manufacturers were Burroughs Corporation, IBM, Minneapolis-Honeywell (Honeywell Labs), RCA, Sperry Rand, and Sylvania Electric Products. The three government agencies were the US Air Force, the David Taylor Model Basin, and the National Bureau of Standards (Now NBS). This committee was chaired by a member of

the NBS. An Intermediate-Range Committee and a Long-Range Committee were proposed at the Pentagon meeting as well. However although the Intermediate Range Committee was formed, it was never operational; and the Long-Range Committee was never even formed. In the end a sub-committee of the Short Range Committee developed the specifications of the COBOL language. This sub-committee was made up of six individuals:

- William Selden and Gertrude Tierney of IBM
- Howard Bromberg and Howard Discount of RCA
- Vernon Reeves and Jean E. Sammet of Sylvania Electric Products

This subcommittee completed the specifications for COBOL as the year of 1959 came to an end. The specifications were to a great extent inspired by the FLOW-MATIC language invented by Grace Hopper, commonly referred to as "the mother of the COBOL language", and the IBM COMTRAN language invented by Bob Bemer.

The specifications approved by the full Short Range Committee were approved by the Executive Committee on January 3 1960, and sent to the government printing office, which edited and printed these specifications as Cobol 60.

The American National Standards Institute (ANSI) has since produced several revisions of the COBOL standard, including

- COBOL-68
- COBOL-74
- COBOL-85
- COBOL 2002

Findings

An email survey was sent to the ISWORLD listserv. The listserv contains IT, IS, CIS, and CSCI faculty members that work in colleges and universities around the world. There were 23 respondents to the survey. The survey asked two questions:

- 1) Does your department currently offer COBOL programming?
- 2) If no, has your department ever offered COBOL?

Out of 23 responses, 2 said that their department currently teaches COBOL. Out of the 21 respondents that said that COBOL was not currently offered, 13 indicated that the language used to be taught at their school. Some of these respondents who no longer teach COBOL offered some interesting insight into their decision to drop the language:

- 1) Haven't offered it in years.
- 2) Offered COBOL 5 or 6 years ago
- 3) Not offered since late 90s.
- 4) One professor loves COBOL and incorporates it in one of his courses, but we don't have a specific course.
- 5) Dropped it several years ago.
- 6) Used to but we offered our students the choice of COBOL or VB and the market spoke.
- 7) Taught up until this year.
- 8) We were heavily focused on COBOL until about 2004. We changed it to JAVA and Visual Basic.
- 9) Offered COBOL until about 1999.
- 10) Our department is nearly 30 years old, I'm sure we offered it at sometime.
- 11) Stopped offering COBOL in mid 90s.
- 12) We did until perhaps 7-8 years ago. We now teach VB and Java.

From the experiences of both researchers who teach COBOL at Southern Arkansas University, we offer this anecdotal data:

- 1) Students who take VB.NET before enrolling in COBOL constantly complain about not having a GUI environment.
- 2) ALL students complain about the lengthy code that has to be entered.
- 3) In Fall 2007 one COBOL student became so belligerent that he laid down across two chairs and refused to listen.
- 4) The student mentioned in #3 above "changed his tune" when one of his classmates was hired at \$45,000 a year working as a COBOL programmer analyst

- at Dillard's Department Store Headquarters in Little Rock, AR.
- 5) Java is taught as a programming course in the Computer Science department and we encourage all students to take it, if possible. That course used to be an elective option. Students could choose between COBOL II and Java.

Conclusions

The conclusions are based on the survey. The first conclusion is that a vast majority of the schools who used to offer COBOL no longer offer the course. The second conclusion is that comments seem to imply that schools may have stopped offering COBOL in order to offer VB.NET or Java.

Recommendation

The following recommendations are based on the survey and anecdotal data:

The first recommendation is that the MIS faculty need to do a better job of explaining why they believe that COBOL builds skill as a procedural language where VB.NET does not, such as file management.

The second recommendation is that the MIS faculty need to make sure that area employers who hire COBOL programmers are invited to job fairs so that students can learn

more about COBOL programming job opportunities.

The third recommendation is that the MIS faculty must keep an open mind concerning the curriculum and make changes based on input from stakeholders.

The final recommendation is to replicate this study by surveying a larger population and gathering demographic data.

Implications of the Study

The results of this study could be used by information systems departments as a factor in making decisions concerning whether to continue to require COBOL in the MIS major or minor.

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Notes

PERSONAL ELECTRONIC DEVICES IN THE UNIVERSITY CLASSROOM

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Introduction

What R U doin after class? Lests get lunch B4 U go. Whats that answer to #5? LOL. These are a sample of text conversations that might be happening in university classrooms. MP3 players may be tuning out the instructor or being preloaded with notes to be played during the exam. Laptops can be used to find and download essays and test banks or play games online with friends.

There is a large variety of personal electronics available to today's university students. Students have access to cell phones, mp3 players, notebook computers, PDAs, portable game systems, and other smart devices. The devices may be linked to the Internet, each other, and various other communication media. These devices provide disruptions and distractions to the lecturers and students alike. Some elementary and high schools have banned the devices from campus, with much complaint from parents and students. These devices also have been involved with various forms of academic integrity. However, some in education are embracing the new technologies and using them to enhance the educational experience and reach out to the students.

This paper will address the issue of how students are using the available technologies within the classroom setting. The paper will cover the percentage of students that have access to these devices, and how often they use these devices in the classroom. The paper will also examine whether students are distracted by other students who are using these devices during classes. Finally, the paper will examine if these devices are being misused in violating academic integrity policies.

Review of Related Literature

Technology usage among college students continues to grow and be a large part of students' lives today. There were 250,146,921 estimated current wireless subscribers as of June 2007. There are 240.8 billion text messages being sent and 1.95 trillion cell minutes used annually. (CTIA The Wireless Association, 2007) Cell phone usage continues to be one of the fastest growing technology sectors. Today's children are being raised with electronic devices as part of their lives. "Families with school-age children planned to spend \$4.2 billion on back-to-school electronics or computers, including laptops, PDAs and calculators. That was up 10 percent from last year, according to the National Retail Federation's annual survey." (Dunnewind, 2007).

This technology has also shown to be a problem in some academic circles. Technology has been used in many incidents of violating academic integrity policies. Students have found many unique ways to use technology to cheat on exams and circumvent the safeguards used in the testing process.

Twelve University of Maryland students were caught using text messages to cheat on an accounting exam. (CBS News, 2003) There are a lot of examples of cheating with technology, especially cell phones. Cases range from high school students to firefighters. Several Boston firefighters were caught cheating on their civil service promotion exam. (WHDH, 2008) There are also many cases where international places are suffering as well. One highly documented case in Vietnam has even solicited death threats to the teacher that caught the students cheating on national exams. (Steinglass, 2006)

Technology also provides distractions to the faculty and students in the classrooms.

Cell phones have become a high tech way to pass notes in today's classroom.

Internet and other distractions can be counterproductive to the classroom setting. "Cyberslacking is the overuse of the Internet in the workplace for purposes other than work. Obviously, cyberslacking can be a problem for companies as this can lead to loss of productivity and could be considered a waste of companies' resources." (Whitty, 2006) This concept also applies to the students inside and outside the classroom.

However, several universities are using new communication technologies to recruit and retain students. "Online technologies, including email, Web sites, Weblogs, etc. were implemented to help enrollment management professionals reach out to prospective students and help them explore colleges in unique and technologically-savvy ways." (Zalanowski, 2007) Texting became a popular loophole with college coaches contacting potential recruits. The NCAA recently imposed a ban on coaches from contacting potential high school recruits through text messages. The coaches had been using this method with great success and frequency.

Outside of recruiting and retention, colleges and universities are exploiting personal electronic devices as learning platforms. Mobiles that double up as internet platforms and iPods and MP3 players that can download hefty video or audio files mean students own what is in effect a portable learning tool. Digital mobility is drawing in students through distance learning, outreach or aids for special needs. What's more, the use of technology can be highly motivating, adding value and content in opening up entirely new teaching scenarios. (Hoare, 2007) Some colleges and universities are looking at incorporating text messages and Facebook in their emergency alert systems. (Dobbin, 2007)

Technology is being used in productive and counterproductive ways in the educational setting. Some places are embracing the technology while others are banning them from the educational setting. The National Education Association (NEA) even sponsored and published an online debate about the

issue. (Ostrowski, 2004) This paper will address some of these issues.

Survey Instrument

The survey consisted of questions about personal usage. The scale was Never = 1, Rarely = 2, Seldom = 3, and Often = 4. The scale for how distracting technology usage was Strongly Disagree = 1, Disagree = 2, Neutral = 3, Agree = 4, and Strongly Agree = 5. The questions covering cheating were simple Yes or No. The survey asked about cheating on a personal level and also if they personally knew of people that cheated using technology.

Research Design and Results

A survey of 248 students from two different universities was conducted. The survey was given primarily to business majors. The survey was given to students with diversity along discipline and classification. The survey focused on three technologies: cell phones, computers, and MP3 players. The students were asked about ownership, usage in the classroom, and about academic integrity. Only 235 of the surveys were usable. Thirteen students did not complete the entire survey.

Technology usage was high among the students surveyed. Of the students surveyed, 95 percent own cell phones, sixty-nine own MP3 players, and 88 percent own computers.

The first set of research questions addressed the usage of technology in the classroom.

Question 1: Do you talk on your cell phone in class?

Never	Rarely	Seldom	Often	Mean	Median	Mode
77.87%	17.45%	3.83%	0.85%	1.28	1.00	1.00

Question 2: Do you Text / SMS on your cell phone in class?

Never	Rarely	Seldom	Often	Mean	Median	Mode
26.81%	17.87%	26.38%	28.94%	2.57	3.00	4.00

Question 3: Do you use a computer for personal reasons during class?

Never	Rarely	Seldom	Often	Mean	Median	Mode
48.09%	26.38%	16.60%	8.94%	1.86	2.00	1.00

Question 4: Do you use a MP3 / Music Player during class?

Never	Rarely	Seldom	Often	Mean	Median	Mode
84.26%	10.64%	3.40%	1.70%	1.23	1.00	1.00

Using a cell phone to send text messages was the most common activity with 55 percent using the technology seldom or often in the classroom. Computers were the second most commonly used technology.

The next set of questions addressed how much other people using technology distracted students in the classroom.

Question 5: Does it distract you when other students talk on their cell phone?

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Median	Mode
6.81%	6.81%	17.87%	35.32%	33.19%	3.81	4.00	2.00

Question 6: Does it distract you when other students text / SMS on their cell phone in class?

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Median	Mode
33.62%	28.51%	22.55%	9.36%	5.96%	2.26	2.00	1.00

Question 7: Does it distract you when other students use a computer for personal reasons during class?

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Median	Mode
29.36%	35.32%	25.96%	6.38%	2.98%	2.18	2.00	2.00

Question 8: Does it distract you when other students use a MP3/Music Player during class?

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Median	Mode
20.85%	20.43%	22.98%	23.40%	12.34%	2.86	3.00	4.00

Talking on the cell phone in the classroom was considered the most disruptive by students. Thirty-six percent of the students found MP3 or music players disruptive. Using text messages and the computer were less distracting to students.

The last set of questions involved academic integrity and technology. As noted in the review of the literature this area has been a concern for many universities around the world.

Question 9: Have you ever used the voice part of your cell phone to cheat in a course?

Question 10: Have you ever personally known someone to use the voice part of their cell phone to cheat in a course?

Question 9		Question 10	
Yes	No	Yes	No
0.85%	99.15%	10.21%	89.79%

Question 11: Have you ever used the text / SMS part of your cell phone to cheat in a course?

Question 12: Have you ever personally known someone to use the text / SMS part of their cell phone to cheat in a course?

Question 11		Question 12	
Yes	No	Yes	No
4.68%	95.32%	35.74%	64.26%

Question 13: Have you ever used a computer to cheat in a course?

Question 14: Have you ever personally known someone to use a computer to cheat in a course?

Question 13		Question 14	
Yes	No	Yes	No
6.81%	93.19%	21.70%	78.30%

Question 15: Have you ever used a MP3/Music Player to cheat in a course?

Question 16: Have you ever personally known someone to use a MP3/Music Player to cheat in a course?

Question 15		Question 16	
Yes	No	Yes	No
1.28%	98.72%	1.70%	98.30%

More students used text messages and computers to cheat in courses. Over a third of the students were aware of someone text messaging to cheat in a course. While 21.7 percent knew of someone using a computer to cheat.

Conclusions

Technology usage is a large part of today's business world. Most people cannot think of having to do business without cell phones, computers, Blackberries, PDAs, and high speed internet connections. Students need to be able to use these technologies in an appropriate and ethical manner. This study concludes that some of these technologies are being use in the classroom environment. Some students are also using these technologies to cheat on various courses. This is something that needs to be addressed in further research.

This study is limited in scope and breadth to make definite conclusions. The results were also heavily skewed in some cases. Therefore, some methods of analysis could not be used on the data. However, further research with a larger Likert scale and a larger sample could be used to capture more relevant information.

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BRIDGING THE ONSITE/ONLINE GAP FOR STUDENTS/FACULTY: INTEGRATING ADOBE BREEZE SOFTWARE TO TEACH MANAGERIAL FINANCE

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Abstract

In this article, the author suggests a process that could reduce some barriers to effective teaching and learning online. Delivering Managerial Finance in the online environment presents significant challenges to instructors and students alike, because of varying student preparedness levels, complexity of content, and limitations on the use of text driven material. This paper explores a strategy involving the use of animated audio visuals presentations to explain key topics in finance. With the aid of literature, the author examines the way in which this technology may help instructors effectively manage the online delivery of finance course material. This is an effort to contribute to a body of faculty development literature to improve the quality of online teaching and learning.

Introduction

Although Nicholason & Sarker (2002) found that students preferred finance faculty to provide course material online, the majority of students did not like the idea of taking a finance course delivered solely through distance-learning technologies. In large part this was because they found the subject too difficult to comprehend without face-to-face instructions. The use of animated audio visuals addresses this barrier head-on. This paper suggests that their use can greatly enhance how faculty present quantitative material online.

More than 2.3 million students took at least one online course in 2005 (Allen & Seaman, 2006). By fall term of 2005, higher education institutions taught nearly 3.2 million

online students, an increase of 850,000 students and a growth rate of 35 percent from 2004. (Allen & Seaman, 2005). Online teaching is a growing segment of the education market and warrants our attention. A survey by the Sloan Consortium (Allen & Seaman, 2005) showed the overall percent of post-secondary schools that identify online education as a long-term strategy grew from 49% in 2003 to 56% in 2005. For Associate's degree institutions, the percent grew from 58% in 2003 to 72% in 2005. Yet, despite the growth in online learning systematic evaluative studies of web-based learning environments are scarce (Sheard & Markham, 2005).

Recent developments reflect that distance learning represents a particularly powerful addition to a growing array of delivery options for higher education (Eaton, 2001). Distance learning is having a very real impact on higher education and creating alternative models of teaching and learning.

It is also significant that so many of the institutions and programs that are adopting distance learning practices are among the most well-established and highly regarded in the country; institutions such as Cornell, Columbia and New York University have all developed for-profit operations in response to this growth(Eaton, 2001).

The academic redesign strategy for colleges must focus primarily on improving both student learning and satisfaction of their instructional experience (Graves, 2004). This would pertain to both in class and online environments.

Every instructor is a content expert who is capable of selecting, organizing, and annotating content for study by students. The course content organized by the online

instructor is typically expressed in text in a printed or digital format (Graves, 2004) Unfortunately, this can restrict the content of material presented. Text in print or digital form is a very limited way to present quantitative material such as that found in a managerial finance course.

This limit could be overcome, however, if there was a way to engage students by providing a better means for them to view the steps of calculations, synthesize processes, and see the relationship of variables. By using more creative means to deliver this type of information, the learning experience may be enhanced. If students were able to review these processes at their leisure to reinforce concepts, the process may lead to a more satisfying online experience. Anecdotal evidence obtained by the author from students suggests that this is possible as it relates to learning finance online.

In this paper, the author examines how the integration of a fairly simple interface program, Adobe Breeze Presenter with Microsoft PowerPoint can potentially accomplish some of the aforementioned goals.

The premise that computer-assisted instruction contributes positively to students' learning experience and outcomes is evident in the education literature. Examples of such research include Zack, 1995; Daniel, 1999, Michelson and Smith, 1999; Hein and Stalcup, 2001; Saunders, 2002; Michelson and Smith, 2004. The results from previous research, however also indicate that integrating computer and software packages into finance curriculum is limited (Clinebell & Clinebell, 1995).

The aim of this narrative is to explore the potential impact that the use of specific authoring software (Adobe Breeze Presenter with Microsoft PowerPoint) will have on the effective presentation of finance course material online. Can its use lead to increased finance student learning and satisfaction? If so, might the experience encourage students to take other finance courses online?

Description of Software

Adobe Breeze Presenter with Microsoft PowerPoint software is a program that has the potential to overcome some of the limitations of delivering content online. Breeze is a web communication system. It is an add-on program to PowerPoint that empowers faculty to easily create effective, engaging presentations. These creations include voice and animations and are delivered on the web.

An instructor can create new presentations or add animations and audio to existing PowerPoint files. The author has done both, which is described below.

If an instructor already knows how to use PowerPoint he/she has most of the skills necessary to create a Breeze presentation. To create a Breeze presentation you must first install the software, which installs the Breeze menu right into PowerPoint. To install Breeze presenter you simply log into the Breeze manager and install the program to your computer.

You can then use the Breeze menus to record audio narration, import flash content, add a quiz or survey to make it interactive or publish content to a Breeze server.

Description of Project

The author has delivered a managerial finance course using WebCT courseware. The course was delivered 100% online within the WebCT environment. This environment provides for discussion, assignment submission via the web, quiz and test management and email communication between the faculty member and students. All course material is online. The course content area contains weekly chapter sequences with both text and audio visual lecture material loaded onto a server using the Adobe Breeze program.

The audio visual Breeze PowerPoint presentations were embedded as a link within in a text lecture or as clickable links in the course content area. The lectures were sequenced as outlined in both the syllabus and textbook.

The author is specifically looking at using technology to replicate a face-to-face lecture in an online environment. Audio coupled with a step-by-step animated processes reproduce a life-like, chalkboard type of presentation. This online method of delivery can improve students' ability to follow steps involved in problem solving and exposition of many multi-stage processes involved in finance.

Clear directions are given to the student on screen before he/she goes to the server and opens the file. A typical directive would read as follows: "Please open the highlighted audio visual breeze PowerPoint presentation on 'Constructing a Statement of Cash Flows' and be prepared to answer questions regarding this presentation either in an assignment or in the discussion area. The presentation should load automatically after you click on the aforementioned highlighted area. Thank you."

Examples of topics covered are statement of cash flows, long term debt leverage, sinking fund problems, capital budgeting methods and cost of capital determination.

Each presentation contains a PowerPoint presentation consisting of 8-12 slides. Each slide contains anywhere from five to 15 animated illustrations illustrating the steps required to answer a particular element of the lecture. The animations used could depict parts of an equation, graphical representations, timeline illustrations or any sequential series of events. As each item is exposed, an audio explanation both precedes it and follows it as the student would experience in an in-class presentation.

Along side the visual box is a series of labeled tabs to describe various parts of the presentation. The tabs sequentially match the sections of the presentation and the student can repeat any part of the presentation or move ahead to another section at their leisure or as their learning needs dictate.

Quizzing the student anywhere within the presentation is possible by embedding quiz slides that are tailored to the presentations goals. The answers are sent to a server where the faculty member can access them for review.

Student Satisfaction

Sarker found that the majority of students prefer a hybrid (online/in-class) version of course delivery because they consider finance too difficult a subject for online delivery alone (Nicholson and Sarker, 2002). Other researchers have learned that face-to-face instruction was the preferred method, along with making pertinent material available online (Peng, 2006). The author suggests this is the case because much online material is text-driven in nature and lacks some instructional value.

Students are in a quandary because they prefer the traditional face-to-face courses with which they are most familiar, yet their life situations make it necessary to take online courses (Simonson et al. 2003). Therefore, both reluctance and a necessity are at play within the motivation of an online student. This anxiety can be addressed with the use of animated audio visuals. The author suggests that an effective strategy should be one that ensures the learner has a meaningful and memorable experience and achieves desired learning outcomes.

Some have argued that whereas traditional education is centered on the professor, distance education is inherently student centered (Larson, 2002) This suggestion has a rather profound implication: although the instructor may continue to orchestrate the course, the students actually may direct the learning process, relying on their own initiative and frames of reference (Grandzol, 2004).

The use of animated audio visual programs can provide students of finance more guided instruction through complex financial formulas and concepts.

Smith (2001) noted that reading instructions is not a priority for students and that professors must repeat instructions, ideally placing them in several locations in the online course. The use of PowerPoint with Breeze provides an easy way for faculty to send out (audio/visual) messages within the course content area to either clarify instructions or assist the class with specific

problem solving exercises relating to assignments or class projects.

Online instruction provides flexibility for students but also presents a perception problem of lower quality (Terry, 2007). PowerPoint with Breeze can potentially deliver flexibility and still enhance the quality of output within the online experience.

The use of animated audio visual format allows students to participate in digesting material using their own filtering systems, both visual and auditory (Torres, 1985). It also brings them closer to the faculty and class by replicating the live presentation of material as they would experience in a classroom. Although not a synchronous experience, the audio piece may have a conversational style that replicates a live experience.

Every individual has a unique learning style, the “personal qualities that influence [the] ability to acquire information, to interact with peers . . . and to otherwise participate in learning experiences”(Grasha 1996:22). Some people learn actively and interactively, others focus on facts, some prefer visual forms of information, and some learn from written and spoken explanations (Felder 1996) Therefore, any course of study will have students with various learning style backgrounds and levels of preparedness (Kramer-Koehler, Tooney, and Beke, 1995), which influence their engagement with learning environments (Sheard and Lynch 2003). Animated audio visuals address the appeal to the spoken and visual forms.

Research demonstrates, however, that distance learning can be as effective as traditional instruction when the technologies are appropriate for the instructional tasks (Moore & Thompson 1990). In fact, students demonstrate more positive attitudes and higher levels of performance in online classes when they experience high levels of interaction (McCroskey and Anderson 1976).

Although the use of subject animated, audio visual lectures are asynchronous, they can be seen as moving the professor and learner closer in two ways. First, by creating a more personal presentation, the impersonal barrier inherent in text-driven information is mitigated. Second, when students more

successful grasp the information presented, this also improves the quality of their discussion in the discussion area.

Kearsley (2002) contends that there is no single prototypical online student and so faculty members need to be able to work with a diverse range of students while targeting what they feel is the norm. The ability to present material with audio explanation in a step-by-step fashion helps to tailor the delivery of the subject matter and makes it more digestible to the average audience.

Faculty Satisfaction

Carlson and Everett (2000) claimed that we, as faculty, need to alter our communication style to reach our online audience. Clear presentation and user-friendly mechanisms can enhance the process for students. We may clarify complex explanations by animating them and using our voice to guide the student through the process. Knox (1997) admitted that content can take many forms on the web and we need to ensure that we are aware of a purpose for putting content online in a particular form. The approach of integrating the Breeze and PowerPoint programs combines good form with good content and a user-friendly method of accessing it.

The author therefore urges other faculty to take advantage of the online environment by providing students with relevant hyperlinks to web-based material within course content. Because creating online content is different than writing content for other media, we have to change our communication style to reach our online audience (Carlson and Everett, 2000).

The majority of faculty have little knowledge about what online education is, what it entails, and how it is successfully taught (Moore and Kearsley 1996), however. Instructors receive little or no training prior to being assigned an online course (Gehlauf, Shatz, and Frye, 1991), which leads to teachers being under-prepared, frustrated, isolated, and disillusioned. The task of preparing a finance class online is compounded by the fact that the material may

not lend itself to text-driven methods alone. The Microsoft PowerPoint program is familiar to many faculty members, however, and the learning curve for the Adobe Breeze Presenter add-on is short.

Research has recognized that many faculty and teachers are engaged in designing and delivering web based instruction (WBI) they still seem to be more concerned with information presentation than with creating instructional sites that are designed to attain well-intended positive outcomes (Becker, 1999; Downs, Carlson, Repman & Clark, 1999). The emphasis on information presentation is important, of course, and the use of a more creative presentation method may enhance the reception of the material.

Conclusion

Online education is not for all students or faculty members. It requires faculty to learn how to use a new tool and to spend significantly more time on organizing, preparing, teaching, and monitoring the class compared with traditional classes (McEwen, 2001). The learning curve required to add animation and audio to Powerpoint presentations, however, is short; the technological training is minimal. This may appeal to faculty who until now were reluctant to incorporate this particular technology into their teaching strategies. It may be delegated to teacher assistants with proper supervision. The exercise of constructing an animated audio visual presentation may also be a justified exercise as an assessment tool for a student's learning portfolio.

Northrup (1998) argues that additional training on new instructional techniques and strategies for promoting interactivity and providing adequate and timely feedback may promote an online environment more conducive to learning. The use of the subject programs could be a technology that meets the needs of both students and instructors. The use of the subject technology may provide an instructor with the opportunity to capture his/her lectures in a systematic manner as to make them better understood. It may also reduce the anxiety of students who may be

reluctant to study complicated or technically-oriented subject, such as finance, online.

The author suggests that the use of subject programs could be added to a strategy that will ensure that the learner has a meaningful and memorable learning experience while achieving desired learning outcomes.

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Notes

CULTIVATE ONLINE STUDENTS WITH ADOBE CAPTIVATE 2: USING SCREEN CAPTURE TO TEACH EXCEL/FINANCE ONLINE

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Abstract

Integrating Excel within an online corporate finance course presents significant challenges for instructors and students alike. Some of these challenges are varying student preparedness levels; time required to teach Excel's functionality; and the need to develop proficiencies in spreadsheet modeling. In this paper, the author demonstrates how an audio screen capture program, Adobe Captivate 2, can enhance online teaching and help students learn financial modeling with Excel. The author has proven that the current screen capture technology has advanced to the point where creating tutorials is exceptionally easy, with a gently sloping learning curve. This advanced functionality allows faculty to create a basic, integrated audio lecture in about an hour. The technology potentially serves online students by helping them learn both the functionality and modeling capacity of Excel as it is used in corporate finance.

Introduction

Recent research reflects that distance learning represents a particularly powerful addition to a growing array of delivery options for higher education (Eaton, 2001). Distance learning is making a very real impact on higher education and creating alternative models for teaching and learning. The academic redesign strategy for institutions of higher learning, therefore, must focus primarily on improving both student learning and satisfaction with their instructional experience (Graves, 2004). This pertains to both in-class and online environments. Within this framework is the need to enhance the content and effectiveness of integrating

Microsoft Excel into online corporate finance courses. This paper suggests how this can be accomplished.

There is likely no more important teaching tool in finance curriculum than Microsoft Excel. The spreadsheet environment provides interactive modeling opportunities, which allows students to incrementally develop problem solutions and gain better insight into the process involved in their solution. Excel also provides students with the tool to build spreadsheets by integrating their understanding of variables with concrete output capable of powerful analysis. Corporate finance textbooks have continually added discussions of Excel when they cover finance material. Finding an effective way to make Excel an integral part of a student's ongoing learning experience online, however, has been a challenge.

The purpose of this exploration is to attempt to measure if the use of visual assistance through screen capture assists students in learning Excel and its applications in Finance.

Unfortunately, however, students often lack the required spreadsheet proficiency and thus spend more time learning spreadsheet commands and techniques than absorbing the modeling process. This challenge is made even more difficult in an online setting where, many times, curriculum is offered in a text-driven format, which is not at all amiable to comprehending spreadsheeting techniques.

The use of audio screen capture technology, such as Adobe Captivate 2, can provide students with the opportunity to develop both their technique and modeling process skills. The program achieves this because it allows the instructor to replicate the technique and logic behind the spreadsheet

construction through audio commentary. By simultaneously explaining the logic behind the design of the spreadsheet and the specific functions used, students see and hear both the “why” and the “how” behind the spreadsheet construction.

With more complicated spreadsheets, the use of Captivate 2 allows the instructor to present the process in increments, unfolding each section in digestible pieces for the student. This enables the student to work, side by side, with the instructor in formulating his/her version of the spreadsheet.

The author explores the potential of using some recent screen capture software to create online audio lectures to guide students' thought process through parts of the spreadsheet model development. This allows students to identify model parameters and variables and validate their reasoning and spreadsheet logic.

The Online Environment

Teaching students to use a software program is effectively performed in a computer classroom lab setting, where the students can both visualize and replicate the processes presented by the instructor. In the online learning environment, however, the difference in time and space between the instructor and students complicates the instructor's efforts to ensure that students master certain hands-on skills (Wang, 2006). Some scholars who research tutorials suggest teaching spreadsheet skills outside the classroom, so that class time can be devoted to teaching concepts and modeling aspects. Many authors who have created modules or tutorials to supplement their teaching have commented on the wide spectrum of student abilities. Therefore, one of the main benefits of the tutorials is to provide students with a means to work at their own pace and catch up on any spreadsheet deficiencies they may have, without taking time away from class.

It is the author's proposal that developing audio screen capture presentations present opportunities to mitigate the distance issue and provide an instructional method that resembles an in-class computer lab experience.

Researchers (Sokol, 2005; Grossman, 2004; Powell, 2001) point out that even though modeling is considered to be one of the most important skills for corporate finance students to learn, it is the most difficult and least-developed area in finance education, primarily due to the nature of the modeling process. Spreadsheets add further challenges to the learning process.

Every instructor is a content expert who is capable of selecting, organizing, and annotating content for study by students. The course content organized by the online instructor is typically expressed in text, in printed or digital format (Graves, 2004). Unfortunately, this often restricts the content of the material presented. Text in print or digital form is a very limited way to present spreadsheet content because so much depends on the technical knowledge behind each spreadsheet's formulations combined with the application in problem solving.

Instructional material in which various media are integrated improves learning more than instruction with only one medium (Kulhavy, Stock, Peterson, Pridemore, & Klein, 1992; Mayer, 1999; Mayer, Moreno, Boir, & Vagge, 1999; Mayer & Sims, 1994; Mayer & Gallini, 1990; Robinson, Robinson, & Katayama, 1999). Mayer (1999) and his coauthors have repeatedly shown that learners benefit from a multimodal approach, the most common form of which is a mixture of words and pictures.

The author also suggests that in the online environment, audio should be added to the multimodal approach. Specifically, the author suggests that using Adobe Captivate 2 in the online environment can encourage an interactive modeling opportunity, allowing students to incrementally develop the model and gain better insight into their models and the process of model development.

Description of Program

Adobe Captivate 2 allows instructors to rapidly develop engaging e-learning content. After the program is download and installed, the instructor is ready to capture onscreen actions presented during lectures and

demonstrations. Depending on the recording mode, the instructor may end up with one of several products: 1) an interactive simulation where the learner must follow onscreen prompts to complete a task; 2) a demonstration that the learner can watch; or 3) a scenario simulation. The author has limited this paper to a demonstration mode, although the author has used other modes as well.

Using Adobe Captivate 2 software, an instructor creates online lectures that show students how to use Excel software, to map out and complete an Excel spreadsheet and demonstrate its analytical strength. Teaching students how to integrate Excel into practical problem solving applications can involve multiple steps.

To prepare the learning modules efficiently, consider the following suggestions:

1. Use a microphone to capture audio.
2. Prepare the narratives and storyboards, and then follow the storyboard to record onscreen actions.
3. Do not record audio when either dragging the mouse or performing similar actions on the screen. These actions can cause a serious lag problem when the animation is played back. Captivate enables the instructor to record voice narratives during the presentation and edit them later if needed.
4. Use the highlight box and dialog tools to highlight actions or areas on the screen.
5. Backup Captivate files for future revisions.

Adobe Captivate 2 also enables instructors to design a self-assessment in a short period of time. Instructors can design assessments using multiple choice, true-false, matching, and Likert-scale methods of evaluation. In addition, the instructor can decide whether the students have to pass a quiz in order to complete the learning module. This capability forces the online learner to systematically check his/her progress in comprehending Excel and its capabilities in problem solving.

Captivate 2 captures the lecture as the instructor is delivering it. It records any keystrokes made, showing which menu

command is being used. An instructor could add highlight buttons and textbooks to emphasize specific parts of the spreadsheet or the use of financial functions within Excel. After the online lecture is recorded, it can be edited to improve either the audio or the illustrative components.

The lecture is then published using Adobe Connect Enterprise to a server location operated by the institution. The URL address for the lecture is then accessible to whomever the instructor authorizes.

Benefits of Screen Capture Technology
Screen captures are probably the most frequently-used illustration in software manuals (Horton 1993). Studies on this subject (Van der Meij, H., & Gellevij, 1998) strongly support practitioners' impressions that the most frequently-used picture in software manuals is a screen capture. Screen captures outnumber other illustration types by a factor of three or more.

Screen captures have received little attention in the literature on technical documentation. For example, Brockmann's highly-regarded handbook does not discuss screen captures (Brockmann 1990). Schriver also does not discuss the concept, although her book details many principles of visual design and the interplay among words and pictures (Schriver 1997). Other handbooks likewise pay little attention to screen captures (Markel 1994; Price and Korman 1993; Simpson and Casey 1988).

Adobe Captivate 2 can transfer the same benefits of screen capture to online learners. This software makes it possible for students who are learning online to gain access to Excel's capabilities by viewing the design and implementation of problem solving in a step-by-step manner as it unfolds. To the author's knowledge, little evidence exists of the use of this technology in online delivery due to the early stages of this software's development.

Captivate 2 provides a presentation that is audio and visual in nature. In fact the process has movie like qualities to it because you are recording pictures of your screen which are being linked together in a smooth transistional manner. Gellevij and Van der Meij, H. (2002) showed that in a realistic context, multimodal

(using more than text) instruction leads to better outcomes than unimodal instruction. Training time is shortened, learning is improved, and cognitive load is not altered. Mayer (1999) supported an integrated design criterion to include the use of visuals in instruction.

Further, Horton predicts that user motivation will increase because screen captures provide visual relief on pages full of text and because they enhance the attractiveness of the printed manual (Horton, 1993).

The author contends that these predictions pertain not only to static screen captures. Rather, these concepts have also been advanced for pictures in general (Fredette 1994; Levie 1987; Peeck 1993). Extending the concept further, Adobe Captivate 2 allows the online learner to view whatever is on the instructor's screen. For example, if an instructor used a Powerpoint slide describe an issue, he/she can embed that Powerpoint slide into the Captivate 2 lecture. This way, the student views a graphic and sees in another way how the spreadsheet is designed to solve the problem.

Literature also supports the concept of a mental model that helps users of software programs better understand how a program works (Carroll, J. M., and J. R. Olson, 1988). This model helps the user make connections among actions and explain why these actions produce particular results. A mental model has to do with the structure of the software, with users becoming acclimated to the standard layout of the parts in a program.

Mental models in general play a critical role in problem solving. Users apply mental model to detect, define, diagnose, and solve problems. A strong mental model makes it possible for users to deal with new situations; in fact, it is conditional for handling transfer tasks. Experience, training, and imitation all contribute to mental model development.

In teaching corporate finance, using screen captures from an Excel program help reinforce and connect concepts, formulas, interrelationships of variables and structure in problem solving. Experience, training, and

imitation all contribute to mental model development.

Screen captures can help user's develop a mental model. This occurs by acquainting the user with the main input variables and financial functions within Excel; explaining the spatial layout and design of the spreadsheet model; and developing a sense of the logical flow or progression of outputs.

Methodology of Instruction

As previously described, using Adobe Captivate 2 software, a professor can create interactive web tutorials that show students how to use Excel software to map out and complete an Excel spreadsheet and demonstrate its analytical strength. This section addresses teaching students how to integrate Excel into practical problem-solving applications in greater depth. This process can involve multiple steps:

1. First, taking the concept with which the class is working and seeing how it would arrange itself in a spreadsheet format.
2. Second, formulating the spreadsheet effectively to capture all the necessary linkages among variables.
3. Third, using the completed spreadsheet to solve practical application problems.

If the class is investigating the way in which market values of capital determine yields and yields are linked to the component costs and then linked to cost of capital, these relationships can be developed easily within the spreadsheet design. We then would move to using cost of capital in the capital budgeting analysis. Within the analysis, of course, would be the cash flow estimations tied to the forecasted income statements and balance sheets. Explaining each step and its connection is done efficiently with the use of Captivate 2 for it allows us to both emphasize the components and the big picture to student observer.

Benefits to Students

Sarker found that the majority of students prefer a hybrid version of course delivery (both online content and material delivered in-class because they consider finance a subject too difficult for online delivery alone (Nicholson and Sarker, 2002). Other researchers have learned that face-to-face instruction was the preferred method, along with making pertinent material available online (Peng, 2006). The author suggests this is the case because much online material is text-driven in nature and as a result lacks some instructional value. This is especially pronounced when attempting to teach Excel with finance.

Students, therefore, are in a quandary because they prefer the traditional face-to-face courses with which they are most familiar, yet their life situations make it necessary to take online courses (Simonson, et al. 2003). Therefore, both reluctance and necessity are operating on the motivations of an online student.

Some of this anxiety can be addressed with the use of the screen capture technology described above, eliminating the necessity to be in a computer lab setting. The author suggests that an effective strategy should be one that ensures the learner has a meaningful and memorable experience and achieves desired learning outcomes.

When using a screen capture techniques the student can simultaneously interact with the problem solving exercise by executing the actions depicted on screen. These steps prompt the student to manipulate the interface. The student must perform a physical action (for example, click the mouse) that relates to what is shown on the screen. Thereafter, the student must focus on the screen to observe the consequence(s) of this action on the system state. The added benefit of stopping and starting the process tailors the exercise to the needs of the learner. This action-oriented element, combined with the audio explanations provided by the instructor, enhance the use of auditory and physical elements.

Although the research in this area is limited, there are some researchers who have developed tutorials on spreadsheet skill development helping students understand the mechanics of spreadsheets. (Troxell, 2002; Seal and Przasnyski, 2003). In the interest of applying the understanding of spreadsheets to solve problems and an inherent range of student abilities, covering both in a single audio screen capture exercise is more efficient. The online learner can then work at his/her own pace to integrate his/her understanding of the program and the process most efficiently.

In implementing the Adobe Captivate 2 program, the author has used action-research techniques to investigate the effectiveness with which the use of technology supports students' learning of hands-on skills. The preliminary observation of this study suggests that if instructors appropriately adopt onscreen-action-capture technology, the effort could have a positive effect on students' hands-on skills in online learning environments. Effectiveness depends, however, on the instructors' awareness of related issues, including the importance of both an online community and interactivity among participants.

Therefore, students must integrate both the mechanics and concepts in their thought process in order to fully master Excel as a finance tool before they can proficiently solve more complex financial problems. Audio screen capture lectures allow students to focus on concepts that they do not fully comprehend and practice putting information together at a pace that is appropriate for their individual needs.

Benefits to Faculty

Creating custom tutorials gives instructors the option of customizing each tutorial to be exactly the way each instructor desires it to be to supplement specific approaches to the modeling logic of a given topic. To the author, the ability to customize outweighs the advantages that may be obtained from off-the-shelf modules. Updates and modifications can be easily done on an ongoing basis once the

software is mastered and the initial development is completed.

The URL address where the Adobe Captivate 2 lectures are stored online can be accessed by any users the instructor deems necessary. This additional benefit provides a ready-made library of Excel presentations that can be used by multiple sections of a course or multiple courses. The degree of the usage by multiple classes depends on the relative nature of the presentation to a given course.

Publishers also commonly provide student disks or web site access to spreadsheet templates for cases and problems. Spreadsheets (e.g., Excel), however, are primarily used for application purposes, rather than introducing financial theory. Online lectures to explain Excel's theoretical and practical aspects add value to any text that integrates Excel into its material.

The author recognizes that the current generation of screen capture technology, particularly Adobe Captivate 2, has advanced to the point where creating tutorials has an easy learning curve, allowing faculty to create a basic tutorial in about an hour. More advanced and interactive tutorials can take up to several more hours depending upon the complexity of the interactivity.

Conclusion

Online education is not for all students or faculty members. It requires faculty to learn to use new tools and to spend significantly more time on organizing, preparing, teaching, and monitoring the class compared with traditional classes (McEwen, 2001). The learning curve required to produce screen capture Excel presentations, however, is short and the technological training is minimal. This may appeal to faculty who, until now, have been reluctant to incorporate this particular technology into their teaching strategies. It is even feasible that the task of creating Captivate 2 lectures could be delegated to teacher assistants with proper supervision. The exercise of constructing an audio screen capture presentation may also be a justified exercise as an assessment tool for a student's learning portfolio.

Northrup (1998) argues that additional training on new instructional techniques and strategies for promoting interactivity and providing adequate and timely feedback may promote an online environment more conducive to learning. The use of Captivate 2 could be a technology that meets the needs of both students and instructors and may allow the instructor to more effectively integrate Excel, an essential tool for finance, into online courses. It may also reduce students' anxiety, who may be reluctant to study Excel's role in the study of finance in an online environment.

The author suggests that the use of Captivate 2 could be added to a strategy that will ensure that the learner has a meaningful and memorable learning experience, while achieving desired learning outcomes.

Future Research

The next step in this process is to measure how effective the use of visual assistance provided with screen capture is to students viewing lectures online.

This will be done by data collection by a survey instrument which first of all determines whether the learner is primarily visual, auditory or both visual and auditory driven.

Then I will try to connect how successful the use of screen capture was in improving the satisfaction and knowledge acquisition level of the students

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