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BUSINESS DISCIPLINES**

**ASSOCIATION OF
BUSINESS INFORMATION
SYSTEMS**

Proceedings and Directory

**March 1 – 4, 2006
Renaissance Oklahoma City Hotel
Oklahoma City, Oklahoma**

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INFORMATION SYSTEMS**

2006 Refereed Proceedings

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**Association of Business Information Systems
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Annual Conference in Oklahoma City, OK

Thursday - March 2, 2006

7:15 a.m. – 8:00 a.m.

Room 21

ABIS Continental Breakfast (*Members only*)

Co-Sponsored by: **The College of Business of Northwestern State University**

8:00 a.m. – 9:00 a.m.

Room 21

MEETING Association of Business Information Systems Business Meeting

Session Chair: **Beverly Oswald**, Southern Arkansas University
President, Association of Business Information Systems

9:00 a.m. – 10:00 a.m.

Room 21

SESSION A: Opening Session and McGraw Hill/Irwin Distinguished Paper

Session Chair: **Beverly Oswald**, Southern Arkansas University
President, Association of Business Information Systems

Predicting Success of Small Business E-Commerce

Daniel Friesen, Midwestern State University

Ryan Krietsch, Midwestern State University

10:00 a.m. – 10:30 a.m.

Ballroom C

FBD Coffee Break

Congratulations!
Recipient of the 2006 Thomson South-Western Outstanding Educator
Award

Vanessa Lee Ritchie
Mississippi Gulf Coast Community College at Perkinston

Thursday – March 2, 2006

10:30 a.m. - Noon

Room 21

SESSION A: Students: Graduation and Beyond

Chair: **Chynette Nealy**, University of Houston--Downtown

Graduation and Drop-out Rates of Computer Information Systems Majors
Walter Creighton, Northwestern State University

Business Communication Competencies/Skills: Students' Perceptions
Margaret Kilcoyne, Northwestern State University
Julie McDonald, Northwestern State University

Technical Certification and Licensure Through MIS Programs at AACSB Accredited Schools
Beverly Oswald, Southern Arkansas University
Carla Barber, University of Central Arkansas
Ronnie Watson, Southern Arkansas University

Teach Students to Design an Effective and Useful Web Site
Marcel Robles, Eastern Kentucky University

Thursday – March 2, 2006

1:30 p.m. – 3:00 p.m.

Ballroom A

SESSION A: Computer Crime, Security, and Ethics

Chair: **Margaret Kilcoyne**, Northwestern State University

Virtual Ethics
Chynette Nealy, University of Houston—Downtown
Carolyn Ashe, University of Houston—Downtown

Legal Responses to Spyware Invasions and Implications for End-Users
John G. Igwebuike, Alcorn State University
Nansi Swartwout, Alcorn State University

Dealing with Identity Theft: An IS/IT Professor's Personal Experience with Lack of Media Richness
Betty Kleen, Nicholls State University

Portal Security
Jacob Ogunlade, Walden University

Thursday – March 2, 2006

3:00 p.m. – 3:30 p.m.

Ballroom C

FBD Coffee Break

3:30 p.m. – 5:00 p.m.

Room 12

SESSION A: Joint ABIS and SWDSI Panel Discussion

Topic: The State of IS Enrollments: Have We Turned the Corner?

Panel Co-chairs: **Julie McDonald**, Northwestern State University
 Lynn R. Heinrichs, Elon University

Panel Members: **Betty A. Kleen**, Nicholls State University
 Walter Creighton, Northwestern State University
 Carol J. Jeffries-Horner, Our Lady of the Lake University
 Beverly J. Oswalt, Southern Arkansas University
 Brian J. Reithel, University of Mississippi

Information systems programs across the nation have suffered from a decline in enrollments. Many reasons have been offered for the decline such as the dot com bust and the media focus on outsourcing of information technology jobs. While waiting for the decline to reverse, programs must sustain themselves or risk losing valuable resources such as faculty. Panelists will discuss the enrollment patterns at their own institutions, what actions they have taken to sustain their programs, and their expectations for future enrollments.

Friday – March 3, 2006

8:30 a.m. – 10:00 a.m.

Biltmore

SESSION A Teaching and Curriculum

Chair: **Walter Creighton**, Northwestern State University

An Investigation into the Correlation Between Math Skills and Microcomputer Applications Skills
Nansi Swartwout, Alcorn State University

How to Structure and Evaluate Information Technology Assignments
Brent Reeves, Abilene Christian University
Ian Shepherd, Abilene Christian University

Are we Teaching the Computer Application Skills Employers Need?
Susan Evans Jennings, Stephen F. Austin State University
Ann Wilson, Stephen F. Austin State University

Friday – March 3, 2006

10:00 a.m. – 10:30 a.m.

Ballroom C

FBD Coffee Break

Please make plans to visit the exhibits to receive information on the latest books and newest education technologies.

◆
Please let exhibitors know how much we appreciate their presence and continued support!

10:30 a.m. - Noon

Room 21

SESSION A Internet Issues and Technology

Chair: **Jere Hatcher**, Louisiana State University in Shreveport

How Much Content Should Internet Outlets Give Away?

John Scott, Southern Arkansas University

Beverly Oswald, Southern Arkansas University

A Wealth of Knowledge for Free

Adnan Omar, Southern University at New Orleans

Alfred Samman, Southern University at New Orleans

Teaching Introduction to Application Programming for Non-CIS Majors via the Internet

Walter Creighton, Northwestern State University

Friday – March 3, 2006

1:30 p.m. – 3:00 p.m.

Room 21

SESSION A Disaster Planning and Information Technology

Session Chair: **Julie McDonald**, Northwestern State University

Expansion of Broadband Access in Louisiana: Issues and Options

Jere Hatcher, Louisiana State University in Shreveport

IT Disaster Recovery Planning: Lessons Learned from Hurricanes Katrina and Rita

Beverly Oswald, Southern Arkansas University

Carla J. Barber, University of Central Arkansas

IT and the Strategy of Continuous Innovation

Patrick Fitzgerald, Oklahoma City University

Max Doleh, Oklahoma City University

Frank Pfaff, Oklahoma City University

Friday – March 3, 2006

3:00 p.m. – 3:30 p.m.

Ballroom C

FBD Coffee Break

Please make plans to visit the exhibits to receive information on the latest books and newest education technologies.

◆
Please let exhibitors know how much we appreciate their presence and continued support!

3:30 p.m. – 5:00 p.m.

Room 21

SESSION A Management Issues and Information Systems

Session Chair: **Carla Barber**, University of Central Arkansas

Impact of Effective Collaborative Communication on the Success of Collaborative Commerce at FedEx Corporation

Beverly Oswalt, Southern Arkansas University

Integrating Gartner Resources into the IT Management Curriculum

Robert Mitchell, University of Arkansas at Little Rock

The Use of LanSchool to Control and Enhance Management Lectures in Computer Classrooms

Brett Landry, University of New Orleans

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DISTINGUISHED PAPER AWARD

2006

Predicting Success of Small Business E-Commerce

Daniel Friesen, Midwestern State University

Ryan Krietsch, Midwestern State University

PREDICTING SUCCESS OF SMALL BUSINESS E-COMMERCE

Ryan Krietsch and Daniel D. Friesen, Midwestern State University

Abstract

Logistic regression was used to determine if the composite variables *entrepreneurship*, *customer focus*, and *on-going innovation* predict which small business e-commerce programs will be very successful versus marginally successful and not successful. Data was gathered through a survey emailed to small businesses throughout Texas.

Introduction

This paper documents an analysis to identify critical success factors (CSFs) that exist in currently successful, small business electronic commerce (e-commerce) programs. The two purposes of this research are: (1) to provide direction for small businesses that start, or are considering starting an e-commerce program, and (2) to provide ideas for improving activities of small business e-commerce programs. To the authors' knowledge, this is the first study of small business e-commerce programs involving CSFs.

E-commerce Incentives

The definition of e-commerce used in this paper is "the sharing of business information, maintaining business relationships, and conducting business transactions by means of Internet-based technology" (Poon & Swatman, 1998). *Financial Executive Magazine* (2003) noted "more than one half of small and medium sized businesses said information technology will be more important in helping their company to achieve its business objectives in the next year." Perceived benefits include financial improvement and an increase in customer base. Indirect benefits include new business opportunities and improvements in marketing. The Internet allows businesses to expand markets, handle and track transactions more easily, and cut costs by finding either cheaper suppliers or alternative solutions ("A Thinkers' Guide," 2000). In a study by Poon and Swatman (1998), business owners said that they believed that engaging in Internet activities would prepare their firms to take advantage of unanticipated business opportunities. Long-term indirect benefits include continued business initiatives and overall business transformation (Poon & Swatman, 1998, Barua et al., 2001). Other important benefits of e-commerce to small business owners include improved information gathering, email, and quick response capabilities (Pratt, 2002). In addition, the Internet makes it possible for companies to find new customers without relocating or paying expensive marketing costs (Barua et al., 2001).

In comparison with traditional business methods, e-commerce offers small businesses significant opportunities to increase customer base. Methods of attracting customers include supplying information about new

products, extolling successes, and keeping customers informed about important events (Barua et al., 2001, Burgess, Sellitto & Wenn, 2003).

E-commerce Failures

Not everyone who attempts e-commerce initiatives is successful. Golmolski (2000) predicted that "Sixty percent of business-to-consumer dot-com companies formed between 1997 and 2000 will dissolve by 2005—a 50% increase over historical dissolution rates." Lack of understanding of the capabilities and limitations of running an e-commerce program is the most often reported cause of small and medium enterprise (SME) e-commerce failure.

E-commerce entrepreneurs who ignore the need for a basic technological knowledge of e-commerce are setting themselves up for failure. Further, those who expect technical experts, such as programmers, to automatically base technology acquisition on the business plan are in for a rude awakening. The entrepreneur has to be the link between the technological and business elements (Mulbery, Paper, & Pedersen, 2003). Hay (1994) found that "the key internal growth constraint is managerial capacity and the unwillingness on the part of the owner-managers to incur the risks associated with growth."

Planning and controlling are important aspects of successful e-commerce programs. Unfortunately, small businesses are not effectively planning and evaluating their e-commerce programs (Burgess et. al., 2003). Research by Burgess et. al. (2003) found that, in general the contact information of small businesses was inaccurate, emails were not promptly answered, and backup plans were not available when servers went down. In addition, many businesses fail to track e-commerce performance measures the way they track traditional business measures including inventory turn-over and order-to-delivery cycle time. One-third of business managers have no idea how much money they spent on building their web site (Burgess et. al., 2003, Barua et. al., 2001, Pratt, 2002).

Other failure-related issues include the fact that e-commerce activities take up a significant amount of time, which may interrupt a firm's ability to engage in the core of its business (Poon & Swatman, 1999). Finally, e-commerce failure can also be attributed to the lack of reliable guides and information (Barua et. al., 2001) since "theory development in the area of e-commerce for SMEs is in its infancy" (Mulbery et. al., 2003).

E-commerce Successes

Many small businesses thrive by using e-commerce, but a clear definition of success is elusive.

Mulbery et. al. (2003) describes small business e-commerce success as “a solvent e-commerce business that has continuously generated a profit for at least five years.” Research by Hopkins (1997) shows that only 3% of small companies actually grow. Research by Kumar, Kumar, & Maheshwari (2004) derived measures of success from information systems, e-commerce success, and balanced scorecard methodology since “no comprehensive measure for e-business success was available from the literature.” Their measure of success includes increased return on investment, increased profitability, improved business processes, improved flexibility, and improved product and service innovation (Kumar et al., 2004). Research by Barua et. al. (2001) has shown that companies that had significantly improved financial performance had three common success factors: (1) higher Internet revenue, (2) higher procurement, and (3) higher new-customer acquisition.

Some firms choose not to grow. Success is a relative term. A small business owner enjoys relative freedom in defining success while a corporate chief executive officer (CEO) must answer to investors. Some small business owners operate their business to allow them to live in a certain location, while others do not seek growth, but prefer a supplementary income (Pratt, 2002).

CSFs are defined as “the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization” (Rockhart, 1979). Companies that achieved rapid growth and had been in business at least 2 years demonstrated an average of 5.7 of 7 CSFs recommended in the study by Chappell et al. (2002). Mulbery et. al. (2003) logically derived 10 CSFs by interviewing 15 successful small business e-commerce CEOs. These CSFs included fundamental skills and knowledge, opportunity identification, market research, competitive assessment, strategy development, technical delivery, web review, risk assessment, initial launch implementation, and continuous innovation. Kumar et. al. (2004) derived 8 CSFs from a study of 34 Canada-based Internet firms. Of these CSFs, the most significant were e-business organizational culture, customer focus, technical infrastructure, and e-business strategy. Of significance were website management and supplier orientation. Barua et. al. (2001) presented a very customer focused set of CSFs. The study listed customer orientation, supplier orientation, internal operations, customer processes, supplier processes, internal operation processes, customer readiness, and supplier readiness as the drivers of e-business. And finally, a study by Chappell et. al. (2002) of high growth e-businesses described 11 CSFs derived from telephone interviews of 46 large, medium and small businesses. They listed content, convenience, control, interaction, community, price sensitivity, brand image, commitment, partnership, process improvement, and integration as key components. The study by Mulbery et al. (2003) was the only one that involved SMEs solely.

Of the CSFs listed above, a reoccurring theme of three CSFs appeared from each of the researchers. These three CSFs are *entrepreneurship*, *customer focus*, and *on-going innovation*. The next three sections describe the components of these three CSFs.

Entrepreneurship

A reoccurring theme in the literature is that the key to growth in small businesses comes from solid entrepreneurial leadership (SME Policy Unit, Ministry of Economic Affairs, 1999). Chappell et. al. (2002) states “the impact of business founders on organizational success remains the leading factor.” *Entrepreneurship* includes the ability to “create, innovate, bear risk, and manage and achieve targets” (Jennings, 1994).

Another important aspect of e-commerce initiatives and their success is funding. Funds for the smallest firms typically come from personal and family savings. External investment from venture capitalists as opposed to strategic partners creates more pressure to succeed. This is because venture capitalists offer management expertise and networking as well as liquidity. In return they expect ambitious returns, and therefore create pressure to succeed. E-commerce initiatives often fail when they are unable to secure additional capital (Chappell et. al., 2002, Pratt, 2002).

Another factor of entrepreneurship includes setting e-commerce strategy, which is a key to success (Mulbery et. al., 2003). Pratt (2002) stated that, “leading edge entrepreneurs are demonstrating imaginative ways to conduct e-business.”

When performed in-house, technical delivery, initial launch, and implementation of a website are team efforts that require considerable management skill on the part of the entrepreneur. The entrepreneur must assemble and economically integrate programmers, business developers, and designers to deliver a web site (Mulbery et. al., 2003). Currently prices for e-business services too high for many small businesses (Torode, 2002).

Some of the most successful small businesses have one or two skilled employees who possess the technical expertise to make the information technology (IT) equipment work. Small businesses that can retain skilled computer technicians will more likely achieve e-commerce success (Mirchandani & Motwani, 2001). Businesses that employ technically skilled workers often enjoy e-commerce success (Babcock, 2003).

Risk is another important entrepreneurial facet; risk is defined as “exposure to possible loss or injury” (Phillips, 1997). Risk reduction in an SME involves being conservative in terms of spending, and using technically skilled employees. Risk reduction techniques include the use of sweat equity, partnerships, good hiring practices, and purchasing high quality information technology (IT) equipment. Sweat equity is the practice of providing stock or incentive to employees based on performance level (Mulbery et. al., 2003). Chappell et. al.

(2002) stated “in order to tie good employees to the company they need to hold a stake in it.”

Finally, e-commerce entrepreneurs must be committed to their projects. Ultimately, success requires that entrepreneurs need to be excited about doing business in new and innovative ways (Chappell et. al., 2002).

Customer Focus

Another reoccurring theme in the e-commerce literature involves *customer focus*. Most companies must be able to rely on their customer relationships to maintain an advantage against competitors. Customer loyalty is important because the World Wide Web is a “sticky space” meaning customers will return to a website that is user friendly (Chappell et. al., 2002).

Finding and retaining customers is very important. Building a loyal customer base involves providing quick response to customer needs, detailed pre-sale information, order delivery, product/service satisfaction, and thorough post-sale support. Proper web design is important to delivering these items to the customer because “customers will more readily return to a site where it is easy to do what they want” (Chappell et. al., 2002).

Internet promotion and web design are key components of attracting new customers. To be successful, web sites must deliver a satisfying experience to the customer. Particular requirements include dependability and reliability, and the site must make the customer feel like the business is trustworthy (Maheswari et. al., 2004). Also, contact information must be made easily available to avoid frustrating the customers.

Once contact is made, businesses need to process feedback as quickly as possible in order to incorporate it into improved products and practices. Not doing so in a timely manner can have adverse consequences. Other important customer-related features of a web site include a frequently asked questions (FAQ) section, ability to submit and track orders, and ability to pay for orders online (Barua et. al., 2001).

Finally, web site review is a key factor of creating a successful, customer-friendly web site. This involves having a third party act as the customers/users in order to review the web site after it has been delivered, and before it goes public. Web sites that are reviewed seem to fare better than those that are not reviewed in that customers tend to return to reviewed sites (Mulbery et. al., 2003).

On-going Innovation

A recurring theme that emerged from the literature of CSFs was on-going innovation. E-business requires rapidly paced innovation. Commitment requires preparing for continuous innovation and reinvention of strategy. This means small businesses must be open to new ideas, technology, customer behavior, opportunities, and partnerships. Key elements of innovation include

continuously developing new products, developing partnerships, and acquiring other small ventures. This allows businesses to enter into new markets and expand business through product service extension (Chappell et. al., 2002). Improvement, re-engineering and constant innovation are essential in an ever-changing world of technology and e-commerce since “Innovate, Innovate, Innovate are the three things you must do to survive in the e-commerce world” (Mulbery et. al., 2003).

Approach

In order to study the identified CSFs, it is hypothesized that the three CSFs are vital to small business e-commerce programs. To test this hypothesis, small businesses in Texas were asked a series of questions through an email survey. The goal of the research was to conclude if the three CSFs—*entrepreneurship*, *customer focus*, and *on-going innovation*—are important to e-commerce success in small businesses. Although not discussed in this paper, managers were also asked to provide specific important factors they felt were crucial to running their e-commerce programs.

The first CSF found in the literature was *entrepreneurship*. The literature suggests that this variable includes: (1) owner/CEO fundamental skills and knowledge of e-commerce, (2) how the owner/CEO secured funding for the e-commerce project, (3) if the owner/CEO developed a detailed e-commerce strategy before starting the e-commerce initiative, (4) if the owner/CEO involved employees in the success of the e-commerce venture, and (5) if the owner/CEO is open to new ideas and innovation. Further, since most small businesses do not have the resources that large companies have, it is even more crucial that the owner/CEO have a multi-faceted and integrated role in the operation of the e-commerce initiative.

The second CSF suggested from the literature is *customer focus*. This variable includes: (1) professional web site design, (2) delivery and ease of use, (3) ongoing attempts to bring in new e-commerce customers, (4) effective management of current e-commerce customers, and (5) immediate incorporation of feedback into the website. If a small business delivers a professional looking, easy to use website with detailed product and company information, updates the website based on customer feedback as soon as possible, and strives to maintain close relations with its customer base, then the business should have the customer focus necessary to bring its e-commerce program to success.

The third CSF found in the literature is *on-going innovation*. This variable concerns a small company’s ability to: (1) exploit new technology, (2) stay open to constant change, and (3) keep its employees educated while offering incentive to increase their knowledge of e-commerce and related technologies. The rationale behind this variable is that companies that stay at the forefront of Internet technology and take advantage of changes in

technology should be the beneficiaries of successful e-commerce programs.

Based on the literature it is expected that all three CSFs have high scores for small companies with successful e-commerce programs, and low scores for ones with unsuccessful programs. Since a definition of small business e-commerce success is elusive in the literature, perception of success became the dependent variable.

Method

Data for this research was collected from small businesses engaged in e-commerce in Texas. The participants were asked to provide both factual and perceived responses to questions about their e-commerce programs. The questions, derived from the literature, were used to determine if three success factors were critical to the success of a small business's e-commerce program.

Participants

A sample plan that would result in a group that represents small businesses engaged in e-commerce around the United States was considered. Unfortunately, the cost proved prohibitive. It was decided that small businesses engaged in e-commerce in Texas would provide an acceptable subset of U.S. e-commerce small businesses for this study.

The companies selected for the survey were required to be involved with e-commerce for at least 3 years. The definition of a small business is one that employs 250 people or less (Pratt, 2002). Small businesses surveyed that were not purely e-commerce companies were included in the research.

Materials and Procedure

The database of businesses was acquired in printed format from CJS Business Directories and through the Freedom of Information Act in CD-ROM format. Businesses from the print edition were manually emailed and businesses from the CD-ROM were surveyed via mass emailing. The statistical software used for the analysis was MINITAB 14.

In addition to email surveys, follow-up telephone surveys were conducted in order to validate the content of the surveys and to solicit additional information on what makes a small business e-commerce program successful. Systematic sampling was used for the telephone surveys. Zikmund (2003) describes the systematic sampling procedure whereby every 100th small business was selected from the database and contacted.

Email Survey

The survey included a letter that briefly described the research and the survey. The letter directed the CEOs of each company to answer the questions and return the email. Surveys of companies engaged in e-commerce for less than three years were removed. The CEO of each company was asked the perceived success of

their e-commerce program in a yes or no format. All other questions asked information specific to a critical success factor on a Likert-type scale from 1 to 5. The first five questions applied to the CSF *entrepreneurship*, the next five applied to the CSF *customer focus*, the last three applied to the CSF *on-going innovation*. The scores for the group of questions for a particular CSF were averaged to yield an overall score for the CSF.

The first survey attempt received only 32 responses out of a list 5411 email addresses, or a response rate of 0.6% which is well below anticipated. Many of the returned surveys were unusable for many reasons such as incomplete information, unreadable format, or not meeting the 3 year criteria. Also, many email addresses had changed since the database was made, causing a flood of "undeliverable" emails. There was also concern that some of the major Internet service providers, e.g. AOL and Hotmail, refused to deliver the surveys under the assumption that their clients were receiving SPAM. Due to these problems the first email attempt became a pilot study which produced 30 usable surveys. Many lessons were learned from this first attempt and some adjustments were made.

The most significant adjustment was the use of a survey website named surveymonkey.com. This service allows the researcher to design the survey, send the survey via email, and collect the data. The price of using surveymonkey.com was slightly less than \$20.

Some adjustments were made to the survey itself. Based on the pilot study, it was obvious that some respondents felt their e-commerce programs were very successful, where others considered themselves to be somewhere between successful and not successful. In the case of the latter respondents, they would often answer "yes" to the question "Do you feel your company's e-commerce program has been successful?" It is possible that in this case a particular respondent may not want to answer "no" as this would admit defeat. To address this problem, it was decided to give the respondents three possible responses to the success question: very successful, marginally successful, and not successful. This way a manager who feels that his or her e-commerce program is only of some benefit may choose between very successful and marginally successful.

Statistical Model

The objective of the research is to determine if the three CSFs—*entrepreneurship*, *customer focus*, and *on-going innovation*—are good predictors of perceived success of a small business's e-commerce program. Logistic regression was selected as an appropriate model for the investigation.

In logistic regression, the dependent variable (0 or 1) is the conditional mean of y given x , $\mu_{y|x}$, which is equal to the probability that the observation belongs to a particular group. Although logistic regression has few

assumptions, outliers and multicollinearity should be assessed (Dielman, 2001).

The nonlinear model used for the regression can be written:

$$\mu_{y|x} = \frac{1}{1 + e^{-(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3)}}$$

Where:

β_0 = Constant

β_1 = **Entrepreneurship** Coefficient

β_2 = **Customer Focus** Coefficient

β_3 = **On-going Innovation** Coefficient

x_i = the value of composite variable i

Here is an example of calculating the composite score for **customer focus**. Suppose the answers to survey questions 12-16 are 5, 5, 4, 1, and 4 respectively. To average these scores add: 5+5+4+1+4. The total is 19. Dividing by 19 by 5 yields the **customer focus** score of 3.8. Table 1 shows how the dependent variable is coded.

Observations with missing data were removed.

An examination of the coefficients of correlation revealed significant levels among CSFs. In particular, the Pearson coefficients of correlation between **on-going innovation** and **entrepreneurship** and between **on-going innovation** and **customer focus** are slightly above 0.6; both coefficients are statistically significant.

Results

The combined response rate of the surveys was 1.8% of 5411 businesses. Of the 92 surveys returned, 64 were usable. The reasons for the 28 unusable surveys were less than three years in e-commerce, too many employees, or improperly completed surveys.

The data gained from the survey was used to calculate the values of the three variables **entrepreneurship score (ES)**, **customer focus score (CFS)**, and **on-going innovation score (OIS)**.

Regression Results

Minitab logistic regression was used to test the validity of the model. The resulting equation is:

$$\ln\left(\frac{\hat{y}}{1-\hat{y}}\right) = 2.4829 + 0.0485*ES + 0.7271*CFS + 0.1698*OIS$$

Where \hat{y} is the predicted probability of the company belonging to the “very successful” group. The estimated coefficients for Entrepreneurship Score ($p = 0.909$), Customer Focus Score ($p = 0.112$), and On-going Innovation Score ($p = 0.650$) have p-values greater than 0.05, indicating that there is little evidence that the individual coefficients are different than zero. The p-value for the test of overall model significance is 0.086. Somer’s D is equal to 0.34. Collectively, this reveals that

the original model is less than ideal for predicting the dependent variable.

One explanation of why the original model does a poor job is multicollinearity, i.e. two or more of the independent variables contribute redundant information due to correlation (Mendenhall & Sincich, 1993). As previously discussed, the coefficients of correlation for the independent variables are suspiciously large. Contradictory results from coefficient tests and overall model tests are symptoms of multicollinearity. (Mendenhall & Sincich, 1993).

One way to deal with multicollinearity is to drop independent variables from the model. However, if the researcher is interested in using the model for estimation or prediction then it may be decided to keep the independent variables in the model (Kutner, Neter, & Wasserman, 1990, Mendenhall & Sincich, 1993). In order to improve the original model, the independent variable with the highest p value, **Entrepreneurship Score**, was removed. Next, logistic regression was run using **Customer Focus Score** and **On-going Innovation Score**. The results are shown below.

$$\ln\left(\frac{\hat{y}}{1-\hat{y}}\right) = -2.4054 + 0.7286*CFS + 0.1917*OIS$$

The estimated coefficients for **Customer Focus Score** ($p = 0.112$), and **On-going Innovation Score** ($p = 0.650$) have p-values greater than 0.05, indicating that there is little evidence that the coefficients are different than zero. However the p-value for the model is significant at 0.037. Although the results returned insignificant independent variable coefficients, the model is statistically significant; this indicates that one or more of the independent variables are contributing to the prediction of the dependent variable “success.” This failure of the individual tests combined with a successful overall model test led the researcher to believe that multicollinearity was present between the variables **customer focus score** and **on-going innovation score**. Somer’s D for this model is 0.34. Thus, there was no decrease in strength of association from dropping **entrepreneurship score** from the original model.

To further investigate the significance of the variables **customer focus score** and **on-going innovation score** on the prediction of the probability of “Success,” each variable was logistically regressed against the dependent variable “Success” one at a time. **Customer focus score** was significant when regressed solely ($p=0.045$).

On-going innovation score was marginally significant when logistic regression was used to describe the dependent variable ($p=0.055$ for coefficient and $p=0.045$ for the model). Since the overall model test was significant and the coefficient test was extremely close, it was decided to keep **on-going innovation score** as a significant and useful variable.

Discussion

The statistical analysis it appears that two variables, *customer focus score* and *on-going innovation score*, are useful in predicting the perceived success or failure of a company. The other variable, *entrepreneurship score*, was not significant in predicting the success of small businesses.

The *customer focus score* incorporated five factors to calculate its score. These factors included a professional looking website, website review prior to release, constant search for new e-commerce customers, care and nurture of current e-commerce customers, and incorporating e-commerce customer feedback immediately. By inspection, we see that of these five factors, professional looking website and website review had the largest differences between very successful companies versus marginally successful and not successful companies. Specifically, 53.7% of very successful companies reported that their website was designed completely by professional programmers compared to 25% of marginally successful companies. Also, 41.5% of very successful companies reported that their website was not reviewed prior to public release as compared to 79.2% of marginally successful companies. Table 2 summarizes the responses of very successful companies, and marginally successful/not successful companies for question 12.

Based on these results, it appears that website design and user interoperability are crucial to the success of a small business e-commerce program. This comment supports the results of this research and reinforces points made in past research that customer loyalty is important due to the fact that customers will return to user friendly websites (Chappell et. al., 2002). Also, customers tend to return to reviewed sites (Mulbery et. al., 2003).

The *on-going innovation score* incorporated three factors in its calculation. These factors included the attitude that innovation is crucial to survival, an active innovative process, and a willingness to reward employees for bettering their e-commerce performance through education. Each of these three factors scored well with very successful companies versus marginally successful and not successful companies. Specifically, 39% of very successful companies strongly agreed that innovation was a key part of their e-commerce program compared to 4.9% of marginally/not successful companies. Forty-eight point eight percent of very successful companies reported that they strongly agree that they are constantly in search of new and better ways to sell their product/service through the Internet compared to 9.8% of marginally/not successful companies. Finally, 36.6% of very successful companies strongly agreed that they encourage and reward employees for increasing their education of e-commerce versus 0% of marginally/not successful companies. Table 3 summarizes the survey

responses for very successful companies, and marginally successful/not successful companies for the questions 17.

Although the variable *entrepreneurship* was not significant in the study, there may be a good explanation for this, and further study may be warranted. Specifically, the survey questions for *entrepreneurship* may have not truly measured the differences between the CEOs of very successful companies versus marginally successful and not successful ones. For example, when asked the question "As owner/CEO I feel I have good fundamental skills and knowledge of e-commerce," 79.5% of all respondents answered either agree or strongly agree. It may be that a more detailed, focused series of questions should be asked to truly ascertain whether a particular CEO has a good understanding of the fundamental skills and knowledge required of a very successful e-commerce program. It is possible that pride may have been a factor in answering this question which may have subsequently hidden the differences of fundamental skills and knowledge between CEOs. In this case a better definition of fundamental skills and knowledge may be required for small business e-commerce and may warrant a study all its own. Other remedies for multicollinearity should be investigated, e.g. factor analysis and cluster analysis.

Conclusion

E-commerce is a valuable tool for businesses: small, medium and large. Much study needs to be done to ensure that businesses that use it are successful. This research sought to determine if three factors, *entrepreneurship*, *customer focus*, and *on-going innovation*, were key to making a small business e-commerce program successful. From the results of the study, it appears that *customer focus* and *on-going innovation* are useful in classifying very successful e-commerce companies. Specifically, companies that produce professional looking, reviewed websites that are user friendly tend to obtain the best results. Certain aspects of *entrepreneurship*, despite not being significant in this study as an amalgamated score, should not be discarded. Instead further research should be initiated to better define what factors of *entrepreneurship* and *on-going innovation* are important to small business e-commerce programs.

Areas for Further Research

E-commerce and its application are in their infancy. There is a tremendous amount of research that needs to be done before small business e-commerce can be truly understood.

The first area for further study should include a better definition of small business e-commerce. The current definition of small business e-commerce is a business that employs 250 people or less (Pratt, 2002). As was discovered, there were many companies that employed less than four people. This varies greatly from some of the companies that were surveyed that included

more than 100 employees. Therefore further delineation of categories of small businesses would be helpful to future research.

Another area for further study is the inclusion of variables other than the ones covered in this paper.

The next area for further study should include the different types of e-commerce businesses. Businesses observed in this survey used e-commerce for a variety of types of money making operations such as the selling of products and services, pay-per-click advertising, contractual bidding, online catalogues and brochures, research, classified web portals for business to business transactions, and Ebay businesses. Researching each of these categories separately may give further insight as to what makes a small business e-commerce program successful. Also, there may be differences in what makes a small business e-commerce program successful in one industry versus another.

Finally, research should be done to find better measures of success and failure for small business e-commerce. It is very difficult to compel companies to divulge confidential information, such as financial information, that could be used as a solid measure of success. Also, many companies may be reluctant to say their e-commerce program is not successful. With a better measure of success it may be possible to achieve a higher quality of data for future research.

References available upon request.

Survey Questions are available upon request.

Minitab output available on request.

Table 1

Dependent Variable Coding

Dependent Variable Value	Code for Regression
Very Successful	1
Marginally Successful	0
Not Successful	0

Table 2

How companies answered question 12

Our website was designed and produced by professional designers and programmers.	Very Successful	Marginally / Not Successful
	Response Percent (Total)	Response Percent (Total)
Not Professionally Produced	26.8% (11)	41.6% (10)
Very Little	2.4% (1)	12.5% (3)
Some	7.3% (3)	12.5% (3)
Most	9.8% (4)	8.3% (2)
All	53.7% (22)	25.0% (6)
Total	100% (41)	100% (24)

Table 3

How companies answered question 17

Innovation – constantly seeking and applying new e-commerce technology – is crucial to our e-commerce survival.	Very Successful	Marginally / Not Successful
	Response Percent (Total)	Response Percent (Total)
Strongly Disagree	14.6% (6)	12.2% (5)
Disagree	9.8% (4)	7.3% (3)
Neutral	12.2% (5)	14.6% (6)
Agree	24.4% (10)	19.5% (8)
Strongly Agree	39.0% (16)	4.9% (2)
Total	100% (41)	100% (24)

Graduation and Drop-Out Rates of Computer Information Systems Majors

Walter Creighton, Northwestern State University

Introduction

Northwestern State University's College of Business offers a four year baccalaureate degree in Computer Information Systems. This program has been recognized as one of the top CIS programs in the nation by prominent companies such as State Farm, Walmart and J.C. Penny's. Graduates have little trouble finding jobs and securing some of the highest entry level beginning salaries. The CIS program does have a problem however in that the number of student's graduating doesn't meet the demand and many national and international companies will not recruit from the university due to the low number of graduates.

Problem Statement

What are the graduation and drop-out rates of Computer Information Systems majors? This paper will present the results of research done on freshmen students enrolled in CIS 1010 – Introduction to Technology from 1999 – 2002.

The six-year graduation rates for full-time entering freshmen for public universities in the United States is 43.9% with Louisiana universities graduation rate being 31.4%. Northwestern State University's graduation rate is 26.5%. (IPED)

How does the CIS major graduation rate compare to the local university, the state and the national average?

Objectives

This paper will present the results of:

- Graduation rates of all classes of CIS majors, but especially CIS freshmen taking the CIS 1010 course

- Drop-out rates of freshmen taking the CIS 1010 course
- Average GPA scores of graduates and drop-outs.
- Tracking students through the program in determining the retention level at each of the first 3 courses in the program – CIS 1010, CIS 1030 and CIS 2020.
- Other information discovered in processing the data (any non freshmen data, etc.)

Curriculum and Course Details

The Computer Information System baccalaureate program for this research required 124 hours with 36 hours of CIS courses. There were 28 hours of the College of Business core (required of all majors). Along with these courses, majors were required to take 60 hours of University core classes. Beginning in the fall of 1999, freshmen CIS majors were required to take CIS 1010 – Introduction to Information Technology. This course covered a variety of topics such as computer hardware, software, systems and provided some hands-on training in word processing and spreadsheets. It generally differed from other computer literacy classes in that it concentrated on issues and topics unique to CIS majors.

After successful completion of this course the students would enroll in CIS 1030 – Structured Programming Design Techniques. This course introduced the students to logical and structured programming techniques such as flow charts, action diagrams and hierarchy charts. The Visual Basic software program was used to teach programming and problem solving. Those passing CIS 1030 then took CIS 2020 – Structured COBOL Programming. In this class, traditional COBOL programming and structure is taught. Those that survive COBOL move onto

the rest of the advanced CIS courses in the curriculum.

Results

This longitudinal research studied 405 Computer Information Systems majors enrolled in CIS 1010 from the fall semester of 1999 through the spring semester 2002. In particular, the research focused on 230 freshmen enrolled in the course for the same period of time. Students not majoring in CIS were not included in the study.

CIS Majors. As of December, 2005 there were 12 or 3% of the students still in the program, i.e. students still majoring in CIS but not graduated. Of the 405 students studied 102 or 25.2% have graduated. These students had an overall final GPA of 3.0. There were 154 or 38% who dropped out or left the university. These students had a 1.9 GPA. For the period studied, 120 or 29.6% changed to another major having a 2.5 GPA. (see Table 1).

Freshmen CIS Majors. Of the 230 freshmen taking CIS 1010 during the semesters studied, 29 or 12.6% have graduated through December 2005. There are 9 or 3.9% students still in the program. There were 109 or 47.4% who dropout or left the university with 69 or 30% changing their major from CIS. (see Table 2)

Continuation Percentages: Of the 405 CIS majors, an average of 58% enrolled in CIS 1030 (Structured Programming Design Techniques). Of those successfully completing CIS 1030, an average of 65% went on to take CIS 2020 (Structured COBOL Programming). If the student successfully completed CIS 2020, there was a 73% graduation rate. (see Table 3)

Discussion

The graduation rate of all students at Northwestern State University is reported as 26.5% and the graduation rate of all students taking CIS 1010 for this study was 25.2%. Both rates are very low compared to the nationwide rate of 43.9%. One factor leading to this low graduation rate is probably that during the time period studied in this research, Northwestern State University was an “open” enrollment university, that is, any student regardless of ACT score was allowed to enroll in the university.

The freshmen CIS majors taking CIS 1010 during the period studied had only a 12.6% graduation rate in the CIS major. That means only about 1 in 8 students stayed with the major. It looking at the overall GPA of students who changed majors, 2.5, some of these students went on to graduate in other majors. Several of these students changing majors had over a 3.8 GPA which probably means they didn’t find the curriculum too hard, but probably just didn’t like Computer Information Systems.

The continuation rates of all class levels of CIS majors from the first course CIS 1010, through CIS 1030 and finally CIS 2020 revealed that out of a 100 students, an average of 58 will enroll in CIS 1030. An average of 38 will continue on and take CIS 2020. One response to this attrition rate has been to provide specific tutors for CIS 1030 (implemented in fall 2005). How the tutors have affected the attrition rate has not been determined at this date.

Since the period time studied in this research the university has implanted enrollment criteria, raising the ACT entrance requirement to 21. This should at least raise the continuation rates. Hopefully this will counteract what seems to be a national decline in students pursuing a Computer Information Systems degree.

References available upon request.

Table 1: CIS Major Profile – All Class Levels (Freshmen – Seniors)

	Number	ACT	%	GPA	GRADE
Continuing CIS Majors	12	17.5	3.0%	2.7	3.2
Dropout CIS Majors	154	18.1	38.0%	1.9	2.2
Changed Majors	120	19.1	29.6%	2.5	2.7
Graduated	102	21.4	25.2%	3.0	3.5
Suspended	17	17.7	4.2%	1.6	2.1

n=405

Table 2: Freshmen Class CIS Profile

	Totals	Continuing Students	Dropouts	Changed Major	Suspended	Graduated	% Graduated
FA 1999	19	0	8	4	1	6	31.6%
SP 2000	26	0	15	9	1	1	3.8%
FA 2000	64	0	26	19	3	16	25.0%
SP 2001	31	1	17	8	4	1	6.5%
FA 2001	66	7	27	25	2	5	18.2%
SP 2002	24	1	16	4	3	0	4.2%
Totals	230	9	109	69	14	29	
%		3.9%	47.4%	30.0%	6.1%	12.6%	

n=230 % Dropouts/Class CIS Profile - 83.5%

Table 3: Continuation Percentages for All Class Levels

Semester	% of 1010 Continuing to 1030	% of 1030 Continuing to 2020	% Graduating After Completing 2020
FA 1999	69%	67%	75%
SP 2000	68%	66%	63%
FA 2000	62%	71%	79%
SP 2001	57%	73%	71%
FA 2001	51%	75%	90%
SP 2002	38%	41%	63%
Totals	58%	65%	73%

Business Communication Competencies/Skills: Students' Perceptions

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Introduction

Communication skills or competencies are an integral part of most business related employment opportunities in today's workplace. Employers expect employees to have oral and written communication skills and to be able to use communication skills for business research. Of course, using the computer and computer-related communication skills is also of vital importance in today's employment market.

Yet, most of the studies and research related to the strengths and weaknesses of current college graduates reveal that one of the major weaknesses is the ability to communicate well in all the business communication skills/competencies just mentioned. Business faculty at Northwestern State University wanted to know if indeed, the students in the business program perceived the importance of certain business communication skills and competences to their future employment.

Problem Statement

Do students perceive business communication competencies/skills as important to their future employment? This paper will present the results of a questionnaire given to all students enrolled in a business communication course at Northwestern State University, a four-year public university, in Natchitoches, Louisiana, during the summer and fall semesters of 2005.

Course Description and Course Objectives

The business communications course at Northwestern State University is a sophomore-level required business course entitled Office Administration 2200. The communications course is listed in the university catalog with the following description:

Communication problems, business letters, employment application procedures. Problem areas investigated by research procedures, sources of data, compilation and arrangement of data, documentation, bibliography, and effective presentation.

The course objectives listed on the professors' syllabi are

1. To present the psychology applicable to business communications.
2. To understand and apply the concepts and techniques essential for achieving clarity through correct usage of English.
3. To learn to construct and present effectively both written and oral reports that solve business communication problems.
4. To understand and apply the concepts and techniques essential for writing business letters.

Students in the Course

This course is designed as a sophomore-level business course. It is a mandatory course for graduation for both associate

and bachelor degrees. Students must have completed two semesters of English composition and at least one computer applications course before enrolling in this course.

The students participating in the study were enrolled in this course during the summer 2005 and fall 2005 semesters. A total of 94 useable surveys will be reported in this paper.

Survey Instrument

The survey consisted of two parts. One part collected demographic information including: school classification level; gender; and age. The second part consisted of four competencies/skills categories. The four categories were oral communication skills, written communication skills, business research; and computer and other communication competencies. A total of 57 competencies/skills items were listed. These competencies/skills were derived from a review of several current business communication textbooks and from current course requirements.

The students were asked to give their perceptions of the importance of the 57 competences to their future job. The students used the response scale of **0**-Undecided (I can't decide if competency would be essential for my job); **1**-Not Important (I believe competency would not be essential for my job); **2**-Somewhat Important (I believe competency would be somewhat essential for my job but could be learned on the job); **3**-Important (I believe competency would be quite essential for my job); and **4**-Extremely Important (I believe competency would be absolutely essential for my job).

Results

A total of 94 useable surveys were used in this study. Forty-three females and fifty-one males participated in the study. The average age of the students was 21, with an age range of 17 to 41. Participants included 3 freshman, 44 sophomore, 21 juniors, and 25 seniors. One student did not report his/her classification.

The competency list was divided into four major communication categories. These categories were oral communication skills, written communication skills, business research competencies, and computer and other communication competencies. Overall, the students perceived all the competencies to be at least somewhat important to their future job. The highest mean was 3.78, using a personal computer, while the lowest mean was 1.84, using a foreign language. In Table 1, Students' Perceptions of Importance of Business Communication Competencies to Future Employment, all 57 competencies are listed with their corresponding means. In Table 2, Students' Perceptions of Most Important Business Communication Competencies, the top 11 competencies with corresponding means are listed. In Table 3, Students' Perceptions of Least Important Business Communication Competencies, the 11 competencies with the lowest corresponding means are listed.

Conclusions

The students appear to believe that using a foreign language might not be essential to their future jobs. However, with the impact of the global economy and the ever-changing diverse composition of the American workforce, employees who possess a working knowledge of a foreign language, especially, Spanish would have an advantage over other job seekers. The students appear to believe that using a

personal computer is quite essential for their future jobs. Local, regional, and national job advertisements list the use of computers as a job requirement or skill necessary for employment. According to Phillip D. Gardner, research director of Collegiate Employment Research Institute,

in his 2003-2004 report employers want employees with developed communication skills (oral and written). Also, he stated that employees must be willing to continually update their technology-related skills.

References Available Upon Request

Table 1
Students' Perceptions of Importance of Business Communication Competencies to Future Job

Competency List	
Oral Communication Skills	Mean
Presenting ideas clearly and concisely	3.71
Listening to others' ideas, instruction, etc.	3.62
Using correct grammar	3.52
Asking appropriate questions	3.43
Communicating on the telephone	3.24
Giving oral instructions to coworkers	3.39
Participating in business meetings	3.45
Giving presentations to small groups (5-15)	2.97
Describing table data and graphic data used in presentations	3.08
Interviewing others	3.01
Conducting business meetings	3.24
Giving presentations to medium groups (16-49)	2.94
Giving presentations to large groups (50+)	2.67
Using a foreign language	1.84
Written Communication Skills	
Presenting ideas clearly and concisely	3.66
Using correct grammar in written work	3.66
Using correct punctuation in written work	3.63
Proofreading, revising, and editing written work	3.62
Writing internal company memorandums	3.01
Writing other business letters	3.33
Writing instructions/procedures	3.18
Writing request letters	3.30
Writing progress reports	3.12
Writing 1-5 page reports	2.76
Writing refusal letters	2.76
Incorporating tables and graphics in reports	3.01
Writing executive summaries	2.96
Writing sales letters	3.02
Writing policy statements	2.87

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Competency List	
Written Communication Skills (continued)	Mean
Writing policies	2.84
Writing 6-10 page reports	2.41
Writing formal reports (over 10 pages)	2.41
Writing collection letters	2.62
Business Research Competencies	
Knowing how to gather information	3.64
Knowing where to collect information	3.54
Conducting research using internal company files	3.27
Conducting research using other computerized sources	3.40
Conducting research using the Internet	3.44
Constructing questionnaire/data collection forms	3.02
Using public or university library	2.88
Computer & Other Communication Competencies	
Using a personal computer	3.78
Taking constructive criticism	3.65
Working in teams or small groups	3.37
Encouraging and motivating others	3.62
Understanding nonverbal communication	3.41
Giving constructive criticism	3.40
Persuading others	3.38
Using a fax machine	3.12
Resolving conflicts	3.36
Using E-mail	3.63
Mediating others' conflicts	2.85
Preparing and using computer-generated visuals	3.28
Using the Internet	3.57
Participating in audio teleconferencing	3.00
Using computer bulletin boards	3.01
Using computer intranet	3.08
Participating in video teleconferencing	2.87

Note. Response Scale: **0**-Undecided (I can't decide if competency would be essential for my job); **1**-Not Important (I believe competency would not be essential for my job); **2**-Somewhat Important (I believe competency would be somewhat essential for my job but could be learned on the job); **3**-Important (I believe competency would be quite essential for my job); **4**-Extremely Important (I believe competency would be absolutely essential for my job).

Table 2
Students' Perceptions of Most Important Business Communication Competencies

Business Communication Competencies	Mean
Using a personal computer	3.78
Presenting ideas clearly and concisely (Oral Communication)	3.71
Presenting ideas clearly and concisely (Written Communication)	3.66
Using correct grammar in written work	3.66
Taking constructive criticism	3.65
Knowing how to gather information	3.64
Using correct punctuation in written work	3.63
Using E-mail	3.63
Listening to others' ideas, instruction, etc.	3.62
Encouraging and motivating others	3.62
Proofreading, revising, and editing written work	3.62

Note. Response Scale: **0**-Undecided (I can't decide if competency would be essential for my job); **1**-Not Important (I believe competency would not be essential for my job); **2**-Somewhat Important (I believe competency would be somewhat essential for my job but could be learned on the job); **3**-Important (I believe competency would be quite essential for my job); **4**-Extremely Important (I believe competency would be absolutely essential for my job)

Table 3
Students' Perceptions of Least Important Business Communication Competencies

Business Communication Competencies	Mean
Using a foreign language	1.84
Writing 6-10 page reports	2.41
Writing formal reports (over 10 pages)	2.41
Writing collection letters	2.62
Giving presentations to large groups (50+)	2.67
Writing 1-5 page reports	2.76
Writing refusal letters	2.76
Writing policies	2.84
Mediating others' conflicts	2.85
Writing policy statements	2.87
Participating in video conferencing	2.87

Note. Response Scale: **0**-Undecided (I can't decide if competency would be essential for my job); **1**-Not Important (I believe competency would not be essential for my job); **2**-Somewhat Important (I believe competency would be somewhat essential for my job but could be learned on the job); **3**-Important (I believe competency would be quite essential for my job); **4**-Extremely Important (I believe competency would be absolutely essential for my job)

CONFERENCE NOTES



Technical Certification and Licensure through MIS Programs at AACSB Accredited Schools

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Introduction

Business degrees at AACSB business schools are typically structured to include one-half of the degree credit in general education courses with the other half being devoted to the business degree. Graduates of MIS under-graduate programs at accredited business schools are severely limited in the number of credit hours in their MIS major (area of concentration) due to the number of traditional business courses required in the foundation and core. The average MIS major (concentration) requires only 24 credit hours of computer courses. However, these graduates compete in the marketplace for entry-level positions with students from certificate, two-year, and computer science programs that require 30-60 hours of computer classes.

The traditional argument from MIS programs in AACSB accredited business schools is that they are preparing students for business or systems analyst positions in middle management. One business school dean tells students that their business major will get them their first job, but their BBA degree will get them their promotions. However, the reality is that most graduates from MIS programs do not enter the job market at the middle management level. Instead, they have to initially compete in the marketplace for entry-level technical positions. Thus, they may be less prepared for entry-level positions than students from other certificate and degree programs.

Research Design

This paper addresses the issue of how to better prepare MIS majors for competitive entry-level positions in the IT job market

given that most programs at AACSB accredited business schools only require 24 hours of computer courses for the MIS degree.

The paper discusses how the MIS programs at two AACSB accredited business schools in Arkansas, Southern Arkansas University and University of Central Arkansas, are preparing students for the entry-level job market by tailoring the content of computer courses to prepare students to take certification and licensure tests in the computer field.

Review of Related Literature

New MIS graduates move into a different workplace than those of a few years ago. They are still expected to have a solid foundation in systems analysis and design, database management, and the fundamentals of programming, but also be familiar with new technologies (Denning, 2001).

One of the factors in preparing MIS students for the job market is the dizzying pace of technology changes. Such developments as electronic data interchange, object-oriented technologies, relational database systems, fiber optics, satellites, wireless communications, software sophistication, and dramatic reductions in the costs of transmission and computing power drive daily changes in technology (Mann, 2000; Gilder, 2000).

Typical programs in information systems may fall short in providing specific skills that have immediate application in the current job market and even those skills may have a short "half-life" -- as short as 18 months (Salisbury, 2005).

The higher salaries and bonuses paid to certified professionals support the fact that many IT managers view certification as a powerful asset (Gilhooly, 2001).

Certification And Licensure Models

The MIS programs at Southern Arkansas University (SAU) and University of Central Arkansas (UCA) are tailoring their courses to better prepare students for taking certification and licensure exams. These changes will enable MIS majors to take the professional exams prior to graduation; thus, becoming more competitive in the job market.

CISCO Certification at SAU

Cisco Systems offers a variety of certifications in the telecommunications and networking areas. The primary certifications are the Cisco Certified Network Associate (CCNA™) and the Cisco Certified Network Professional (CCNP™). The CCNA is comprised of four course blocks. The CCNP is a continuation of the CCNA and is comprised of four course blocks as well. These courses cover general networking and telecommunication skills and practices as well as skills that are specific to Cisco Systems. Cisco Systems is the dominant company in the networking router market with over seventy-five percent of the market share.

Southern Arkansas University offers the CCNA and the CCNP courses as part of the curriculum for the MIS degree. All MIS students are required to take Introduction to Networking I. Introduction to Networking I is comprised of the first two courses for the CCNA (CCNA 1 and CCNA 2.) The MIS program also offers Introduction to

Networking II, which is comprised, of CCNA 3 and CCNA4. Students completing these two courses should be prepared to take the Cisco Certified Network Associate exam. Advanced Networking I and Advanced Networking II are comprised of the four courses required for the CCNP. Students that complete these courses should be prepared to take the Cisco Certified Network Professional exam.

Novell Certification at SAU

The College of Business at Southern Arkansas University is a Novell Academic Training Partner (NATP). The college offers a Special Topics course in Linux once a year. This course is being offered to help students prepare for the Novell Certified Linux Professional (Novell CLP) exam. This course covers most of the topics that are part of the three Novell Linux Courses required to test for the Novell CLP: SUSE Linux Fundamentals, SUSE Linux Administration, and Advanced SUSE Linux Administration. This course is offered as an elective for MIS majors.

CIW Certification at UCA

The College of Business (CBA) at the University of Central Arkansas is implementing a program that will offer Certified Internet Webmaster (CIW) certification training for students that choose to major in the Internet/E-Commerce track in the Management Information Systems department. There are three levels of certification that will be available for students. UCA will be a CIW Authorized Academic Partner (CIA APP) and a CIW Authorized Training Partner (CIA ATP).

Level I - CIW Foundations: Once the exam is taken for this level, students will be awarded the CIW Associate certificate. This level covers foundational skills which will include basic knowledge of Internet

technologies, network infrastructure, Web authoring using XHTML, and job skills such as project management.

The College of Business will provide the material needed to pass this exam in two courses: MIS 3356 Introduction to E-Commerce and HTML Programming and MIS 3363 Telecommunications and Computer Networks.

Students who have completed both MIS 3356 and MIS 3363 with a C or better will be eligible to sit for the Prosoft CIW Associate Certificate exam at UCA.

Level II - CIW Site Designer: Once the exam is taken for this level, students will be awarded the CIW Professional certificate. This level validates human-factor principles in designing, implementing and maintaining hypertext-based web sites using authoring and scripting languages, content creating and management tools, and digital media tools.

CBA will provide the material needed to pass this exam in one course MIS 3366 Web Site Development. Students who are CIW Associate certified, and complete MIS 3366 with a C or better, will be eligible to sit for the CIW Professional Certificate exam.

Level III - E-commerce Designer: Once the exam is taken for this level, students will be awarded the CIW Master certificate. This level focuses on standards, technologies and practices for both business-to-business and business-to-consumer e-commerce models. It addresses relationships among marketing, promotion, customer service, user interaction, purchasing methods and secure transactions by using SSL and SET, payment gateways, inventory control, shipping and order information, and site performance testing and evaluation.

CBA will provide the material needed to pass this exam in one course MIS 4366

Advanced Web Design and Development. Students who are CIW Professional certified and complete MIS 4366 with a C or better will be eligible to sit for the Master CIW Designer Certificate exam at UCA.

Conclusions and Recommendations

Empowering MIS graduates to be competitive in highly specialized areas such as CISCO Networking, Linux OS, and Internet Webmaster can attract new majors to a program and provide a unique way to assess program quality.

It is strongly recommended that all MIS programs conduct a curriculum review to determine which courses can be revised to include specialized training that can lead to professional certification and licensure.

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CONFERENCE NOTES



Legal Responses to Spyware Invasions and Implications for End-users

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Introduction

This paper discusses the legal responses to addressing the attendant problems of spyware. The paper begins by giving a cursory explanation of what spyware is and how it affects end-users. From this introduction, analysis of the legal status of spyware is elucidated: (1) judicial action taken by courts to address spyware is examined. Specifically, the common law doctrine of trespass to chattel is analyzed in order to illuminate why further legislative action is a necessary, but not mutually exclusive, component of an overall strategy to combat spyware. (2) Existing federal legislation and (3) State spyware initiatives are also discussed as to their tenability in combating spyware. In comparing the various state and federal actions in juxtaposition, one readily discerns the shortcomings and gaps extant federal and state law. (4) Because the implications of spyware are of ultimate import to the final end-user, the paper concludes by discussing actions consumers may effectively take to protect their privacy and maintain control over their computing and Internet activities. Thus, the paper calls attention to the role of end-user education in concert with judicial action and federal and state legislation plays in combating spyware.

Torts to the applicable case at bar in issue. According to *Restatement (Second) of Torts*, § 217, a trespass to chattel can be committed where the defendant intentionally (i) dispossesses another of the chattel, or (ii) using or intermeddling with a chattel in the possession of another. According *Restatement (Second) of Torts*, § 218, a spyware defendant “. . . who commits a trespass to a chattel is subject to liability to the possessor of the chattel, if but only if, (i) he dispossesses the other of the chattel, or (ii) the chattel is impaired as to its condition, quality, or value, or (iii) the possessor is deprived of the use of the chattel for a substantial time, or (iv) bodily harm is caused to the possessor, or harm is caused to some person or thing in which the possessor has a legally protected interest.”

The Problem with Spyware

Spyware is software that is surreptitiously implants itself on a user's computer from an unsuspecting download (such as a music service or screensaver download). Once lodged in the hard drive, spyware can invade user privacy in the following ways: (i) invade user privacy by monitoring user web activities; (ii) capture passwords, credit card numbers, addresses, and other sensitive data; and (iii) track key strokes. In addition to the invading an unwitting consumer's privacy, certain spyware applications can insidiously commandeer the user's computer and computing resources by: (i) barraging user screens with a blizzard of unwanted ads and pop-ups; (ii) cause the user's browser to visit sites (salacious and otherwise) that the user would not visit; drain resources (bandwidth and processing power) to communicate user-information to remote locations; and, crash the user's machine.

Spyware is not only insidiously invasive and intrusive, but the problem with spyware is also perplexingly pervasive. According to National Cyber Security Alliance, eighty percent of home personal computers are infected with spyware. Yet, only ten percent of respondents know what spyware programs are (Byron & Swartz, 2004). Spyware presents such a serious threat to users' privacy and control that courts and federal and state legislatures are addressing legal and ethical issues that spyware presents.

A major issue with trying to control spyware is the issue of End-User License Agreements (EULAs). Often buried in the EULA of the intended download is another EULA for a spyware program. By accepting the primary license agreement, the end-user also agrees to all the other EULAs within the agreement. Since the end-user has agreed to accept the all of EULA, even if they did not realize the agreement was there, it makes any legal response difficult.

Judicial Response-Trespass to Chattel Law Suits
Legal action based upon a trespass to chattel action emanates from common law. Common law is judge-

made law or case law. In a trespass to chattel case, a judge would likely apply Restatement (Second) of

Although a spyware trespass can easily fall within the ambit of any, or all, of these above-mentioned areas, to date, no precedent supports a trespass to chattel action based on invasion to computer property. For example, under subsection (i) of *Restatement (Second) of Torts*, § 217, spyware software that causes a computer owner's computer or network to crash logically renders the owner "dispossessed" of the chattel (here, the computer or network). Yet, the courts have simply been unwilling to extend the legal theory of trespass to personal property through application thereof in the digital domain. Hence, common law does not present a viable, legal alternative in combating spyware.

Federal Legislative Response

No federal law specifically addresses the unique features of spyware. Hence, existing laws may be applied to deal with spyware. Three existing federal laws may have relevance to at least the most extreme examples of spyware, although none of the three laws are directly responsive to some of the technology's unique features and all may fail to cover some of the most common cases. While each of the three statutes may relate to the most excessive instances of spyware invasion, none independently apply to even the most mundane intrusion.

Electronic Communications Privacy Act

The Electronic Communications Privacy Act (ECPA) makes it illegal to intercept communications without (a) a court order or (b) permission of one of the parties. The ECPA may provide legal protections against spyware in so far as web browsing information or click-through data intercepted without consent is illegal. However, it is on the issue of consent that many spyware applications find an escape from the strictures of the ECPA. Specifically, applications that work with the consent of the user or the website visited will likely not violate the ECPA. This is the case even though the end user licensing agreement (EULA) was deeply buried, difficult to understand, or filled with legal jargon. The

Computer Fraud and Abuse Act

Computer programs that propagate by exploiting security vulnerabilities in network software and co-opt control of users' computers or exploit their

Internet connection may constitute a violation of the Computer Fraud and Abuse Act (CFAA). Cases where the program steals passwords and other information especially fall within the confines of the CFAA. Thus, the spyware would need to infect the computer and interfere with its operation (or increase user costs) to violate the CFAA. However, many types of spyware would indeed violate the CFAA were not they not excepted from the CFAA because of user consent as with the ECPA.

Federal Trade Commission Act

Title 5 of the Federal Trade Commission Act (FTCA) gives the United States Federal Trade Commission (FTC) the ability to take action against "unfair" and "deceptive" trade practices. One could reasonably categorize certain spyware activities as unfair and deceptive. Typical deception actions include cases where a firm is telling customers the firm will do X but does Y or does X plus Y. Hence, if a spyware application states that the customer is downloading one program but is actually downloading something else, conduct would likely constitute a deceptive practice. Unfairness cases can be brought against companies that trap consumers into unwanted payments. Thus, spyware companies that (i) utilize consumer resources such as computer power or bandwidth; (ii) capture personal information, key strokes, or internet sites visited; and, (iii) make it difficult to uninstall the application could be viewed as engaging in an unfair practice. Thus, among the three extant federal laws, the FTC appears to be most relevant in its direct application to spyware invasions. However, heretofore, the FTC has brought not action against spyware makers or any of spyware distributing companies based on the aforementioned scenarios.

In recapitulation, the three federal laws-ECPA, CFAA, and FTCA-each provide a tenable basis upon which to combat spyware. However, combating power of these regimes is attenuated primarily due to user consent, guideline limitations, or lack of enforcement. Thus, federal law provides a narrow pathway for consumers concerned about spyware. The next paragraphs consider whether state initiatives might be more availing.

State Legislative Response

Utah is the first, and, to date, only state to pass a specific anti-spyware legislation (a la' The Spyware Control Act). Under the Utah statute, spyware creators must give consumers notice that the

spyware is to be installed on their hard drives, obtain informed consent, and provide a means for uninstalling the spyware.

One of the chief criticisms about the Utah statute focuses on its broad definition of “spyware.” Under the Utah statute, “[s]pyware” is defined as “. . . any software that monitors a computer’s usage, reports on that usage, [or] triggers advertisements, and does not provide the adequate notice [as defined by the statute] of its actions”. Hence, opponents assert that the language of the law sweeps too broadly, by potentially making illegal a wide array of network applications that may actually be beneficial to computer users (i.e., web browsers and software update utilities) to ensure proper functioning of the software.

Another concern as to the Utah statute, in particular, and statutes (federal and state), as it applies to a legal framework to combat spyware lends to its narrow focus on privacy. Most legislation challenges spyware on the privacy front. That is, such statutes target spyware programs that reveal user information. However, privacy statutes would not prevent spyware software that commandeers computing resources without revealing user information. Thus, statutes which expressly or implied intend to protect privacy provide a loophole for spyware creators whose product preclude uninstallation or causes piggybacking, etc. So, even if a state, for example, were to introduce legislation that is neither over-broad nor under-inclusive, the critical issue of end-user control remains.

Despite the increased attention to spyware, the average consumer is still unaware that (i) spyware is on the computer, (ii) how spyware entered the computer, (iii) the types of spyware which may be operating on the computer, (iv) how to remove it from his computers if discovered, (v) the available legal mechanisms (i.e., CFAA or common law trespass to chattels) in order to gain recompense for injury, (vi) what company to sue for the spyware on the computer, or the financial resources to mount such suit. We argue that a full solution to spyware must deal, not only with the notice and privacy aspects (which comprehensive legislation would play a vital role), but also with the user-control aspects of the spyware issue

(which user education and trainings plays an inextricable role). To that issue, this paper now turns.

End-User Implications

Perhaps the most significant step toward curbing spyware lies with end-users. First, end-users are the ones who elect the elected officials who will pass spyware protection legislation. Legislation is important in ensuring transparency of on the Internet. Legislation that compels spyware software makers ensure transparency of their applications so users understand what is being loaded on their computers, allows users to control their personal information, and gives users command over what their computers and Internet connections are being used for is a vital step to curbing spyware invasions. Indeed, where legislatures, through appropriate legislation, create this opportunity; users must become better educated about how to protect themselves from spyware. Given the proper tools end-users to distinguish between bona fide software and spyware.

A variety of technologies to help deal with these invasive applications and related privacy issues are in various stages of development. For example, several applications are currently available that search the user’s hard drive for spyware and attempts to delete them. Such vendors include AdAware, Spybot Search and Destroy, Spyware Eliminator, and BPS Spyware/Adware Remover. Other software companies are seeking to create software programs that find and quarantine spyware before the software is ever implanted into the hard drive.

Increasingly, standards such as the Platform for Privacy Preferences (P3P) may also play an important role in aiding transparency on the Internet. P3P is a specification developed by the World Wide Web Consortium (W3C) to allow websites to publish standard, machine-readable statements of their privacy policies for easy access by a user’s browser. Such standards facilitate privacy best practices. They also help end-users make informed decisions, since they’ll be better able to distinguish bona fide software applications from specious spyware programs.

There are a number of things that end-users can do to protect themselves:

1) Run one of the spyware detection and removal utilities. Especially if a computer demonstrates noticeable slowdowns, instability, or odd behaviors, including changed settings, there is a good chance it is infected with spyware. Consider repeating the process weekly.

2) Clear the cache in your Web browser on a weekly basis.

3) Be circumspect about installing free, ad-supported applications unless they are from a trusted party.

4) Read up on new software and always read the applicable licensing agreements (EULAs) before installing it. If the information you find is confusing, send the company email asking detailed questions or gain interpretation from legal counsel or a tech expert. Users should be able to feel comfortable about any software they click “agree” to install.

5) If you find a reference in the EULA to other software than what you are downloading, investigate it. Often, it will be spyware. Make sure you understand how to remove the extra software if you choose to.

6) Check for and read privacy policies posted on company websites, and be extremely wary if no readily accessible policy exists.

7) Do not accept downloads from pop-up windows or from unknown websites.

8) In particular, reading up on applications from independent sources such as computer magazines and Web sites before downloading them is a simple but especially important and effective measure for combating spyware.

9) In addition, users should always take basic security precautions to protect themselves from spyware. Simple measures include keeping

different strong passwords (passwords should not be names, or found in the dictionary and should contain numbers or symbols) and changing passwords frequently. When using a public computer at an Internet café or a library, one should avoid accessing sensitive information such as bank accounts.

Admittedly, no surefire strategy for avoiding spyware exists for end-users. Furthermore, many of the anti-spyware technologies and applications are unclear. Nevertheless, the foregoing suggestions provide a basic framework of due care that users can immediately implement to guard their privacy and help maintain control over what applications are installed on their computers while maintain greater control over their computer and their computing resources.

Conclusion

This paper examined the legal status of spyware. It described spyware and its multiple legal problems to which spyware gives rise. The judicial response to spyware was discussed to point up the need for a comprehensive legislative policy. Various laws-state and federal-were analyzed to draw the conclusion that the language and scope such policy must be narrowly tailored to address the privacy invasion concerns with specific problems of spyware while ensuring the beneficial use of a narrow class of spyware. Finally, this paper assumed that no doubt, the attention paid by lawmakers and courts is a positive trend. Nevertheless, spyware is a complicated problem, and it will require a multifaceted solutions. Congress has a role to play by passing baseline Internet privacy legislation that includes appropriate spyware provisions. At the same time, we cannot assume that legislation alone can address all of the concerns raised by spyware. Industry self-regulation and user education of available technology tools are also essential to give users control over their digital lives

Spyware is very likely here to stay. To what extent it will be affect privacy issues, trespass issues and intellectual property rights will be determined by judicial decisions, legislative actions, and most importantly, end user responses.

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CONFERENCE NOTES

Virtual Ethics

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Abstract

How to integrate ethics content within the business curriculum and assess the learners' outcome is an ongoing discussion for colleges and universities accredited by the Association for the Advancement of Collegiate Schools of Business (AACSB). This paper discusses how an assignment focusing on virtual team netiquette can be used to assess learners' outcomes as it relates to ethics within a virtual environment. Findings are also presented as to how on-line course material can be integrated to examine ethical issues involving workplace and social responsibility.

Introduction and Rationale

Why integrate ethics and on-line communication?

During the last few decades of the 20th century, innovative changes in information technology contributed tremendously to rapid and global electronic communication. Although these changes have been quite effective, some disadvantages have been created with the use of electronic mail (e-mail). One example is the unethical practices of personal and social usage of technology in the workplace. According to Surf Control Company (2000), the average worker goes on-line more than three times a day for non-business purposes.

Subsequently, this activity contributes to and/or causes other workplace interruptions. These findings support a prior study revealing implications that increasing amount of technology in the workplace hinders productivity (Pitney Bowes Inc., 1999).

A primary contributor, spamming, described as receiving unsolicited electronic communication without consent, create problems primarily related to bulk (Falk, 1998). These unsolicited electronic communications are often a result of non-business related on-line activities such as employees visiting sites with multiple links. These unsolicited e-communications result in post promotional pop-ups. The majority of workers are interrupted by communication technology every ten minutes, with the average U.S. worker receiving over 200 e-mails per day totaling 1,000 messages a week (Pitney Bowes Inc., 1999). Pop-ups, a strong form of spam, grew from 3.9 billion to nearly 5 billion impressions during a three-month period (Hansen & Olsen, 2002). Businesses, employees, consumers and state attorneys are trying to stamp out the irritating spam on-line sales pitches. These various types of spam clog up the transmission systems causing the loss or delay of important messages. Some varieties of spam include: commercial, noncommercial, unsolicited bulk electronic mail (UBE), unsolicited commercial electronic mail (UCE), and flaming. Flaming refers to that which provokes anger as well as that which involves unethical acts such as vulgarity, pornography, and offensive slurs related to cultural diversity (Sorkin, 2001).

The lack of courtesy or etiquette when sending messages by electronic mail that clog websites and are sometimes offensive resulted in the development of a term called netiquette. Netiquette is identified as the professional code of behavior for electronic communications

(<http://www.albion.com/netiquette/corerules.html>). The basic premise of netiquette is to treat people with courtesy and consideration. This involves courtesy on the NET, Newsgroups, chat rooms, World Wide Web, electronic mail and other networks. The following five core rules and/or a set of guidelines for behaving properly on-line are important when applying netiquette:

1. remember that you are communicating with another human being
2. behave ethically
3. look before you leap
4. respect other people's time and bandwidth (the information carrying capacity of the telephone lines or networks used to transmit your message); and
5. be tolerant of other people's mistakes. Give them the benefit of the doubt

(<http://www.albion.com/netiquette/corerules.html>).

This paper discusses how assignments focusing on ethics and virtual team netiquette were used to assess learners' outcomes as it related to ethics within a virtual environment. The paper also presents findings as to how on-line course material can be integrated to examine ethical issues involving workplace technology and social responsibility.

Topic Delivery

The ethical issues emerging from technological advances are of particular concern to instructors' teaching on-line courses. It is essential, given the increase number of courses taught on-line, that strategies and practices regarding instructional delivery (modes of curricular development and applications) result in enhancement of students' learning

opportunities. For example, electronic communication (e-mail) is one of the most useful features for business (Bovee & Thill, 2000). Hence, an instructional objective would be to engage students in activities that focus on ethical constraint as it relates to factors affecting workplace communication. A lapse in decision-making to use e-mail for non-related work communication could cause an ethical dilemma. Identifying and analyzing an ethical dilemma using industry news could be used to circumvent unethical communication practices and help students to develop transferable workplace skills. Moreover, the process provides students with an opportunity to understand the benefits of professional on-line behavior.

Numerous methods can be used to assist

students in their preparedness of ethical and on-line professional communication. The sample lesson discussed in this paper can be adapted for classroom and practitioners' usage. The objectives are:

1. discuss why netiquette in the workplace is important and how it can help develop and/or enhance ethics and social responsibility;
2. engage students in a virtual team project examining netiquette; and
3. assess (post on-line survey) experiences and practice of netiquette which might relate to professional on-line behavior.

Theory and Pedagogy

Activity Theory is described as one that can be used to frame the evaluation of virtual

programs involved in technology-mediated contexts (Engestrom, 1999). A major feature of Activity Theory is that it enables the use of an analysis of human-technology such as subject-tool interaction as well as subject-object interactions. This practice extends the parameter of interactions from the minds of individuals and from human-computer interactions to an entire activity system.

Content used to develop assignments for this project was driven by Activity Theory framework. The assignments used lecture to explain the objective (subject-tool interaction) and the expected student outcomes (subject-object interactions). Active learning occurred during individual use of technology: pre, during and post activities. Discussion and questions at the end of the assignments allowed students to extend their understanding of virtual team netiquette. As moderator of the discussion, a comparison was made between human-technology and traditional face-to-face work team tensions.

The supplemental discussions were designed to provide additional clarification, since activity systems are complex and are characterized as sometimes contributing to internal tensions and contradictions (Engestrom, 1999). Tensions and pressures that may enter a virtual system may serve as positive or negative forces. These forces can help to identify strengths or weaknesses that foster continuation, if positive and changes, if negative. Similar to storming, one of the stages in face-to-face work team development and operations when the team lacks progress or becomes overly zealous is frustration and anger (Dufrene & Lehman, 2002). These negative expressions are similar to those that may occur when experiencing flaming spam, which interrupts workplace progress during virtual activities. Netiquette can be used to relieve tensions or frustration resulting from flaming spam or negative effects of virtual program complexities. Storming may assist in

team activities to overcome flaming spam or to reduce tensions, even though they were not the result of complexities in the virtual programs as the Activity Theory mentioned.

Method

Three assignments with a post on-line survey were used to examine students' experiences and practices of netiquette in virtual management courses. Ninety-seven senior level business students enrolled in two virtual courses participated in an 8-week project. Data generated from background information: gender, race, employment history, and virtual experiences were used to assign students to geographically dispersed virtual teams within a large metropolitan area. There were fifteen teams of six, and one team with seven members.

The students' objectives focused on three distinct phases (pre, during and post), experiences, and practices of netiquette. The objective of the project was to determine whether assignments in the classroom influenced and/or lead to modified on-line behavior causing students to practice netiquette or whether students simply perform netiquette in order to pass the course.

The post on-line survey used four components to examine students' experiences and practices of netiquette. The components and the design focus were as follows:

- Component One: Instructional Tool (Virtual Teams). The questions were designed to assess advantages and disadvantages of using virtual teams as an instructional objective for on-line communication.
- Component Two: Content (Cross-Disciplinary Application in Virtual Teams). The questions were designed to assess cross-disciplinary practical applications of virtual teams.
- Component Three: Netiquette (Virtual Teams). The questions were designed to

assess the on-line students pre (before course), during (during course) and post (after course) experiences and practices of netiquette.

- Component Four: Professional Applications (Virtual Teams). The questions were designed to assess the linkage of instructional strategies to professional (workplace) applications.

Assignments and Objectives

The first assignment of the project was designed for group members to exchange information and to discuss experiences involving netiquette. Each group member was required to convey their understanding of the term netiquette as it related to communication experiences in virtual teams. The objective was to focus on the concept of communication in virtual teams. In order to accomplish this objective, students were required to provide the guidelines for the team contract. Students were also required to develop guidelines to promote discussion during the face-to-face meetings. Thus, to initiate discussion after the contact exchange, the students developed two contract guidelines focusing on respecting the viewpoint of others and time management. Discussions also lead to guidelines for team management. Students agreed to meet on-line the same day. The purpose of this meeting was to discuss their understanding of netiquette.

The second assignment of the project required each group member to locate and discuss a website pertaining to netiquette. The team members had to select a website different from the degree area indicated on their contact information. After discussion, each team member submitted one website that could be used across disciplinary lines to establish guidelines for virtual team communications. The objective was to focus on the content when communicating on-line.

Students were provided examples of three websites that illustrated the use of netiquette across disciplinary lines. This process allowed team members to continue research and collaborative efforts as it related to each member making contributions. Additionally, it provided the teams with data that reflected an integral approach to understanding netiquette. Each team member has an opportunity to examine the application of netiquette across disciplinary degrees as identified by the participants. The focus is to identify how understanding netiquette affects decisions and actions of employees within an organizational setting. Similar to corporate websites used to effectively communicate and share information internally, teams are directed to post netiquette guidelines. These guidelines include:

1. Be courteous, which means (a) save your company money, (b) check your electronic mail regularly, (c) don't spam, or contribute to electronic mail, (d) don't simply reply to a message that was originally sent to multiple recipients, (e) respond quickly, and (f) don't use all capital letters.
2. Be brief, which means (a) don't send too much information, (b) avoid adding too many attachments, and (c) change the subject line when replying.
3. Be careful, which means to (a) edit every message for criticism and sarcasm, (b) proofread every message to avoid misunderstanding, (c) be aware that companies have the right to search company electronic communications, and (d) avoid flaming (Bovee & Thill, 2000).

The third phase of the project was an assignment that required teams to compile and develop a work summary from their discussions and experiences with netiquette.

Students were informed that evaluation criteria would focus on the following:

1. rationale for selected netiquette website,
2. content as it relates to cross-disciplinary and/or audience adaptation,
3. organization which focused the overall project objective with respect to work team netiquette, and
4. writing style which indicated understanding of material discussed as it related to academic preparedness and transitional on-line workplace skills.

The objective was to focus on netiquette, a professional code of behavior for on-line communication. This particular assignment takes the greatest amount of time (at least three or four weeks) to complete and the results are presented in a written document. Each team also prepared and delivered a collaborative oral presentation of the findings. These findings demonstrate the students' understanding of objective one, why netiquette in the workplace is important and how it can help develop and/or enhance ethics and social responsibility. This is accomplished by using on-line applications relevant to virtual team netiquette.

Finally, rather than each team member evaluating the other members' contributions, an on-line survey was administered to examine individual experiences and practices of netiquette (pre, during and post) for this project. The objective was to focus on professional applications of virtual on-line teams. Findings from the project's three assignments were the primary focus for this article. The post on-line survey summative findings provided insight for pedagogical assessment with respect to transferable on-line workplace applications. Some examples of learner outcomes included:

- Component One: Assignments provided students with a logical format that provided feedback on a regular basis. This process allowed student to develop a work team trust.
- Component Two: Assignments provided students with an integrated approach to developing awareness across disciplinary lines. Students were able to compare and contrast on-line communication as it relates to another degree area.
- Component Three: Assignments developed and enhanced students' understanding of netiquette. Three practical applications (course, work and personal) of on-line communication were examined.
- Component Four: Assignments supported linkage of instructional strategies to professional (workplace) applications. Students were able to assess their own experiences and practices of netiquette (pre, during and post).

Summary of Student Outcomes by Objectives

The overall findings for *objective one* revealed 97% of students' perceptions of virtual teams focusing on netiquette behavior were advantageous with respect to developing proper on-line communication behavior. Because non-traditional structures are complex, netiquette guidelines can foster clarity as it relates to on-line communication. Accordingly, proper application required to perform within the virtual communication matrix (formal, informal, downward, upward and horizontal) should occur.

Objective two results revealed understanding communication is an integral factor of building multi-tasking skills required to maintain productivity in the global market place. Many students change employers during the course of their educational pursuits in order to enhance their current or future work place marketability. Subsequently, students should be able to

perform various communication applications.

The results of *objective three* support the significance of linkage between academic preparedness and workforce readiness. Moreover, the results offer a possible solution to disadvantages, unethical practices and/or unauthorized usage of electronic communication in the workplace. Students developed enhanced communication skills for maximum usages (courses, work, personal) with respect to netiquette.

Objective four results support the need to investigate on-line communication as it relates to social trends affecting pedagogy and practices in business and professional communications. The majority of on-line

survey responses, 81% strongly agreed with the need for linkage of instructional strategies to professional workplace applications.

Conclusions And Implications

Technological advances provide instructional opportunities that can be used to develop and/or enhance professional on-line communication resulting in productivity in the workplace. Findings support the need for academic and practitioners' dialogue of how on-line course material can be integrated to examine ethical issues involving workplace and social responsibility.

References Available Upon Request

Dealing with Identity Theft: An IS/IT Professor's Personal Experience with Lack of Media Richness

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Abstract

This paper addresses the concept of media richness and its impact on the information conveyed in communication situations encountered by victims of identity theft. Based on the author's personal experiences reported in the paper, some communication options provided by various organizations do not provide sufficient media richness for identity theft situations.

Introduction

Identity theft is currently the number one financial crime in the U.S. According to the Federal Trade Commission's website (2005), "People whose identities have been stolen can spend months or years – and their hard-earned money – cleaning up the mess thieves have made of their good name and credit record. In the meantime, victims may lose job opportunities, be refused loans, education, housing or cars, or even get arrested for crimes they didn't commit." Residual effects of identity theft can even occur several years after the initial theft. When attempting to halt the consequences of theft of one's identity and restore one's good credit, each communication situation has very personal significance to the victim.

Review of Related Literature

Media richness or leanness refers to a communication channel's ability to convey messages that communicate rich information. Richer media convey a message by means of more than one informational cue, facilitate feedback, and establish a personal focus. Numerous studies have been conducted related to media richness theory. Among these are studies by Daft and Lengel (1984), Rice (1992),

Dennis and Kinney (1998), Carlson and Davis (1998), Carlson and Zmud (1999), Ferry, Kydd, and Sawyer (2001), and Kahai and Cooper (2003).

According to media richness theory, different communication media types have potentially different impacts on a single message. Daft and Lengel (1984) ranked a communication medium's ability to carry information based on the ability to provide immediate feedback to all parties; provide feedback cues through such factors as body language, voice tone, and facial expressions; transmit the feelings or emotions of the communicators; and provide the ability to create or alter a message for the individual, intended recipient. Thus, face-to-face communication would be classified as the richest media, providing immediate feedback, multiple cues, message tailoring, and transmission of emotions. Phone calls with a real person at each end of the conversation, while not providing as many feedback cues as face-to-face situations, do provide immediacy, some nonverbal components, conveyance of emotions, and the ability to create or alter a message. E-mail would be rated as a low/lean communication media.

As technology-enabled communication applications increase, media richness theory would suggest organizations need to stop and consider how to deal with consumers/customers in the most effective and efficient way for a wide variety of situations. In some instances, technology-enabled communication may be insufficient. In some situations, connecting a consumer with a real person is necessary for sufficient media richness.

From an information technology (IT) and information systems (IS) perspective, introductory management information systems

textbooks typically report companies turning to technology-enabled customer relationship management (CRM) to improve their customer focus (O'Brien and Marakas, 2006; Schneider, 2004). Use of IT in CRM often includes application clusters in sales, marketing and fulfillment, contact and account management, retention and loyalty programs, and customer service and support (O'Brien and Marakas, 2006). Companies often experience satisfying results from their efforts to use their websites to provide customers with easy to find and customized information. Tracking customer behaviors on the website can lead to value-added products and services. Thus many companies perceive they are more successful in their contacts with customers by employing more IT-enabled customer interaction.

The Problem

Although studies reveal that communication situations such as face-to-face and telephone communication with real people at both ends of the conversation offer more media richness than other communication situations, many companies within the business sector are currently relying on technology to deal with customer situations that in years past would have involved a company employee.

Customer relationship management is a hot topic in information systems literature today, and companies often achieve this by turning to complete customer-relationship information systems. This allows the organization to create a cross-functional enterprise system that integrates and automates many of the customer serving processes such as sales, marketing, and customer services. To maintain competitiveness and hold costs down, companies continue to seek areas in which automated processes can provide increased productivity, accuracy, and efficiency, often reducing instances when customers communicate directly with a real employee. This often includes automation in

call centers, account management, and help desks.

The ever-increasing capability of information systems is often at odds with individual privacy issues, and IT capabilities often foster thieves' efforts to steal identities. When faced with the need to resolve identity theft problems, individuals are typically operating in high stress mode. At such a time, victims may encounter additional stress when they have to deal with lean communication channels offered by the companies with which they must interact and seek answers.

Based on the author's personal experience as a victim of identity theft, this paper discusses the lack of media richness available in various communication situations an identify theft victim encounters when correcting credit records.

Identity Theft Communication Tasks and Media Richness

The Federal Trade Commission's website ("Taking Charge," 2005) identifies the following four steps an identity theft victim should take as soon as possible:

1. Place a fraud alert on your credit reports and review your credit reports.
2. Close the accounts that you know, or believe, have been tampered with or opened fraudulently.
3. File a report with your local police or the police in the community where the identity theft took place.
4. File a complaint with the Federal Trade Commission.

My first knowledge of being a victim of identity theft came from the bank that dealt with new accounts established by a computer company selling computers online. The bank initially contacted me by mail, requesting that I place a phone call to discuss my “new” account. During my phone call, I gained immediate access to an employee, was asked questions that led me to realize I was an identity theft victim, and was guided in starting the investigation of fraudulent use of my information to establish an account and obtain merchandise. During this time of major stress concerning what other actions identity thieves may have taken, the bank’s employees were calm and responded to my particular situation, thus providing a situation of media richness.

When faced with contacting a credit reporting agency (Step 1 recommended by the FTC), however, less media richness was available in two out of three instances. (Although the Federal Trade Commission indicates that you need contact only one of the three agencies, the bank I dealt with recommended I contact all three for *immediate* placement of fraud alerts on my credit reports.) No instructions on the automated phone systems of the credit bureaus suggested this action. Two of the credit reporting agencies provided only two options—phone menus with no chance for speaking with a real person, or online filing of the identity theft situation (both required providing a social security number). Since my identity theft problem started with someone obtaining my social security number and home address and opening a new account online, sending my social security number over the Internet did not lessen my stress, nor provide media richness! Additionally, only through the credit agency that provided a “real person” phone response was I encouraged to immediately check all creditor account balances without waiting for the credit reports to arrive. The real person phone assistance provided sufficient media richness. Automated phone systems, however,

lacked sufficient media richness for the situation.

An identity theft victim is also required to contact each company that shows some fraudulent activity on his/her account. It is the consumer’s responsibility to request an investigation into the fraudulent activity, work with the company to get it verified as fraudulent, and request that the corrected information be reported to the credit agencies. Once copies of my credit report started arriving from the three credit bureaus, I could begin contacting other companies where accounts had been tampered with or opened fraudulently.

In two instances I experienced *very lengthy*, multiple menus in order to *finally* reach an individual. At one company, I initially talked with someone who seemed to not know what procedures to take. This did not reflect a tailoring of the message to my individual situation. In yet another instance I placed a call but was advised that since the individual I needed to speak to was out of the office, he/she would contact me via email if I would put my information in an email message. I did not view email as a sufficiently rich medium for the situation. Lack of privacy of information was an additional concern in an email communication.

In another company, since lines were busy and an extensive wait time was probable, a prerecorded message suggested I conduct my business through the company’s website. Even my own bank, when contacted to verify the balances in my various accounts, recommended that I keep monitoring my accounts via online access in upcoming weeks. This was not what a victim of online identity theft really wanted to hear! Having to provide any financial information over the Internet did not provide sufficient media richness from my perspective.

Closing accounts with \$0 balances that I no longer wanted to leave open was typically accomplished through a phone call and an automated menu system. Since this activity typically did not require conveying a complete social security number over the phone, the situation did not require multiple cues or conveyance of emotions. Immediacy was provided through the menu system's verification of my closed account. Thus, the amount of media richness provided through automated phone systems was adequate for this task.

Filing a police report involved (1) a phone call to the police department identifying myself as a victim of identity theft, and (2) face-to-face communication with the officer assigned to take my statement and complete the report, thus providing adequate media richness for the situation.

Filing a complaint with the Federal Trade Commission can be done either online or via phone. I elected to do this by phone rather than by providing my social security number over the Internet. The FTC does have full-time employees staffing the identity theft reporting lines. As I completed this task after contacting the credit bureaus and the police, I found the individual very much tailored the communication to my specific situation based on steps I had already taken. Media richness was sufficient in this communication.

Obviously numerous written communication documents were provided to various agencies and organizations. These communications typically followed phone calls and provided the written verification requested by the agencies. Following earlier phone calls, these written documents provided sufficient media richness for the situation.

Conclusions

Technology-enabled communication offers organizations a means of increasing accuracy, productivity, and efficiency in areas of customer relationship management such as call centers, account management, and help desks. However, the lack of media richness in automated phone systems, Internet contact, and email messages systems can present problems for a victim of identity theft who is seeking to correct credit records and undo the damage identity thieves caused. Not all organizations provide identity theft victims a quick way to access a real person. Often lack of media richness in these situations can compound the stress level of the victim. Because identity theft is a major problem today, all organizations should pay special attention to providing sufficiently rich media opportunities for identity theft victims. Room for improvement exists in some companies.

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CONFERENCE NOTES



Portal Security

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Introduction

Portals are intermediary sites positioned as a familiar interface or guide to the Internet, to e-commerce activities for consumers, and for small and medium companies. A portal serves as a tunnel, or gateway for e-business. A portal or Web portal is a site that people use as a launching point to enter the Web (the word “portal” means “doorway”) (Schneider, 2002, p. 95). Portal security is a safe e-commerce activity for consumers and companies. Viruses and worms are the worst security breaches. Companies spent more on security of their budget annually.

Objectives of the Study

The objectives of this paper is to give examples, examined the different architectures, show the security options and how to protect internal networks from unauthorized outside access.

Problem Statement:

With expansion of e-commerce, corporations becoming aware of the vulnerabilities and holes exploited over the Internet and the company that cannot cope with the security threats of e-commerce are at the risk bankruptcy or closed down.

Research Question

Can trust and reputation be weighed lightly in the absence of effective security? Can confidentiality, integrity, availability of an organization, and the negative result of consequences of security breaches ruined the organization. Can technology and computer safeguard information automatically? Security attained by designing an appropriate portal to provide identification and authentication, authorization, non-repudiation, privacy, and accountability.

Literature Review

Web portal is a site that provides a wide range of services, including search engines, free-email, chat rooms, discussion boards, and links to

hundreds of different sites (Haag, Cummings & Mccubbrey, 2004, p. 530). Regan and O'Connor (2002) states that the portal technology acts the function of operating systems by allowing content and data from disparate systems to move in and out of repositories more easily and in the forms users need. Portals enable enterprises to extend knowledge management and business intelligence initiative within and beyond the walls of their organization (p. 179).

Jessup and Valacich (2003) stated, “portals, in the context of B2B EC, can be defines as access point (or front doors) through which a business partner accesses secured, proprietary information from organization” (p. 147).

Microsoft TechNet (2004) found the following:

Most organizations must recognize the critical role that information technology (IT) plays in supporting their business objectives. Nevertheless, today has highly connected (IT) infrastructure exist in an environment that is increasingly hostile-attacks mounted with increasing frequency and are demanding ever-shorter reaction times. Often, organizations are unable to react to new security threats before their business is impacted. Managing the security of their infrastructures- and the business value that those infrastructures deliver- has become a primary concern for the IT department. (Executive Summary).

The threats to the security of communication channels includes: (1) secrecy, (2) integrity, (3) and necessity threats. The threats to the security of server computers includes: (1) Web Server threats (2) database threats, (3) common gateway interface threats, and programming threats (Schneider, 2002, p.380-385).

In support of the security of their infrastructure Pipkin (2000) stated, that protection is needed and is the reduction of vulnerabilities by the application of safeguards and security requires balancing the costs of the security with the possible losses resulting from the theft, destruction, disclosure, or denial of access to the resources being protected. Furthermore, stated that cohesive security design requires commitment from management at highest level and support from all areas of the

organization, and the top of an organization must stringently abide by security measures- even more so than those at the bottom (p. 93).

Pipkin (2000) furthermore stated that the following fundamental aspects of security that are used to organize security design documents:

- Philosophies - the fundamental ideas which the organization believes,
- Principles – the basic substances of corporate integrity,
- Policies - descriptions of the security precautions that are required for different types of information and access,
- Procedures - definitions of how to implement the policies to a specific technology, and
- Practices - the actual day –to-day operations that implement the procedures (pp. 94-98).

The Role of Security Risk Management

Carroll (1987) stated that the role of security risk management in a corporation or agency is to carrying out risk analysis, risk assessment, or threat assessment. That person may be a security director, chief information

officer (CIO), internal auditor, insurance manager, or consultant. Furthermore, the risk management is to assigning an average annual cost figure to destruction, improper modification, unauthorized disclosure, or denial of service from physical or intellectual property and selecting cost-effective countermeasures to reduce that cost figure to an acceptable level (preface).

The goal of risk management is to deliver clear, actionable guidance on how to implement a security risk management process that delivers benefits in a corporation. The benefit including: moving customers to a proactive security posture and freeing them from a reactive, frustrating process, making security measurable by showing the value of security projects, and helping customers to efficiently mitigate the largest risks in their environments rather than applying scare resources to all possible risks (Microsoft TechNet, 2004, p. 2).

Methodology

Portal Examples

The methodology used in this paper gives different portals, examined different securities in place, suggests the required standard portal securities, and then compared the listed portals with the standard using the portal architectural designs, then draw the conclusion of which portal is safe which one is not.

Enterprise Portals

Enterprise portal consists of multiple extranets designed according to the business needs. It is divided into two types, the distribution, and procurement portals (Jessup and Valacich, 2003, p. 147.). It provides a single point of access to the organization information (enterprise information portals) via the Web interface, then dispersers throughout an organization

Haag, Cummings & McCubbrey (2004) stated two categories of enterprise information portals (EIPs) as a collaborative processing enterprise portal and a decision processing enterprise portal. Furthermore, stated, “A decision processing enterprise information portal provides knowledge workers with access to group information such as e-mail, reports, meeting minutes, and memos.” “A decision processing enterprise information portal provides knowledge workers with corporate information for making key business decisions.” (p. 344).

Because of single access the organization information, it reduces the maintenance cost and controls the security risks (Jessup and Valacich, 2003, p. 147). Examples of enterprise portals include Google, Yahoo, and Alta Vista.

Horizontal Portals

Horizontal portals were developed in the early 1990s as simple search engine or directories that offer Internet users with an efficient way to filter the immense amount of information available on the Web. It is know as consumer portals, Web portals or public portals (Sieber & Sabatier, 2003, p. 38). IBM is the leader in horizontal portals products combining technologies from WebSphere, Lotus, and Tivoli. IBM horizontal portals are more scalable and reliable in features (Phifer et al., 2004, p. 3).

Types of Security Breaches - Worst Offenders

A computer virus is written with malicious intent to cause annoyance or damage. It can include benign or malicious. The benign display a message on the screen or slow the computer down, but do not do any damage. The malicious targets a specific application or set of file types and corrupts or destroys them (Haag, Cummings & McCubbrey, 2004, p. 394, Schneider, 2002, p. 378). Computer viruses are the worst of security breaches or espionage.

A worm is a type of virus that replicates itself on the computer that it infects. It is caused by exchanges of files through e-mails or disks storages (Haag, Cummings & McCubbrey, 2004, p. 394, Schneider, 2002, p. 378). Information Week Research's 2005 Global Security Survey conducted online in September in conjunction with management consulting firm Accenture stated other types of security breaches in USA and China show at the end of this paper. The responses are of 700 business-technology and security professionals in China and 2, 540 businesses IT, and security pros in the USA (D'Antoni, 2005, p. 2).

Furthermore, CSI/FBI 2005 Computer and Security Survey provided a supporting data that based on the 2005 calendar year on organizations budget spent on security in USA. The finding is shown at end of this report. The responses are of 690 computer security practitioners in U.S. corporations, government agencies, financial institutions, medical institutions, and universities (Gordon, Loeb, Lucyshyn, & Richardson, 2006, p. 5).

Portal Security Tools

The users want to use technologies that fit into their infrastructure and easily improve their methods of protecting their companies' data. Microsoft Sharepoint and IBM suite of Tivoli secure way to protect not only customer and partner interactions, but also employee transactions as well through a single administrative console and repository for policy information.

Anti-Virus software

Anti-virus software detects and removes or quarantines computer viruses, but must be updated

often. Anti-virus software remove viruses without destroying the software or information a backup is required before use anti-virus software. A backup is the process of making a copy of the information stored on a computer or networks.

Firewalls

Haag, Cummings & McCubbrey (2004) stated that, "a firewall is hardware and/ or software that protects a computer or network from intruders and like a border guard checking passports. It detects a computer communicating with the Internet without approval, as spyware on your computer may be attempting to do" (p. 397).

Access Authentication

Schneider (2002) stated, "Access control and authentication refers to controlling who and what has access to the commerce server" (p. 432). Haag, Cummings, & McCubbrey (2004) stated, "While firewalls keep outsiders out, they don't necessarily keep insiders out" (p. 397). The authors furthermore, stated three basic way of proving access right: (1) password/ biometrics-; (2) ATM card; (3) what you look like (or rather what your fingerprint or some other physical characteristic looks like) (p. 397). Haag, Cummings & McCubbrey (2004) stated, "Biometrics is the use of physical characteristics – such as your fingerprint, the blood vessels in the retina of your eye, the sound of your voice, or perhaps even your breath-to provide identification" (p. 401).

Encryption

Schneider (2002) stated, "Encryption is the coding of information by using a mathematically based program and a secret key to produce a string of characters that is unintelligible" (p. 418). It scrambles the contents of a file so that you cannot read it without having the right decryption key – Public key encryption (PKE) (Haag, Cummings & McCubbrey, 2004, p. 399).

Secure Sockets Layer Protocol (SSL)

SSL provide secure information transfer through the Internet and allow both the client and server computers to manage encryption and decryption activities between each other during a secure Web session. Furthermore, SSL provide the client and server computers exchange a brief burst of messages (Schneider, 2002, p. 423).

Types of Security Breaches-Worst Offender

Security Breaches or Espionage	China (percentage)	USA (percentage)
Viruses	79	67
Worms	70	49
Web-scripting language violations (Java-or ActiveX-based)	31	12
Denial of services	28	20
Trafficking in illicit materials or illegal data	25	6
Illegally download copyrighted material	20	9
Systems programs manipulated	16	6
Hacking of telecom infrastructure	14	9
Identity theft	13	4
Software applications manipulated	12	6

D'Antoni, H. (October 31, 2005). IT security in China shows cracks. Information Week, (1062), 47

CSI/FBI 2005 Computer and Security Survey

Budget	Percentage IT Budget Spent on Security
More than 10%	8
8-10%	11
6-7%	8
3-5%	24
1-2%	24
Less than 1%	11
Unknown	15

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CONFERENCE NOTES



An Investigation Into The Correlation Between Math Skills and Microcomputer Applications Skills

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Abstract

This study will determine if there is a relationship between students' scores in mathematics and their scores in a microcomputer applications course. A comparison between high school Algebra and Geometry final grades, and grades on the word processing and spreadsheet tests in a university microcomputer applications course will be run using a four variable factor analysis. If a correlation is found, it will be the basis for further research.

The Problem

Introduction

There are hundreds of articles in the literature about how to teach mathematics, covering every level from preschool to graduate school. There are also a large number of antidotal articles about how to teach computer applications courses, but little about cognitive approaches to the topic. Research about a potential correlation between mathematical learning and learning to use computers can help gain invaluable insight on how to improve teaching methods.

Background

This study began with an observation about students who were in both high school math classes and a microcomputer applications course. Comparing the grades, there appeared to be a correlation between math and microcomputer applications course grades. Over the next ten years, informal questions of students seemed to confirm this correlation. Essentially, students who do better in Algebra do better in word processing and students who do better in Geometry do better learning a spreadsheet program. It is an interesting

correlation, and could ultimately be used to increase our understanding of how learning about computer applications can be improved.

Purpose of Study

While the literature is full of articles about the practitioner's guide to teaching microcomputer applications, there is little theoretical literature about the cognitive theory behind teaching these courses. Practically, we know what works, but do we know why? On the other hand there is a large body of literature expressing the theoretical models of teaching math, specifically Algebra and Geometry.

This preliminary study will be used to determine whether students who do better in Algebra rather than geometry also do better in word processing rather than in using spreadsheets. This study will also determine if the converse is true; do students who score better in Plane geometry also score better on a spreadsheet test. This study needs to be done to determine whether there is a correlation between a students score in Algebra and word processing and a correlation between geometry scores and the scores of students learning to use spreadsheets.

This study will confirm or fail to confirm the relationship between mathematical learning and computer application learning. If this study confirms the correlation between the subjects scoring, further study will be completed to determine why this is true, and how to improve methods if teaching computer application courses. Additional research will also accomplished to establish the causes of the relationship of the scores.

Limitations

One of the major limitations of this study is the convenience sample to be used. Alcorn State University is a Traditionally Black University. It is not representative of the general population of college students in the racial aspect. To overcome this, I hope to expand this research into another university with a more normalized population, and a larger geographic area.

Overview Of The Literature

According to Giyoo Hatano in *Theories of Mathematical Learning* (Steffe, L.P., Nesher, P., Cobb, P., Goldin, G.A., & Green, B., 1996, 198-200), most researchers in the cognitive area agree on a list of five interrelated ideas about the long-term acquisition of knowledge. These characterizations help understand how mathematical cognition is developed. The five characteristics include:

1. Construction
2. Restructuring
3. Constraint
4. Acquired domain by domain
5. Situated in context.

Construction. Construction is the acquisition of knowledge by interacting with it. Problem solving is the driving force behind this. People will take given facts, and construct meaning outside those facts. According to El-Tigi & Branch (1997), "Learning sessions . . . should provide opportunities for the learner to:

1. interact with the teacher.
2. control the information he or she processes; and
3. give and receive feedback about the knowledge being constructed." (p. 23)

Restructuring. As learners learn, the information becomes more organized. As more details are added they will affect how knowledge is stored and referenced. Relationships about new and older knowledge are forged. New knowledge is grafted onto older related knowledge.

Constraint. There are conditions or factors which "facilitate the process of acquisition as well as restrict its possible range" (Steffe, L.P., et.al., 1996, 202). This knowledge acquisition can be constrained internally and externally. Prior knowledge is internal constraint. Shared cultural experiences are and example of external constraints.

Acquired Domain by Domain. Domains are knowledge systems in which problem solving or comprehension takes place. Eating, driving a car, language arts and mathematics problems are obviously in differing domains. Information is stored within the domain framework, and each domain is unique in the way in which knowledge is acquired. (Steffe, L.P., et.al., 1996)

Situated in Context. Knowledge is held within the context in which it is captured. Not only are the rules stored, but also the experiences around the rules. This can include problems solved, and cultural contexts as well. (Steffe, L.P., et.al., 1996)

Methodology

Population

The population of the study is the group of all students who are studying microcomputer applications, especially those in schools of business who are learning word-processing and spreadsheets.

Sample

The sample for this particular study is a convenience sample. Students who are currently taking BA 233, Microcomputer Applications at Alcorn State University will be included in this study. There are approximately 70 students in three class sections. A single instructor teaches all three sections. All three sections will include the study of Microsoft Word as a word-processing program and Microsoft Excel as a spreadsheet program.

Instrumentation

Reliability. Reliability will be tested using Cronbach's alpha (α). This reliability measure will be based on the consistency of responses to all items in the test, called the inter-item consistency. The data found for this research has multiple-scored items. Specifically, alpha is a lower bound for the true reliability of the survey (SPSS, 1999, p. 362). If it is assumed that all variances are equal, the ratio simplifies to the average inter-item correlation, the Standardized item alpha.

Validity. Since this survey will be created to attempt to determine what the real factors are, face validity will be used and several instructors at Alcorn State University will be asked to review the survey instrument. The surveys will be reviewed for visual errors, for example: spelling, layout and question spacing. In addition, the reviewers will be asked about the clarity and understandability of the statements themselves.

Data Collection Procedures

During the course of BA 233, Microcomputer Applications, each student will be given a test over their knowledge and skills in Microsoft Word and Microsoft Excel. In addition, each student's respective semester and annual scores in high school Algebra 1 and Plane Geometry will be gathered. These scores

will be placed in a spreadsheet and transferred to SPSS, a statistical software package.

Each student in the study will be taking the course BA 233 – Microcomputer Applications. A questionnaire will be passed out at the beginning of each semester. Basic demographic information will be retrieved. Factors to be included are as follows: age, gender, classification, and major.

The course consists of learning to use Microsoft's Word, Excel, and PowerPoint. At the end of the lessons for each application, there is a final test. The final scores for Word and Excel will be gathered. In addition, each student's final grade for his or her high school Algebra 1 and Plane Geometry courses will be retrieved.

Data Analysis Procedures

Descriptive statistics will be used on the four demographic questions and a factor analysis will be used. The responses will be loaded into SPSS, and the results will be tabulated. The correlations will be identified first using a Pearson correlation matrix. The components will be then rotated using the Varimax method of rotation, and a component transformation matrix will be created.

Filtering, using the build in filters in SPSS will be used to check for relations and differences between subgroups. Gender, age, classification, and major, will be the demographic fields that will be filtered. Each filtered subgroup then will have the factor analysis rerun on that subgroup using the same procedures as those used on the whole group. The resulting factors will be then compared with factors from the entire group.

Summary

This preliminary study will be used to determine whether students who do better in Algebra rather than geometry also do better in word processing rather than in using spreadsheets. This study will also determine if the converse is true; do students who score better in Plane geometry also score better on a spreadsheet test. The sample for this particular study is a convenience sample. Students who are currently taking BA 233, Microcomputer Applications at Alcorn State University will be included in this study. A factor analysis will be computed to see if the four variables will produce a pattern to confirm the correlation.

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How to Structure and Evaluate Information Technology Assignments

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Abstract

Business school courses involve homework assignments that require skill at a technology as well as an understanding of a business concept. Yet there is little pedagogical and technological support for teaching “What” (elasticity) while simultaneously teaching “How” (spreadsheet line-chart). We describe a conceptual approach and a system implementation that helps professors leverage their domain knowledge and helps students both learn a new topic and new information technology skill. While professors might allocate more time towards preparing homework, far less time is spent overall in administering and grading assignments. This approach scales to any class size, thus removing grading burdens imposed by large class sizes.

Introduction

Large class sizes have made it more difficult for the professor to provide individual feedback and attention to each student. It is not unusual at the university level to have sections of classes with hundreds of students. These large classes, while financially lucrative for the schools, cause concern for professors as it is almost impossible to have one-on-one feedback between the professor and the student.

Large classes have led to a change in teaching philosophy from the Socratic method, where the professor operates in a mentoring type environment, to straight lecture, where the topic is presented and one would hope that it is understood. One-on-one interaction is limited and individual feedback is difficult. Piaget (1969) maintained that individuals learn through interaction with the real world and that social interaction develops knowledge. By not interacting with the students on a one-to-one basis we may, in effect, be limiting knowledge.

The Socratic process provided an individualistic teaching methodology. Students were prompted with questions to explore and develop their own understanding of the topics at hand. Individual questioning by the professor guided the learners to new levels of understanding. The Socratic method of teaching was seen as a powerful tool in developing critical thinking through self discovery. The professor used guided questions to develop the thinking skills of the student. Each question was specifically designed for that individual to assist in the development of their learning skills.

We have asked ourselves how we might foster the Socratic method of teaching while still maintaining the economic advantages of larger class numbers. To date, instructional technologies have been limited in their ability to gauge an individual’s progress and offer the professor the ability to iteratively guide the student towards new propositions using the manipulation of information. Traditional methods of instruction would require significant professor time commitments and exceptional time management techniques to provide unique one-on-one feedback and guidance through a series of questions. Recent software developments, however, now provide tools that are capable of providing one-on-one instructional feedback.

Marketplace pressures have also resulted in recent curriculum changes at business schools. More emphasis is being placed on the integration of information technology in all business courses. It is typical for visiting committees to recommend spreadsheet and database software be integrated throughout the curriculum.

So in addition to the usual domain knowledge (accounting, finance, management), the student

must also learn database, spreadsheet, presentation, data-mining software etc.

Traditional approaches to integrating technology in the curriculum include requiring introductory courses in, for example, Microsoft™ Excel (Hoovers) or perhaps SAS™. Although one must begin somewhere and the learning curve of most current information technology tools is steep, research shows that the ideal learning environment is in the context of real problems [Suchman 1987].

If the best learning takes place in context of a real problem, an ideal Macro-economics assignment would introduce new spreadsheet concepts in the context of an economics issue, for example elasticity. The student would improve their skill set (spreadsheet knowledge) as well as their interpretation skill (elasticity).

Domain Knowledge

The primary goal of an assignment is to teach domain knowledge. The student is challenged to demonstrate their new knowledge in the context of some problem. Two things interfere with this. First, the increased pressure to infuse technology interferes with domain learning. The learning curve of desktop software applications is steep. So much time must be allocated to learning the technology itself. This time and energy can detract from the learning about the domain. Second, learners make two kinds of errors: syntactic and semantic.

A syntactic error is frequently referred to as a “typo” or typographical error. The most basic syntactic error is when a spreadsheet user forgets to type “=” before entering a formula. The spreadsheet software doesn’t recognize the following “A1+B1” as something to be calculated, but as text to be displayed. A more insidious syntactic error is when the formula is “correct” only in the sense of being accepted by the spreadsheet software. In our context, an example is when a student intends to write =A1 + B2, but instead, enters =A1 – B2. The plus

and minus keys are side-by-side on many keyboards and it’s just a slip.

The challenge that syntactic errors introduce in technology intensive courses is that they confuse the semantic issues. It is difficult to understand elasticity when the formulas are not correct. A small typographical error can cause much confusion.

Semantic errors are true misunderstandings. An example is when a student does not understand how to calculate a slope. The student enters a formula which produces erroneous results. Spreadsheet software cannot know that the formula was intended to calculate “slope,” so there is no way to catch this error other than to recognize an incongruity between expected and actual values. Misunderstandings at the semantic level can cause a student to spend wasted time adjusting formulas that are technically correct, but not appropriate.

Information Technology Skills

The marketplace has increased demand for business graduates with skills in desktop software applications. Most often this is the Microsoft™ Office suite, but there is also more interest in SAS, SPSS, SAP etc. We focus here on spreadsheet assignments using Microsoft™ Excel.

Freshmen students who take the Introduction to Business course learn basic skills in Excel. At the sophomore level Economics courses, they are expected to increase that skill level. At the junior level Management Information Systems course, they must demonstrate expert competence in Excel.

The skills needed in Economics are at the intermediate level. The students come prepared from the introductory business course and are expected to continue to hone their skills. We deliberately assign homework which challenges their understanding of Economics as well as their Excel skills.

System

In use for three semesters, our system manages the distribution, grading, and feedback of spreadsheet homework assignments.

Step 1 - The professor prepares a template containing the perfect answer and decides what is important.

- Different levels of learning can be tested (semantic and interpretive).
 - Basic understanding of formulas
 - Advanced interpretation of data
- There is increased assignment development time (15% to 20%).
 - Assignment creation times are more than offset by the speed with which these assignments are graded.
 - Studies show a 98% reduction in grading time, resulting in considerable cost savings (Shepherd).

Step 2 – The professor creates grading rules for the perfect answer.

- These rules focus on the syntactic
 - Is the formula correct?
 - Is the answer right?
 - Is the data shown correctly?
- They also focus on the semantic
 - What data meets a certain criteria?
 - What does this mean?
 - How might this be interpreted?

Step 3 - Having finalized assignment creation, the professor then creates a blank template by removing from the perfect answer those items to be completed by the student.

Step 4 - The blank template assignment is distributed to the student via common

directory, email attachment, or drop/return box systems.

Step 5 - The student completes the assignment and returns via the common directory, email attachment, or drop/return box systems.

Step 6 - Once or twice a day, all files in the submissions folder are graded.

- The system checks answers, based on rules created by the professor i.e. formulas, formats, ranges, and correct answers.
- Because the system grades the files, it is fast, less than a minute for 100 spreadsheets.
- Part of the functionality of the system includes email notification, so right after grading, the students are informed immediately via email of their grade and exactly what was wrong.
- Professor feedback is created showing assignment problem areas where students are deficient.
- The professor can address these deficient areas either in class or in a special session with the students.

Step 7 - The student reviews the feedback, amends the file and returns the assignment to the professor for re-grading and possible re-submission back to the student with further directed instructions on areas where the student has failed to comply with the assignment instructions.

Iterate Early and Often

One of the most important factors in learning is iteration. We learn best in small, iterative steps. Because our tool grades so quickly, the part of an assignment that used to take the most time now takes the least amount of time. This enables us to give feedback “early and often.”

Rather than accepting homework only once right before the deadline, we accept early work and grade it often.

We believe that this contributes to learning in a fundamentally important way. The nature of technology integration is that small errors (syntax) can lead to large penalties (one formula is wrong and all dependent cells thus also wrong.) Although we live in a world in which small errors can certainly lead to large consequences, we do not believe this is the best way to teach. On the contrary, we think that allowing iteration on assignments helps the student find syntax errors which have resulted in serious semantic errors. Clearly the syntax must be correct before the semantics can be considered correct. We cannot speak intelligently about elasticity if the formulas are incorrect.

However once the syntax is correct, how can we also evaluate semantics? We have discovered that by attention to learning outcomes and careful phrasing of questions, we can use syntactic markers to communicate semantics. For example, referring to a table with data, one can challenge the student to “color the background color green for all those cells that show inelastic demand.” To get this question right, the correct skills must be in place (right formulas) and the concepts must be understood (elasticity).

By allowing iteration, the student receives feedback on both the “how” and the “what” of the assignment. This Socratic style feedback is directly related to the skill level and competency of each student. The ability of this tool to manage large numbers of students not only allows us to maintain the economic benefits of larger class sizes, but begins to focus more closely on individual performance and instruction.

One counter argument to allowing iteration is that students must learn how to get it right the first time. Our experience with under graduates

causes us to be more interested in the lower 99% than the top 1%, who indeed are capable of getting it right the first time. We agree that there are certainly times to teach that precision is needed right now, but that lesson is not the most important lesson and we believe most students benefit more from a gradual and iterative approach.

Conclusion

Tools are available that provide Socratic style feedback related to the skill level and competency of each student. The focused use of this product provides feedback that enhances learning through iteration. The ability of this tool to manage large numbers of individuals allows us to maintain the economic benefits of larger class sizes, but begin to focus more closely on individual performance and instruction. The successful application of this tool enhances the technology skills required for the business world, and the subject knowledge skills required to successfully fulfill course content requirements.

Finally, this tool facilitates a change of focus in instructional methods that leads to an improved quality of teaching experience. As professors become comfortable with this tool they are able to focus on what they need to teach students, rather than the drudgery of grading.

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Are We Teaching the Computer Application Skills Employers Need?

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Introduction

Among the skills that employers have desired of new employees over the years, computer literacy still ranks near the top. As anyone who uses technology can attest, hardware and software changes are rapid and continual. The question arises as to whether the need for basic computer skills: word processing, spreadsheets, and databases have been replaced or augmented by the need for webpage design, programming, and desktop publishing skills?

Purpose

The purpose of this study is to determine current employers' attitudes toward basic application software skills that employees need. Universities desire their curricula to be as pertinent as possible. Therefore, based on a survey of employers who recruit at a regional university in Texas, the research question addressed is: What computer skills should we be teaching students to prepare them best to meet employers' needs and expectations.

Review of Related Literature

Each year numerous companies send recruiters to university campuses looking to hire graduates. According to L. Baird, as cited in an article by Gunderson (2005), "college recruiting provides over 50 percent of the hires of professional, technical and managerial positions filled by organizations". Since the world continues to be transformed by technology, colleges and universities are beginning to recognize that graduates must develop and be able to demonstrate their competency in the use of technology. In fact, the Educational Testing Service has coined a new designation for technology as the fourth basic literacy (Landgraf, 2005).

A decade ago in the 1995-96 study by Michigan State University (Scheetz, 1996) on recruiting trends, the synopsis of needed skills for acquiring a job indicated that applicants not be "cyber-shy." The report showed that employers wanted to recruit those who had a command of popular office technology software. Today's employers are still looking for much the same thing. According to Hansen and Hansen with Quintessential Skills, "Almost all jobs now require some basic understanding of computer hardware and software, especially word processing, spreadsheets, and email." With the increased use of personal computers, most staff, even those at the top echelons, are producing their own correspondence, a task once performed primarily by secretarial personnel (Maitland, 2005). Challenger (2003) indicates that as our nation's use of and dependency on technology increases, even more jobs will require computer skills. According to the Des Moines Business Record Online (2005), "Knowledge of the Microsoft Office suite is the bare minimum expectation today."

The fact that almost every occupation requires some degree of computer or technical skills seems to be often overlooked. McCune (1999) felt that education was "too separatist." She indicated that for those pursuing a liberal arts degree, instruction in technical skills was not considered important. In "Expanding Workforce Greet New Grads" found in the April 16, 2005, USA Today paper, Challenger, Gray & Christmas Inc. from Chicago were quoted as saying, "Even if technology is not your chosen field, college graduates must have technical skills in today's job market. Technology is prevalent in almost every type of business. Those who do not embrace this fact will be left behind."

It appears today that many universities are informing students of the computer skills for

which employers are looking. The Clemson University career page, titled “Qualities Employers Desire in New College Graduates,” lists the need for “established word processing, spreadsheet, database and presentation software skills” and “excellent computer literacy.” Similarly, the Central Washington University career page, titled “Simply Having A Degree Is Not Enough To Get A Job In The Current Labor Market,” lists the “ability to appropriately apply technology and effectively use office software and the web to accomplish job responsibilities” as a need for today’s graduates.

In a 10-month study (January 2004 – October 2004) conducted by the Canadian government using the Toronto Star, The Globe, and the Toronto Sun, data was obtained on the technical skills required by employers advertising job positions. Results of their study showed how many ads specified a particular type of software proficiency such as: office suite, spreadsheet, word processing, database, and also software such as drafting, multimedia, presentation, and other specialized software. The results were then broken down further to show within a general software category whether or not a specific software package was indicated. Microsoft Office Suite was required by 99.5% of the 195 job openings advertised which specified an office suite. Regarding word processing software, Microsoft Word was required by 90.5% over Corel Word Perfect which constituted the other 9.5%. Other software that was most requested in employment advertisements in their respective categories were: Java, Microsoft PowerPoint, Microsoft Access, Microsoft Excel, and Microsoft Outlook. The full results of this extensive study can be found at the Canadian Government website provided in the reference section of this paper.

Methodology

The researchers sent questionnaires to 115 employers who had recruited on the university campus for all disciplines in the spring semester. The list of employers was obtained from the Office of Career Services. A follow-up request,

along with an addressed, stamped envelope, was sent to all those who had not responded within three months. Surveys were tallied and results were graphed. The analysis of the data was based on the total response rate of 34%.

Participants were asked to rank on a Likert-type scale the software skills needed by the employees they were recruiting. The scale ranged from a 5, indicating knowledge of a listed software was required, to a 1, indicating that a particular software knowledge was not needed at all for employment. The software programs included on the survey were: Microsoft Word, Microsoft Excel, Microsoft Access, Microsoft PowerPoint, Microsoft Outlook, Microsoft Internet Explorer/Netscape Navigator, Corel WordPerfect, Microsoft FrontPage, Macromedia Dreamweaver, Macromedia Flash, Macromedia Fireworks, Instant Messenger/Virtual Team Environment, Adobe Photoshop, Java Programming, and Other.

Findings

In addressing the research question, “What computer skills should we be teaching students to prepare them best to meet employers’ needs and expectations,” it was clear from the responses that Microsoft Word is the most widely “required” software application for the employers who recruit on this university campus with 31.43% ranking it as “required” for employment (see Figure 1). When expanded to include “desirable” software knowledge, this number for Microsoft Word rises to 62.86% (see Figure 2). That percentage rose to 97.14% when the choice of “beneficial or useful” was added, and only 2.86% indicated that Word was “not needed or useful” at all for employment with their company (see Figure 3).

When looking at other software program knowledge “required” that ranked highly on the list (see Figure 1), Word was followed by Internet Explorer/Netscape Navigator with 28.57%, Microsoft Outlook with 27.78%, and Microsoft Excel with 25.71%. After the top four, the next highest “required” software knowledge drops to only 5.56% of employers

requiring PowerPoint, 3.24% requiring Java programming, and finally Microsoft Access and WordPerfect being required by only 2.86% each. In the “Other” category, there was only one response, and that was a proprietary software. Though there are new software programs that now are being required or desired of job applicants, word processing software skill continues to be the number one requirement. These survey results correspond closely to the recommendations found at a job search website on basic computer user skills. At this About.com site, information is provided that indicates, “many employers consider Microsoft Office skills to be among the basics.”

As seen in Figure 2, when combining the “required” software knowledge with the software knowledge also considered “desirable” for employment, the rankings were the same order for the first two items; however, Microsoft Excel then moves from behind Microsoft Outlook by just over 2% to ahead of Microsoft Outlook by almost 13%. In addition, with the combined “required” and “desired” results, PowerPoint jumps to tie Outlook at 41.67%. Microsoft Access had the only other significant rise when combining “required” with “desirable” at 17.14% from the “required” 2.86%.

There were several software applications that were not considered “useful” or even needed at all by a large number of the companies included in this study. Microsoft FrontPage, Adobe Photoshop, and Corel WordPerfect were not needed by approximately one-half of the companies. Macromedia Flash, Macromedia Dreamweaver, and Instant Messenger/Virtual Team Software were not needed by approximately sixty percent of the companies, while Macromedia Fireworks and Java Programming were not needed by more than seventy percent of respondents (see Figure 3).

Implications and Recommendations for Additional Study

As recently as five years ago, both Microsoft Word and Corel WordPerfect were being taught in the junior-level word processing course at the university in this study. Software trends seemed to indicate that Microsoft Word was the program more often used in businesses in the area, which prompted removal of Corel WordPerfect from instruction. Other courses within the department of the researchers include software such as Microsoft Access, Microsoft PowerPoint, and Macromedia Dreamweaver. The information from this study will provide insight into possible needs for curricula modification to reflect current employer requirements regarding computer application skills.

The current study has prompted areas for further research. Additional investigation should be ongoing in order to maintain the pertinence of the computer applications included in the curricula. Similar studies could be replicated at other institutions to verify the findings and to determine if any regional variances exist.

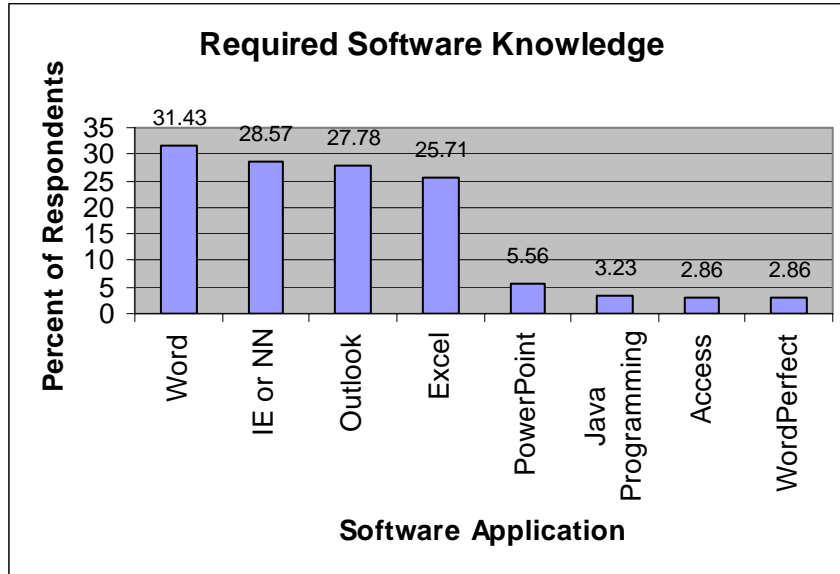


Figure 1: Required Software

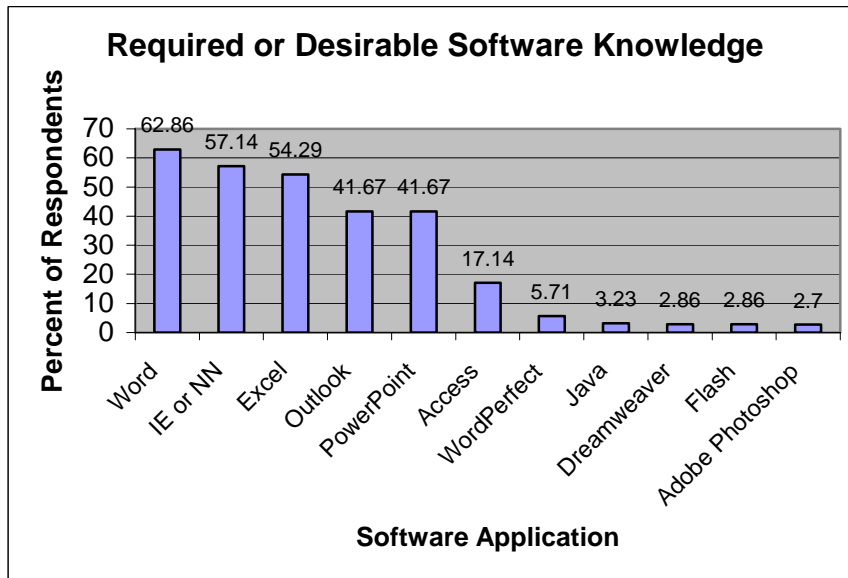


Figure 2: Required or Desirable Software Knowledge

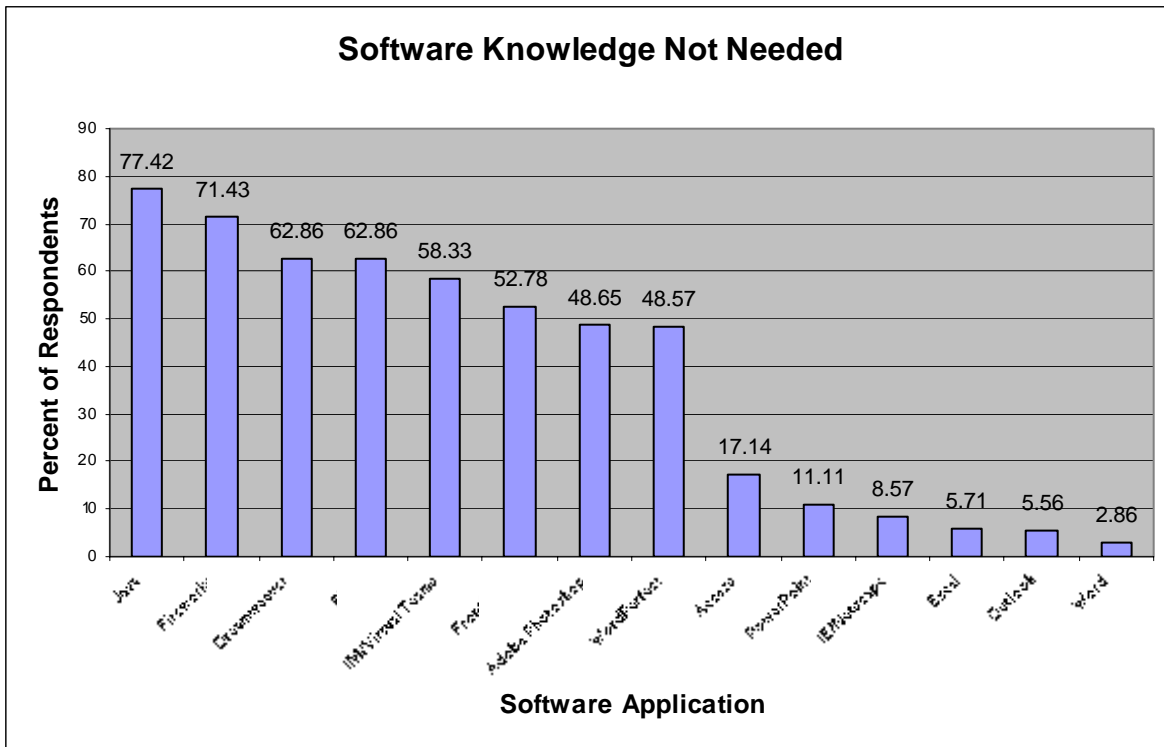


Figure 3: Software Knowledge Not Needed

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How Much Content Should Internet Outlets Give Away?

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Abstract

Firms transmit information content over the Internet in forms such as newspapers, magazines, and data sets. Firms may give away some content free of charge in order to provide potential subscribers with a sample on which to make a decision to subscribe. This research examines the conditions necessary for strategic use of information by potential subscribers. That is, we answer the following question. Under what conditions will an Internet content provider release a free sample of content that the consumer will use as a basis for a decision to subscribe? Our analysis suggests that strategic use of information is rare. The conditions for strategic use of information are so restrictive that we do not expect to see many instances of consumers making subscription decisions based on their evaluation of free samples of Internet content.

Introduction and Literature

The Internet allows users to access great volumes of information for no marginal fee. Newspapers, magazines, data, and other information can be accessed quickly, without regard to geographical boundaries. If the information accessed has a relationship to a physical product that one may consume, then the business model is similar to the traditional, offline market model in which consumers are offered advertising regarding products and services. If the information, itself, is the product of the online firm, then the traditional model does not fit as well. VanHoose (2003, p. 76) defines “virtual products” as “items offered for sale in digital form.” Some of these products are information content.

There are two differences between virtual products and physical products. First, as

suggested by VanHoose (2003), virtual products have low cost associated with serving another customer (the marginal cost). Allowing another reader to view an online newspaper adds a minuscule amount to the firm’s costs. In fact, the marginal cost is likely so low that if the firm charged the consumer a price equal to the marginal cost, then unpaid bills might not be collected, since collection costs might exceed the price charged. Second, virtual products are often easily transferable from one consumer to another with little or no loss of quality. Hence, if an online newspaper did charge a fee for access, then a subscriber might be able to give the content away to others or sell the content to others. If this reselling were flagrant, it would run afoul of authorities in countries where intellectual property is protected (Maskus 2000).

If the virtual products that various firms offer are identical in the minds of consumers, then profit-maximizing firms will compete until the price approximates the marginal cost, consistent with the classical model of perfect competition. This happens because if firms can receive a price that gives them a profit, over and above their other profit opportunities, then other firms will enter the industry to earn these above-normal profits. As more firms enter the industry, the price falls, until it is equal to the cost of providing a unit of the service. Since the marginal cost of a unit of virtual product is nil, the price of the virtual product would be nil. If collecting the minuscule subscription fees would cost more than the fees, themselves, virtual products, including information content, could not exist under conditions of perfect competition without payments from another source. Advertisers’ payments help defray the losses from providing virtual products that are nearly similar, such as with many online newspapers and magazines.

If a firm's virtual product is seen as differing significantly from other virtual products, its owner may find that the perfectly competitive model does not apply and that there will not be competition to the point that the price falls to equal marginal cost. Preventing competition is only possible if the firm (1) has some product advantage that other firms cannot duplicate or (2) has non-replicable cost advantages such that competitors know that another firm cannot enter the industry and earn the normal profit. We give two examples of firms who sell virtual products for a fee.

SNL Financial (located at <http://www.snl.com/>) provides data and analysis regarding key financial industries such as banking, insurance, and real estate. SNL specializes in gathering data that other sources do not have. Whereas many data sources have stock prices, SNL also sells data on other firm specific characteristics, organized by industry. SNL data may be purchased piecemeal or, alternatively, an individual or institution may subscribe to all their databases for a yearly fee. SNL attempts to convey the exact nature of the product they sell by detailed descriptions of their data sets, both in content and form.

The *Wall Street Journal* has long been recognized as the United States' premier financial newspaper. Subscribers to the online version of the *Wall Street Journal* (<http://www.wsj.com/>) pay fees that are far in excess of the small sums that a perfectly competitive virtual product would command. A basic subscription to the online version of the *Wall Street Journal* costs \$79 (\$39 for those who also subscribe to the print edition). The *Wall Street Journal's* homepage displays some news items that may be read free of charge and displays links to other news items that are available only to paid subscribers. In addition, a *Wall Street Journal's* site, *OpinionJournal.com*, contains many opinion pieces that are free, but also contains links to the opinion articles offered only to paid subscribers. Our research focuses on how much of their information content a

provider should offer free of charge, in order to encourage a potential subscriber to make an informed decision to purchase a subscription.

The Game Model

A game-theoretic model in which a content provider and a potential subscriber interact can be used to determine the amount of content that should be given away.

The game can be set up as follows. The content provider chooses the amount of content to make available to the subscriber, free of charge. The potential subscriber then browses the provider's available content and decides whether or not to purchase a subscription.

The content provider has a limited amount of content; hence, any content that is provided free reduces the amount of content that he can charge for. Thus, not only does the content provider have to consider that the subscriber might be sated on the freely provided content, but must also realize that with a greater offered content, less is available to sell.

We model the potential subscriber as using Bayes' law (using the method of Harsanyi, 1967-1968) in deciding whether or not to subscribe. The subscriber views the free content, assesses its overall quality, and uses Bayes' law to infer the quality of content that is only available for the price of the subscription. We find pure strategy Nash equilibria (Nash, 1952) of the game and show that some are sequential equilibria (Kreps and Wilson, 1982).

The problem that potential subscribers face is one of incomplete information about the content provider. Potential subscribers are not certain that a provider's content would be useful to them. We simplify the language and draw contrast by assuming that there are two types of provider, Good (G) and Bad (B). We assume that potential subscribers have beliefs about the proportion of providers who are of type Good,

π , and type Bad, $(1 - \pi)$, but they do not know if a particular provider is Good or Bad.

According to our model, the potential subscriber faces only one provider, who may be the Good type or the Bad type. However we model the game as if a Good provider and a Bad provider are formulating strategies. This is because the potential subscriber must conjecture “if this is a Good provider before me, what behavior would I expect and if this is a Bad provider before me, what behavior would I expect.” Similarly, the Good provider must conjecture, “if I take a certain action, the consumer might infer that I am a Bad provider; hence, I must understand Bad providers.” And, importantly, the Bad provider must conjecture, “if I take a certain action, the consumer might infer that I am a Bad provider; hence, I must understand Good providers so that I may mimic their behavior.” We accomplish this modeling by relying on Harsanyi’s (1967-1968) construction of games of imperfect information. The model is presented as if there are three players—the potential subscriber, the Good provider, and the Bad provider. The potential subscriber faces a provider and may or may not be able to infer the provider’s type from his actions. In any case, the potential subscriber must make plans contingent on the possibility that the provider is of either type and in order for the provider to behave rationally, he must conjecture the behavior of the other type.

We assume that both the Good and Bad type have N articles of content that they may either release free of charge, or only release to subscribers. Articles may be news articles, data, multimedia, or any other electronic content. If Good providers only have good content and Bad providers only have bad content, then a Good provider could reveal its type by releasing one good article. An article produced by a Good provider is *good* with probability P_G . An article produced by a Bad provider is *good* with probability P_B . We make the natural assumption that an article provided by a Good provider is more likely to be good than an article provided

by a Bad provider ($P_G > P_B$). We assume that P_G and P_B are set outside our model—that is, we do not model whether Bad providers will try to become Good or whether Good providers can go astray. We assume that Good and Bad providers know their types and each type sets its own strategy, though one type may purposefully mimic the other’s strategy.

We assume that though both types of provider know their type, that they cannot evaluate the quality of an individual article of content. Hence, when a provider sets its strategy to release articles, it only specifies that it will release a certain number of articles and not whether the articles released are good or bad. Of their N articles, good providers release n_G articles, while Bad providers release n_B articles.

Since the potential subscriber cannot tell whether the provider is Good or Bad, she cannot condition her strategy on the provider’s type. The potential subscriber views the release, evaluates the articles, and decides whether or not to subscribe based on the total number of articles released and the number of good articles in the release. The probability that a consumer will subscribe upon seeing n articles released, g of which are good, is S_{ng} . Clearly $g \leq n$, since the number of good articles released cannot exceed the total number of articles released.

We assume that the cost of a subscription is C for both the Good and Bad provider types. If the subscription cost varied by provider type, then the potential subscriber could infer information from the subscription price. We focus only on the information gained by the potential subscriber’s evaluation of the freely provided content (if any). We assume that the value of a good article to a potential subscriber is 1, while the value of a bad article is 0. This means that the expected value of the total number of articles from a good provider is $N(P_G)$ and from a bad provider is $N(P_B)$.

Having specified S_{ng} and C , we can formulate the provider types' payoffs as the expected value of subscription revenues, which depends on C and S_{ng} . We will delay the exact mathematical specification of this expectation. For now, we point out that if the consumer subscribes, the provider receives C and receives 0 if the consumer does not subscribe. Hence, if the provider types can formulate a strategy that makes subscribing with probability equal to one a best reply for the potential subscriber, then the payoff to the provider types is C .

Suppositions

Suppose no articles are released. First, suppose that the expected value of the articles from either type of provider is less than the cost of a subscription. Then no matter how many articles are released, the consumer will not subscribe.

Second, suppose the expected value of the articles from either type of provider is greater than the cost of a subscription. Then if no articles are released, the consumer should subscribe.

Third, suppose that the expected value of the articles from the Good type is greater than the cost of a subscription, but the expected value of the articles from the Bad type is less than the cost of a subscription. Then if no articles are released, the consumer would wish to subscribe if and only if the provider's type is Good.

Summary and Conclusion

Internet content providers will release meaningful information to potential subscribers, free of charge, when a few conditions are met. First, Good and Bad providers must jointly be of low enough quality that consumers will not subscribe unless they can obtain a good sample. Second, Good and Bad providers must jointly be of high enough quality that consumers might want to subscribe upon obtaining a good sample. Third, Good providers must differ from

Bad providers in significant respects (P_g and P_b must be sufficiently far apart) that are difficult to evaluate without a sample, but are easier to evaluate with a sample. Fourth, the probability that a Good provider will provide Good articles must be sufficiently high so that (1) the sample will reveal the Good type with a high probability and (2) the sample can be so small that the unreleased articles are worth the subscription price.

Given these conditions, it seems rare that providers would strategically release content that provides the consumer with information that the consumer uses to make a decision. It seems much more likely that either the providers will only have to guard against depleting their content by offering it free or that consumers will value the content so low (because P_g and P_b are both low) that consumers would not subscribe in any case.

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A Wealth of Knowledge for Free

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Abstract

Margaret Fuller, one of the most influential personalities of her day in American literary circles, said, "If you have knowledge, let others light their candles in it." The concept of sharing knowledge, whether literature, research, or computer code, is a controversial one. Open access to a wealth of knowledge has become a reality as the Internet has revolutionized data distribution. Open access proponents argue that information should be freely available free of charge for general public use thereby eliminating price barriers (subscriptions, licensing fees, pay-per-view fees) and permission barriers (most copyright and licensing restrictions). They believe that knowledge and ideas are to be shared openly and freely for the benefit of the community. In this regard, various initiatives have risen to further this ideology including Open Source and OpenCourseWare. As the open access philosophy gains acceptance and popularity, it will have a significant impact on the world of education and academia. Introduction

"An old tradition and a new technology have converged to make possible an unprecedented public good. The old tradition is the willingness of scientists and scholars to publish the fruits of their research in scholarly journals without payment, for the sake of inquiry and knowledge. The new technology is the internet. The public good they make possible is the world-wide electronic distribution of the peer-reviewed journal literature and completely free and unrestricted access to it by all scientists, scholars, teachers, students, and other curious minds. Removing access barriers to this literature will accelerate research, enrich education, share the learning of the rich with the poor and the poor with the rich, make this literature as useful as it can be, and lay the

foundation for uniting humanity in a common intellectual conversation and quest for knowledge" [9]

As information becomes more readily available through the Internet, access to it should not be restricted. Copyright and licensing restrictions, subscription fees, licensing fees, and pay-per-view fees are not only costly and constraining but also discouraging and at times suppressive to public self education. In an effort to share

knowledge and insight, spark new research and innovations, and remove barriers to accessing information/materials, organizations such as the Free Software Foundation (FSF) have been established. Furthermore, academia has begun to embrace such ideology as renowned academic institutions post course materials online for general use free of charge. Finally, the Bethesda & Berlin Statements personify open access to scientific literature and research.

Open Source Software

The origin of Open Source Software can be traced back to what is termed the "hacker culture," which, in turn, can be traced to the 1960s in the computer science laboratories of Stanford University, Berkeley University, Carnegie Mellon University (CMU), and Massachusetts Institute of Technology (MIT). In these laboratories, small groups of programmers would send each other program codes. Improvements made to these programs were made public for the benefit of the whole group. The early practitioners of this culture would eventually establish the Open Source and Free Software movements. Richard Stallman emerged from this culture to form the Free Software Foundation (FSF) in 1985. The FSF is dedicated to promoting computer users' rights to use, study, copy, modify, and redistribute

computer programs. The main aim of the foundation is to promote “Free Software.” In 1998, a team comprising of Todd Anderson, Chris Peterson, John Hall, Larry Augustin, Sam Ockman, and Eric Raymond, a leading proponent of the “hacker culture,” coined the term “Open Source” [1]. The term arose from a meeting held by the group in response to an announcement/press release made by Netscape to “...make [the] *Next-Generation Communicator* source code available free on the net” [2]. According to the article, [1] the team coined the term after a decision to “...dump the confrontational attitude that has been associated with ‘free software’ in the past and sell the idea strictly on the same pragmatic, business-case grounds that motivated Netscape.”

As can be observed from its history, Open Source Software has its origins firmly entrenched in the academic worlds of Stanford Universities, Berkeley University, CMU, and MIT. It is closely related to the scientific attitude of advancing knowledge by freely sharing ideas and discoveries. Open Source enables users to view, modify, and redistribute the source code and related documentation that constitute a software product. The licenses for most software are designed to take away freedom to share and change it. By contrast, the General Public License (GPL) is intended to guarantee freedom to share and change free software -- to make sure the software is free for all users. This GPL applies to most of the FSF’s software and to any other program whose authors commit to using the license. For example, the Linux operating system has been developed and released under the GPL which means that its source code is freely distributed and available to the general public. Initially created as a hobby by a young student, Linus Torvalds, at the University of Helsinki in Finland, Linux is being adopted worldwide as a server platform primarily. Its use as a home and office desktop operating system is also on the rise. Furthermore, Linux can also be embedded

into microchips to be used in various appliances and devices.

(<http://www.linux.org.info/index.html>)

Open CourseWare

A prime example of how the Open Source ideology has affected academia is OpenCourseWare. MIT OpenCourseWare or MIT OCW is a large scale web publishing initiative aimed at providing free, searchable access to MIT’s course materials for educators, students, and self-learners around the world.

In the fall of 1999, a committee was established at MIT to provide strategic guidance on how the institution could position itself in the e-learning environment. The committee concluded that it was not desirable for the organization to enter the commercial e-learning industry. Instead they released the organization’s teaching material on the Internet for free, based on the ideals of Open Source and thus MIT OCW was conceived. In September 2003, MIT officially launched MIT OCW publishing the materials from 200 courses on the Internet, and making them freely available to the general public. The material included lectures and class notes, tests and course outlines. MIT President Susan Hockfield sums up the idea behind OCW when she says: “Through MIT OCW, educators and students everywhere can benefit from the academic activities of our faculty and join a global learning community in which knowledge and ideas are shared openly and freely for the benefit of all.” [3]

The success of MIT OCW was evaluated in 2003 based on its number of users, purpose of use, and overall impact. The article, [4] outlines outcomes of the evaluation.

The MIT OCW website registered an average of 12000 visits daily. Forty-five percent of its visitors were from North America (United States and Canada). Western Europe had the second most common point of origin (19%), and East Asia was third with 18%. A summary of

the geographic location of MIT OCW users is given in Table 1.

Most users were self-learners, representing 52% of visitors with an average of 6000 daily visits. Students represent approximately 31% of visitors with an average of 3600 daily visits followed by educators representing over 13% of the visitors or an average of 1550 visits per day (Table 2).

Educators primarily employed the site for planning, developing, improving, and teaching courses or classes (44%), and secondarily to enhance their personal knowledge (25%). Students used the site to find subject matter and materials for use in conjunction with a course they were currently taking (43%), and to enhance their personal knowledge (39%). Self-learners overwhelmingly use the site to enhance personal knowledge (80%).

MIT OCW users overwhelmingly found that MIT OCW has, or will have a significant positive impact on both teaching and learning activities (Table 3). As a result of its success and popularity, the OCW initiative has grown since its inception in 2003 to include JHSPH OCW (Johns Hopkins School of Public Health OCW) [5], Tufts OCW [6], and Sofia (Sharing of Free Intellectual Assets) [7].

Open Access

According to Peter Suber [8], a policy strategist for open access to scientific and scholarly research and Open Access project director of public knowledge, Open-access (OA) literature is digital, online, free of charge, and free of most copyright and licensing restrictions. The Budapest Access Initiative ¹ [9], and the

¹ By "open access" to this literature, we mean its free availability on the public Internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl (traverse) through them for indexing, pass them as data to software, or

Bethesda [10] & Berlin Statements ² [11], offer more rigorous and widely adopted definitions of OA.

use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited.

² Open access contributions must satisfy

two conditions:

The author(s) and right holder(s) of such contributions grant(s) to all users a free, irrevocable, worldwide, right of access to, and a license to copy, use, distribute, transmit and display the work publicly and to make and distribute derivative works, in any digital medium for any responsible purpose, subject to proper attribution of authorship (community standards, will continue to provide the mechanism for enforcement of proper attribution and responsible use of the published work, as they do now), as well as the right to make small numbers of printed copies for their personal use.

The first scholarly journals were launched in Paris and London in 1665. The concept of OA was quickly adopted by scientists as a way for scholars and scientist to quickly share and learn about the recent works of their counterparts. Today, scholars and scientist submit the findings of their research to a journal. The journal editor then removes the name and affiliations of the authors and sends the article to the authors' peers for an unbiased review. Depending on the feedback from the peers the editor then chooses whether or not to publish the finding. A subscription would then be paid by a user to access the information within the journal. This model has spawned a very lucrative scientific publishing industry. According to The Economist magazine [12], the industry is estimated to be worth between seven and eleven billion dollars in the United States alone. Suber [13] states that journal prices have risen four times faster than inflation. This trend has led to claims from certain members of the academic community that scholarly journals are becoming unaffordable and creating a barrier to the acquisition and advancement of knowledge. Furthermore, funding agencies question why publishers are making money from publicly funded research by restricting access to these research findings.

Open Access advocates believe that the solution to such problems is to make scholarly literature freely available online. According to Suber [13], OA removes price barriers (subscriptions, licensing fees, pay-per-view fees) and permission barriers (most copyright and licensing restrictions).

Some examples of OA implementations include the following:

PubMed Central is a digital archive of life science journal literature. It is developed, managed and supported by the National Center for Biotechnology Information at the U.S. National Library of Medicine. It offers free unrestricted access to users. BioMed Central

(BMC) offers free online access to over 100 peer reviewed biomedical journals. arXiv.org e-Print, formerly known as the LANL preprint archive, is a digital archive of scientific papers in the fields of physics, mathematics, computer science and biology. The archive was originally hosted by the Los Alamos National Laboratory but is now hosted and operated by Cornell University.

According to a report by the Organisation for Economic Co-operation and Development (OECD), approximately 75% of scholarly journals are online. Additionally, OA enjoys support from numerous major libraries and organizations. These include British Columbia Library Association, The National Library of Canada and the Medical Library Association.

Conclusion

The above mentioned initiatives have all revolutionized the way knowledge is viewed and shared in academia. Open Source has redefined the way software is developed. OpenCourseWare promises to open a new world of freely accessible course materials to educators and learners alike. Finally, Open Access is changing the way academics and scientists share knowledge through scholarly journals. By removing restrictions and limitations to accessing and sharing knowledge, these initiatives will not only inspire educators and learners to pursue new ideas and visions, but also spark new research innovations and facilitate the dissemination of a wealth of knowledge via the Internet for the public's best interest.

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CONFERENCE NOTES

Teaching Introduction to Application Programming for Non-CIS Majors Via the Internet

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Introduction

In the spring 2004 semester, Northwestern State University's College of Business joined the Louisiana Distance Education Initiative and the University of Louisiana at Monroe in a program to offer computer courses via the Internet. These courses were to allow currently certified teachers in Louisiana to complete a nine hour requirement for an additional "Computer Literacy" certification. Northwestern was asked to develop three programming courses to be offered over the Internet. In October, 2004 the following courses were approved and scheduled for offerings in 2005: CIS 1010 – Introduction to Application Programming; CIS 2010 – Intermediate Application Programming; and CIS 2030 – JAVA Programming. CIS 1010 was taught by the author in spring, summer, and fall semesters with 87 students enrolled in the four sections of the course.

Problem Statement

What are the results (completers, grades, final level of programming skill) from teaching an application programming class to non-Computer Information Systems majors over the Internet?

Can a programming class be successfully taught over the Internet to non-CIS majors?

Course Objectives

This paper will present the results of:

- Completion rates
- Grades

Schneider's text: An Introduction to Programming Using Visual Basic.Net, 5th

- Report on the level of programming skill for those completing the course
- Other information discovered in processing the data

Curriculum and Course Details

Computer Information Systems 1010 – Introduction to Application Programming was offered for the first time in the spring 2005 semester at Northwestern State University. The catalog description for the three hour credit course is as follows: "Introduction to application programming and algorithm design concepts for non computer information systems majors. Topics include computer organization, program and algorithm design, program control structures, functions and subroutines." It was developed through a grant from the Louisiana Distance Education Initiative program to provide certified teachers with Internet computer courses in order to complete a "Computer Literacy" certification. The author and College of Business CIS faculty developed this course and the other two courses for three other purposes as well. They were (1) expose non-CIS majors to computer programming and therefore serve as recruiting tools, (2) give beginning CIS majors who were having difficulties in the first programming a "remedial" course if necessary and (3) expand the number of courses offered for students taking the computer option of the Office Administration two year curriculum.

The curriculum for the course was designed around the first six chapters of David

Edition (ISBN# 0-13-030657-6). The chapters were as follows:

Chapter 1 – Introduction to Computers. This was basically a review and literacy chapter.

Chapter 2 – Problem Solving. This chapter introduced the students to pseudocode and hierarchy charts.

Chapter 3 – Fundamentals of Programming. In this chapter students were actually required to do VB.Net exercises. It was the longest of the six chapters and where most of the students “quit” the course.

Chapter 4, 5, & 6 – These chapters introduce progressively more involved programming techniques such as subprograms, decision statements and repetitions.

Assignments for the course consisted of (1) a series of exercises from each chapter (2) problems from the end of the chapters and (3) a set of problems related to a fictional business that reinforced the concepts introduced in each chapter.

The first assignment for the course consisted of the students reading and returning an “agreement” letter to the instructor. The letter explained the course and detailed what software was necessary to complete the course. The course required the students to secure Visual Studio (the students could call the College of Business’ computer technician for the code to order the software from Microsoft for less than \$20), Microsoft Word and WinZip (in order to submit the VB.Net programs over the Internet).

Results

The data for this research was gathered from the 87 students who enrolled in the four sections of the course offered in the spring summer, and fall sections for 2005.

Of the 87 students, only 21 or 24% received a passing grade, i.e A, B or C (no D’s were given). Of the remaining 66 students, 11 or 13%

received an F and 55 or 63% dropped the course with a W. (see Table 1)

Students from all the various colleges enrolled in the course. The University College and College of Business had the most students enrolled with 27 (31%) and 24 (28%) respectively. The College of Education and College of Science and Technology had the fewest with 4 (5%) and 6 (7%) respectively. (see Table 2 for complete enrollment statistics and grade distribution)

The 87 students were also categorized by class with Sophomores being the largest group with 34 or 39.1%. Entering freshmen was the smallest group with only 4 or 4.6%. (see Table 3 for complete classification and grade distribution)

Discussion

Can a programming class be successfully taught over the Internet to non-CIS majors? With a 76% dropout and F rate, the author feels that perhaps the course doesn’t fit the Internet delivery mode. (The author checked with the instructor who teaches CIS 1030 which is the VB.Net programming class for CIS majors – the dropout and F rate for that class is around 54%) All of the eight students receiving an A and 3 of those receiving a B for the course did seem to understand programming and were capable of designing quality screens and writing supporting code for Visual Basic.Net.

As stated in the chapter discussion section, students actually had to start working with the VB.Net software in Chapter 3. Most of the students dropped out at this point in the semester (generally about six weeks) or shortly thereafter. Those receiving an F did so because of not dropping the course properly. Several had to drop after Chapter 3 assignments were due because of their in-ability to secure the software. Some even thought they could pass the class without doing any VB.Net assignments.

Probably the biggest headache for the author for the four sections was getting the students to submit the VB.Net assignments in proper format. Using WinZip to email assignments proved more difficult for the students than many of the assignments. When zipping a VB.Net file the student must zip the “whole” file folder related to the problem. Any other file or folder that is zipped will not unzip properly.

So far, no Education major or teacher has completed the course. As far as the “other” objectives for the course, none of the 21 students receiving a C or better have changed their major to CIS and no student who had trouble in the CIS VB.Net has taken the class as

a remedial course. There were eight 2-year business students who did sign up for the course in order to use it as a business elective for the associate degree program.

For the spring 2006 semester, the CIS 1010 section has an enrollment of 30 and already full. The author plans on adding a few tutorials for chapter 3 and emphasizing even more the need to secure the Visual Studio software immediately. Unless student success improves in the spring and summer sections, the course will not be taught in the fall semester.

References available upon request

Table 1 – Grade Distribution for CIS 1010

Grades	Number	Percent
A	8	9%
B	7	8%
C	6	7%
D	0	0%
F	11	13%
W	55	63%

n=87

Table 2 – College Representation and Grade Distribution

College	Number	Percent	A	B	C	F	W
BU	24	28%	4(17%)	2(8%)	1(4%)	4(17%)	13(54%)
ED	4	5%	0(0%)	0(0%)	0(0%)	0(0%)	4(100%)
LA	16	18%	1(6%)	1(6%)	2(13%)	0(0%)	12(75%)
NU	10	11%	0(0%)	3(30%)	1(10%)	2(20%)	4(40%)
ST	6	7%	1(17%)	0(0%)	0(0%)	0(0%)	5(83%)
UC	27	31%	2(17%)	1(4%)	2(7%)	5(19%)	17(63%)

n=87

Table 3 – Classification and Grade Distribution

Class	Number	Percent	A	B	C	F	W
EFR	4	4.6%	1(25%)	0(0%)	0(0%)	0(0%)	3(75%)
FR	8	9.2%	0(0%)	1(12.5%)	1(12.5%)	1(12.5%)	5(62.5%)
SO	34	39.1%	3(8.8%)	0(0%)	3(8.8%)	4(11.8%)	24(70.6%)
JR	17	19.5%	0(0%)	3(17.6%)	0(0%)	3(17.6%)	11(47.8%)
SR	23	26.4%	4(17.4%)	3(13%)	2(8.7%)	3(13%)	11(47.8%)
GR	1	1.1%	0(0%)	0(0%)	0(0%)	0(0%)	1(100%)

n=87

Expansion of Broadband Access in Louisiana: Issues and Options

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Abstract

The availability of broadband access to the entire citizen base of a state is a critical step in the development of that state's economy. This paper provides research findings into the current state of broadband access within the State of Louisiana. Recommended steps for deployment of some of these technologies are offered as a way to achieve a more rapid development of large scale broadband access to Louisiana citizens.

Introduction

The value of broadband (high speed) access to the Internet by the citizens of the State of Louisiana is of significant importance in today's technology focused economy. Various governmental leaders of the state of Louisiana have recognized this fact, and they are now taking steps to: (1) understand the current level of broadband deployment in the state, and then, to (2) initiate a program that will provide broadband access to all of the citizens of the state at a cost that is affordable. The Louisiana Broadband Advisory Council was created as Act No. 167 in the 2004 regular session of the Louisiana state legislature [29] to pursue this purpose.

Current Dominant Broadband Providers in Louisiana

There are two main sources of broadband access in most Louisiana cities. Digital Subscriber Line (DSL) service is provided by the telephone companies that operate in the state. The largest of these are Bell South and Century Tel [15]. All Bell South Central Offices (COs) within Louisiana can now offer broadband service. The other telephone providers within Louisiana are mixed in terms of their ability to offer broadband connectivity. Some of these smaller firms offer very advanced services, while others offer only basic phone service.

Cable modem broadband is another primary source of broadband access within Louisiana. The original intent of cable companies was to pipe television service from the cable home plant to the home of the viewer. When the need for broadband began to grow

in Louisiana, many of the cable firms upgraded their systems to provide high-speed data services. These firms had to undergo extra infrastructure expense in order to provide adequate "last mile" service.

DSL and cable modem broadband service tend to be found in the major metropolitan areas of Louisiana. However, much of the rest of the state is without broadband service by means of DSL and cable modem. This not universally true, but the two primary providers of types of broadband service just do not serve the less populated and more rural areas of the state.

There are other means by which users may obtain broadband service [19]. These include fiber optic cable, satellite, terrestrial fixed wireless, terrestrial mobile wireless, electric power line and other, less popular technologies. Fiber optic is very expensive to install. For this reason there are few places where firms have chosen to create fiber installations in order to serve currently under-served customers within Louisiana. Satellite reception utilizes fixed position satellites in space. In the U.S. one national company that offers this service is DirecWay. Electric power line broadband transmission is just emerging from test mode. Wireless broadband connections are becoming increasingly popular as small companies are venturing into the un-served regions of Louisiana.

In summary, the citizens of the larger metropolitan areas of Louisiana tend to have at least two primary choices for broadband service ---- DSL from the phone companies, and cable modem from cablevision firms. Citizens living outside of the seven largest metropolitan areas of the state are poorly served by these two sources of broadband providers. Most of these citizens do not have access to affordable broadband service.

Federal Government Initiatives to Encourage Broadband Expansion

The federal agency charged with oversight of a multitude of communication technologies is the

Federal Communication Commission (FCC). The FCC has stated its strategic goal for broadband, "... is to establish regulatory policies that promote competition, innovation, and investment in broadband services and facilities while monitoring progress toward the deployment of broadband services in the United States and abroad"[2]. President George W. Bush stated in a speech in 2004, "We ought to have ... universal, affordable access for broadband technology by the year 2007, and then we ought to make sure, as soon as possible thereafter, consumers have got plenty of choices when it comes to purchasing the broadband carrier" [5]. It is clear from these pronouncements that the federal government intends to work towards broadband availability to at reasonable prices to all consumers.

The previous FCC Chairman, Michael Powell, created the federal government Wireless Broadband Access Task Force in May of 2004. In February 10, 2005, the Task Force called for innovative technologies to be created that would allow wireless broadband to grow in the United States. The Task Force called for innovative regulatory policies to be created that would allow the new technologies to appear and to grow [9]. On August 5, 2005, the FCC adopted a broadband policy statement that stated that "consumers are entitled to competition among network providers, application and service providers, and content providers."

The FCC continues to rule on matters relative to future broadband growth in the U.S. On August 5, 2005, the FCC decided to free telephone companies from requirements to make their broadband wire lines open to rival Internet Service Providers (ISPs) [14]. The U.S. Supreme Court issued in June, 2005 a similar decision regarding cable companies [34]. Cable companies were freed from a requirement that they share their broadband lines with rival ISPs.

The Issue of Competition

The two rulings cited above serve to free both the telephone and the cable companies from having to support efforts by rival broadband companies that have had access to service lines owned by phone and cable companies. The FCC has stated that the rulings will create a new competitive environment between

the telephone companies and the cable companies to offer broader services at more affordable prices to consumers. However, the reality is that as a result of the rulings discussed above, there probably will be *no new competitive push* that will expand broadband offerings and at the same time bring price reductions to consumers.

Louisiana State Government Initiatives to Encourage Broadband Expansion

The Governor's Strategic Goals

Kathleen Blanco is the governor of the State of Louisiana. She ran for the office on a platform that included economic development as the key focus of her administration, and she has consistently pursued this theme during her time in office. The Louisiana Economic Development Council (LAEDC) was created by the Legislature in the First Extraordinary Session of 1996 (Act No. 20 H.B. No. 26). The Council was originally placed within the Department of Economic Development, but in 2001 it was moved to be situated beneath the Office of the Governor [22]. In 1999 the Council published *Louisiana: Vision 2020, Master Plan for Economic Development* [23]. In this plan, the LAEDC decided to "assess, build, and capitalize on Louisiana's information and telecommunications infrastructure" [25]. Development of broadband capabilities throughout Louisiana was included in the plan. In 2004 the report "Louisiana Broadband Assessment: Louisiana's Readiness for the Digital Economy" was published [4]. This report presented an overview assessment of Louisiana's current broadband infrastructure in the state by a hired consultant. This study represents a first step in understanding broadband issues in Louisiana.

Louisiana Broadband Assessment

The "Louisiana Broadband Assessment" report stated that "Cost of service is the major impediment to greater degrees of broadband adoption nationally." This statement also applies to Louisiana. The telecommunications industry uses the term *consumer take-rates* to describe the rate by which individuals with access to broadband services purchase those services. Louisiana take-rates are much lower than national averages due to the significant number of people living in poverty in the state. This fact is a very real barrier to connection to

broadband services by the citizens of Louisiana. The Assessment report suggests that the primary legislative concern when looking at broadband access in Louisiana should be the rural areas that are simply not served at all.

Louisiana Broadband Advisory Council

The Council consists of twenty-four telecommunication professionals drawn from a variety of industries and representative of each section of Louisiana [5]. During the 2005 Louisiana legislature several proposed bills were introduced that sought to assist the Council in furthering the state's goal of getting high-speed Internet access into rural and under-served areas. House Bill 531 (Act 372) created the Broadband Infrastructure and Information Technology Fund to be administered by the governor's Office of Rural Development [26]. However, the state has now been placed into serious budget deficits due to the losses of revenues caused by the two hurricanes that ravaged the state in the early fall of 2005. This reality will delay any funding of this new economic initiative for several years.

Broadband Over Power Lines

In December 2003 the National Association of Regulatory Utility Commissioners (NARUC) was formed to explore the potential deployment of broadband over electric power lines. The technology is known by the name Broadband over Power Lines (BPL). This technology is especially intriguing because it proposes to send broadband data over existing electric power networks. Since almost every residence within Louisiana has electric power line connections, very little new infrastructure would have to be built before this technology could be implemented.

A Unique Approach to Broadband Access in Lafayette, Louisiana

The City of Lafayette is located in south central Louisiana deep in Cajun country. The Lafayette Utilities System (LUS) was formed in 1897 to provide services to the city. It now has a customer base of 55,000 utility customers [16]. The city recently decided to get into the broadband business itself by offering high speed Internet access to all of its 116, 000 citizens. In mid July 2005 sixty-two

percent of the voters approved a \$125 million initiative to provide fiber-to-the home project.

Widespread Broadband Access Comes to Rural North Louisiana

One very interesting development that is now being seen in some un-served Louisiana communities is the deployment of broadband by means of wireless technologies. The research of the author found two such applications in small North Louisiana communities.

Broadband Service in Vivian, Louisiana

A citizen of Vivian, Louisiana (4,000 residents) began to research alternative sources of broadband service. This individual is a pharmacist at the Vivian hospital, and he had no special technology training or background. He eventually formed a business named *Fastline Wireless Internet Service*, which began to offer broadband access to four small towns located in extreme Northwest Louisiana and Northeast Texas. The entrepreneur created a Wireless Fidelity (Wi-Fi) "mesh cloud" across Vivian [1]. Any resident or business with a regular Wi-Fi client device (antennae) can get onto the network that has been formed. Roughly fifty percent of the town's population can access the network with only a small Wi-Fi antenna in their computers. The portion of the town that is more dispersed must have an outdoor, high-powered bridge installed before they can access the network [8].

Broadband Service in Ruston and Grambling, Louisiana

The population of Ruston is 21,000 and the population of nearby Grambling is 5,000. Both of these communities were offered broadband access through cablevision, but the outlying areas around the towns had no broadband access. Once again, a local entrepreneur began to research the opportunities to bring broadband access to this rural north central area of Louisiana. *Incise-Wire Broadband Networks* was formed to provide this needed coverage [18]. The installed network now covers 120 square miles. It provides broadband and Voice over Internet Protocol phone service to 35,000 homes and an additional 17,000 students housed on the two university campuses.

Recommendations for Expanding Broadband Access in Louisiana

The information presented to this point has emphasized the key factors that currently impact the growth of broadband access in Louisiana. This section will summarize the key research findings and present specific recommendations for accelerating the expansion of affordable broadband across Louisiana.

1. **Services through existing telephone companies and cablevision providers.** These firms are unwilling to expand their broadband coverage beyond the metropolitan areas of the state and into the less populated, more rural areas. Their stated reason for refusing to expand the coverage is based on economics. The investment needed in new infrastructure is not justified when compared to the potential for new revenue [7]. These providers are probably correct in their assessment. Hence, it seems that the most logical conclusion drawn from this analysis is that neither DSL service nor cable modem service offer realistic solutions to the area wide broadband coverage sought in Louisiana.
2. **Broadband over Power Lines (BPL).** BPL is a newly emerging technology. The theory for the technology has been evolving over several years. However commercial applications are now being installed. One such application is a rural area of Virginia. In this application rural farm houses a distance of 4 or 5 miles apart are being served with BPL. It is not yet clear, however, how universal this technology will become. It is worth noting that a representative of a large Louisiana power company who serves on the Louisiana Broadband Advisory Council stated his company is not interested in making the infrastructure investment necessary to expand broadband coverage to rural Louisiana. It is unlikely this view will change soon. As a consequence, it does not appear that BPL offers any real hope for the expansion of broadband access in Louisiana.
3. **Fiber-to-the-Home, Lafayette's Solution.** The initiative in Lafayette to provide fiber-

to-the-home will be a wonderful solution for the citizens of this region of the state. However, Lafayette is probably unique in Louisiana communities. Lafayette has a long-standing publicly owned utility company that will be the provider of the fiber network. The city also already has in place a large fiber ring around the city that is owned by the public utility. For this reason, it does not seem reasonable to view this city's solution as one that could be exported to other Louisiana communities.

4. **Wireless Broadband Service.** The broadband initiatives in Vivian and in Ruston and Grambling are finding new, untapped broadband markets. The services offered are based on wireless networks that do not require the installation of expensive copper wire or fiber cable networks. It is probably too soon to determine the overall customer satisfaction levels of the broadband services. But if the existing customer growth rates are an indicator of customer satisfaction, the new services in these communities is doing great. Wireless systems do have some security concerns that land wire systems are not subject to. However, the cost of broadband service in the wireless systems appears to be comparable to the costs of DSL and cable modem in the metropolitan areas of the state. It appears that this technology is the best technology now available for the unserved rural areas of the state. The installation expense for users is a minimum, and the ability to connect quickly to an existing network is a great advantage.
5. **The issue of "take rate."** Wireless broadband appears to offer the most realistic option for establishing high speed Internet service using existing technologies. However, the cost structure for connecting to the existing wireless firms still appears to be cost prohibitive for many of the poor people in Louisiana who both live within and outside of the major metropolitan areas. It has already been stated that Louisiana has a relatively high percentage of its population living in poverty. The take rate in this population of residents will undoubtedly be much lower at a given cost of subscription

for broadband service than would be found in most other states. This issue provides an even greater challenge to the goal of providing widespread broadband service and connectivity.

6. **The issue of competition.** The greatest need in the broadband market is for a healthy competition to be established among all providers. The present levels of service in Louisiana broadband markets are controlled by the telephone companies and cablevision firms. They currently compete with each other, but on very low levels of intensity. It appears they are content with the existing arrangement of co-existence. The introduction of a strong wireless Internet provider in the metropolitan areas of the state has the possibility of releasing real competition. If this competition emerges in the metropolitan areas, there is then real hope that the rural areas will eventually also be served with high speed access at lower costs.
7. **The Role of the Louisiana Broadband Advisory Council.** This Council offers the greatest hope at the state level of seeing hard statistical data emerge that reveals the true state of broadband in the Louisiana. It will take funding from the Louisiana legislature before this will happen. At the time of the writing of this paper the State of Louisiana is only four three weeks beyond the destruction caused by Hurricanes Katrina and Rita. There is a high likelihood that

Louisiana budgets are going to be very tight for several years. If this is the case, it is also likely that funding for the work of the Council will not be made available for several years in the future.

Conclusion

The best option that is now available to quickly grow broadband access in Louisiana appears to be wireless systems. The models that have been employed in Vivian and in the dual community application of Ruston and Grambling appear to offer real hope that broadband access could actually be a real possibility for all Louisiana citizens. The cost to install these systems is not great, and in those areas where there is no broadband service the probability of finding numerous citizens wanting broadband access is high. These two systems are charging competitive monthly fees. However, it does not appear that the level of service offered in these communities will drive the cost of service down to the point where the “take rate” in Louisiana becomes high enough that poorer citizens of the state subscribe to broadband service. Open and intense competition among broadband providers appears to offer the greatest hope that that the entire state will eventually be covered by affordable broadband service.

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It Disaster Recovery Planning: Lessons Learned From Hurricanes Katrina and Rita

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Introduction

IT disaster recovery planning is one of the ways to help ensure that a disaster will not disrupt IT infrastructure, data, processes and procedures. The purpose of disaster recovery planning is business continuity, which is the ability to keep a business running after a disaster occurs (Turban, Rainer & Potter, 2005). Unfortunately, the only way to truly measure the effectiveness of disaster recovery planning is to evaluate the success of disaster recovery after a disaster occurs.

The destruction caused by Hurricanes Katrina and Rita in a four week period tested IT disaster recovery planning for business, industry, and government in the Gulf Coast region of the United States. The \$200 billion price tag (Weisman and Vandehai, 2005) promised by Washington for reconstruction and recovery from Hurricane Katrina is just one indication of the massive devastation caused by the hurricanes. The flooding of New Orleans and shutting down the city for the first month after Hurricane Katrina disrupted services at all levels of business, industry and government, is another indication of the extent of the devastation. Insurance companies estimate that insured losses will reach over \$60 billion.

The scope of the disaster caused by the hurricanes and the geographic location of the disasters mean that everything from banks to Bourbon Street, casinos to colleges, and oil refineries to military bases were impacted. Large banking institutions, like Hibernia Bank, were severely impacted. After 23 days, only 2 “drive up only” branches out of 43 bank

branches were reopened in the New Orleans area (Branch Availability, 2005).

A student from a gulf coast university transferred to the University of Central Arkansas (UCA) after Hurricane Katrina flooded the campus of her university. When she called that university to ask that her student records be sent to UCA, she was told that her student records had been destroyed in the disaster. Luckily, she had just applied for graduation at her previous university and had copies of all of her records (Johnson and Porterfield, 2005).

Review of Related Literature

IT disaster recovery is the chain of events linking planning to protection to recovery. The worst case scenario of total loss of all computing capabilities must be the focus of the written disaster recovery plan. Recovery procedures must address the steps necessary to recover all critical applications (Turban, Rainer, and Potter, 2005).

Disaster recovery planning is vital. It must be a front line priority for business, industry, and government. The organization’s governing body must drive and oversee the project to ensure its completion and constant revision. A list of all necessary documents and the organization’s major business areas must be developed. A description of the business processes, main dependencies on systems, communications, personnel, and information/data must be developed (The Disaster, 2005).

Lawrence F. Steffann, CEO and president of Data Protection Solutions (DPS)

says a variety of factors in business continuity plans, such as size of budgets and tolerance for risk, must be considered when planning for a temporary outage vs. a major disaster, such as Hurricanes Katrina or Rita. Mike Rosenfelt, Executive Vice President of Austin-based MessageOne, a company that provides business continuity services, stresses that the ability to communicate is the key to disaster recovery (Impact of Hurricane, 2005).

Information technology companies, such as Hewlett-Packard, are investing millions of dollars in business continuity and recovery centers. The centers “technologically advanced and secured facilities that can help companies proactively maintain, recover or resume their critical business processes following virus attacks, natural disasters or other unforeseen events”. The company opened a new center in Georgia in August. Hewlett-Packard provides the centers so that their clients can switch their base of operational control in case of an emergency (HP Investment, 2005).

In 2001, Watkins Uiberall, PLLC, suffered a disastrous fire in Memphis. Despite having no formal disaster recovery plan, the necessary elements of having a clear chain of command, providing new physical space for the business, having an off-site data backup, maintaining client contact, and having qualified, responsive employees were in place. As a result, the company was able to bounce back in two days (A Case of Speedy, 2003).

Essentials of Disaster Recovery Planning

The seemingly large variety of possible disasters can actually be grouped into one or more of only three categories: loss of information, loss of access, and loss of personnel. The duration or extent of loss, however, cannot be predicted. All disaster recovery planning should include the following:

- provide top-management guidelines
- identify serious risks

- prioritize the operations to be maintained and how to maintain them
- assign the disaster team
- take a complete inventory
- know where to get help
- document the plan
- review with key employees, test the plan, and train all employees (Getting Started, 2006).

It is essential that companies understand the volatile nature of data and plan ahead for disasters. One decision involves hosted vs. managed data. Hosted data involves contracting with an Application Service Provider (ASP) who will host data on their server. This approach relieves a company of the expense of purchasing and maintaining their own servers and networks. However, an ASP may not offer all the applications required by a company (Goodfellow, 2006).

Goodfellow (2006) indicates that hardware and software should be categorized based on their strategic value to an organization. The most critical systems and data should be given full attention when developing a plan for disaster recovery. A suggested categorization of the importance of systems and data and the optimum recovery time are:

- Critical — Full recovery required within 24 hours (example: communications).
- Urgent — Full recovery required within 72 hours (example: file and billing access).
- Important — Full recovery required within 30 days (example: employee records).
- Other — Recovery not required or recovery beyond 30 days (example: client files more than seven years old).

Disasters pose many obstacles for integrating and coordinating emergency operations, but communications is a vital key. The breakdown in communications and

inaccessibility to emergency command centers caused many of the nightmares that were exposed in the media in the aftermath of Hurricanes Katrina and Rita. It is essential that low-cost, robust and field deployable wireless emergency management information networks are in place so that:

- emergency management staff can be able to reach emergency operations centers
- communications between all agencies and levels of government are maintained at normal levels
- managers can remain in the information loop regardless of physical location (Anderson, 2006)

Summary and Conclusions

The hurricanes on the gulf coast in August and September 2005 exposed gaping holes in disaster preparedness at the local, state, and national levels. The extensive media coverage and governmental review of oversight responsibilities for the processes and procedures have identified weaknesses at every level. The lessons learned from Hurricanes Katrina and Rita should be used to improve the processes and procedures so that the next disaster will be managed properly.

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HP investment in business continuity and recovery centers around the world reaches \$100 million. (2005, September 8). *Disaster recovery journal*. Retrieved September 28, 2005 from <http://www.drj.com/special/newsbriefs/drjnews.htm>

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Turban, E. & Rainer, R. K., & Potter, R. E. (2005). *Introduction to information technology*. John Wiley & Sons, p. 391.

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Groupware and Continuous Improvement in Knowledge-Based Organizations

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Introduction

In this paper we define groupware and discuss various applications. We also define and describe continuous improvement and how groupware can lead to an appropriate result demonstrating continuous improvement. We discuss groupware design, groupware applications and products.

General-purpose groupware applications and products

What is groupware?

Groupware is a technology that is used to address the need for knowledge transfer as well as making it possible to accelerate the learning process in organizations. The term has only become popular since 1991, when PC Week issued the first special supplement¹ on this subject. Later, in 1992, a conference focusing on commercial Computer Supported Cooperative Work (CSCW) products and their impact on organizations was held in the US. That conference was called Groupware '92². There is no generally accepted definition for groupware. One

definition, which is acceptable within the scope of this paper, is provided as follows. This definition is a convergence of three other definitions. "Groupware is a generic term for computer-based systems, which are particularly used to support groups of people, engaged in a common task."³

¹ Kock, N. F. and McQueen, R. J. (1993), Integrating Groupware Technology into a Business Process Improvement Framework. *Information Technology & People*, V. 8, No. 4, pp. 19-34 [Publisher: MCB University Press]

² Coleman, D. (Ed) (1992), *Proceedings of Groupware '92*, Morgan Kaufmann, San Mateo, California, pp. 84-90.

³ Johansen, R. (1988), *Groupware: Computer Support for Business Teams*, The Free Press, New York; Ellis, C.A., S.J. Gibbs and G.L. Rein (1991), Groupware: Some Issues and Experiences, *Communications of ACM*, V. 34, No. 1, pp. 38-58; and Kock, N. F. and McQueen, R. J. (1995), Groupware and Business Process Improvement: Technology Enabled Organizational Learning. *Proceedings of the Australian Conference on Information Systems*, 1995, pp. 333-347. [Publisher: Curtin University of Technology, Perth, Australia].

Typically, these groups are small and have relevant tasks with definite deadlines."⁴ We could also define groupware as a generic term used to refer to a class of information communication technologies (ICT) that provide electronic support to groups of people engaged in collaborative work.⁵

Software developers routinely use Source Code Management (SCM) systems as a collaborative store for evolving systems. This is often integrated with bug-tracking systems and high-level code editors (Integrated Development Environments, or "IDEs"). More recently, distributed development planning systems (e.g. Microsoft Project Network) are integrated as well. IBM markets a sophisticated collection of tools for cradle to grave (requirements, development, build, test, deployment, maintenance) product development. Yahoo Groups (<http://groups.yahoo.com/>) is a well-known example of a fairly informal collaboration tool.

Groupware technologies are typically categorized along two primary dimensions:

1. Whether users of the groupware are working together at the same time ("real-time" or "synchronous" groupware) or different times ("asynchronous" groupware), and
2. Whether users are working together in the same place ("co-located" or "face-to-face") or in different places ("non-co-located" or "distance").⁶

(See Figure 1)

Examples of current groupware solutions are IBM Lotus Notes, Microsoft Exchange Server, Novell GroupWise, and Webex, to name a few.

What is continuous improvement?

"Continuous improvement" is a term often used to describe an organization's efforts to continually enhance

⁴ Groupware And Business Process Improvement Groups <http://www.mngt.waikato.ac.nz/depts/mnss/bob/WEBDOCS/pubs/acis95.pdf>

⁵ Dulce Pumareja, Klaas Sikkels, Department of Computer Science, University of Twente, The Netherlands, <http://doc.utwente.nl/fid/1187>, 5/15/2005

⁶ Usability First web site, Tom Brinck, 1998, <http://usabilityfirst.com/>

its operations, services, and goods by pursuing opportunities internally as well as externally. Pinpointing those opportunities and acting upon them is the essence of a learning organization. In order for an organization to continually improve itself, it must share learned experiences across the organization. These experiences include ideas, techniques, statistics and any useful information that could be integrated with other form of data to create an even more effective knowledge base.

Continuous improvement efforts may take several forms in an organization. It generally starts with re-engineering the business process an organization adapts to store, track, use, and reuse data among its group of employees and other stakeholders. Effective communication throughout the organization is the key. Users of knowledge must be able to retrieve useful information when needed efficiently and effectively.

How groupware may contribute to continuous improvement

Often, the term “continuous improvement” is synonymous with knowledge management. By managing knowledge effectively, organizations are more capable to better compete in the twenty-first century. “We have moved into a period where competitive advantage is gained not just merely through access to information but, also—more importantly—from new knowledge creation.”⁷ There are many definitions of knowledge management. At a generic level, it can be defined as the collection of processes that govern the creation, dissemination, and utilization of knowledge. It involves creation of supportive organizational structures, facilitation of organizational members, putting IT instruments with emphasis on teamwork and diffusion of knowledge (e. g., groupware) into place. Knowledge is the full utilization of information and data coupled with the potential of people’s skills, competencies, ideas, intuitions, commitments and motivations. A holistic view considers knowledge to be present in ideas, judgments, talents, root causes, relationships, perspectives and concepts⁸. William R. King has defined an “effective knowledge organization” (EKO) as an organization that creates, explicates and communicates knowledge and applies it to create improved decision-making and

organizational behaviors that positively influence overall performance.⁹

Groupware technology has been used to manage knowledge by helping organizations convert tacit knowledge into explicit knowledge. Groupware also allows for collaboration among team members throughout the organization. Such collaboration facilitates communications and could reduce time to market, generate new ideas, and reduce costs by reducing the learning curve when tackling issues that might have been solved by other teams in the organization.

Groupware in essence facilitates collaboration, which is the process of shared creation involving two or more individuals interacting to create shared understanding where none had existed or could have on its own¹⁰. To collaborate is to work in a joint intellectual effort. Partitioning problem solving to produce a synergy such that the performance of the whole system exceeds that of any individual contributor is the essence of collaboration (Bird & Kasper, 1993).¹¹

Groupware allows users of the system to accomplish tasks, which contribute positively to the strategic goal of continuous improvement as stated by Lococo and Yen's “shared thoughts, shared media and shared models,”¹²

- Coordinate with each other's schedules
- Identify and isolate steps in the work process
- Find, assess, and interact with organizational knowledge
- Identify and explore linkages between coworkers (social networks)
- Develop and broadcast new knowledge
- Share and manipulate digital objects
- Easily orient themselves among coworkers in the virtual environment.

⁹ Kim, Young-Gul (Editor). Knowledge management and organizations: Process, system and strategy. West Yorkshire, England: Emerald Group Publishing Limited, 2003. p x.

<http://site.ebrary.com/lib/dulaneybrowne/Doc?id=10052756&ppg=10>

¹⁰ Schrage, M. (1990). Shared minds: the new technologies of collaboration. New York, NY: Random House

¹¹ Khosrow-Pour, Mehdi(Editor). Collaborative Information Technologies. Hershey, PA, USA: Idea Group Publishing, 2002. p 44.
<http://site.ebrary.com/lib/dulaneybrowne/Doc?id=10019265&ppg=59>

¹² Lococo, Anthony, & Yen, David C. (1998). Groupware: Computer-supported collaboration. *Telematics and Informatics* 15, 85-101

⁷ Drucker, 1994; Davenport & Prusak, 1997

⁸ Gupta, Jatinder N. D. (Editor). Creating Knowledge Based Organizations. Hershey, PA, USA: Idea Group Publishing, 2003. p. 4.
<http://site.ebrary.com/lib/dulaneybrowne/Doc?id=10044946&ppg=17>

Groupware Design

The most important component of a collaborative system is the users. The technical components of groupware applications include objects and concepts of a familiar variety. The basic regions of CSCW (computer supported cooperative work) applications include: email, document management, workflow, information sharing, access to shared data sources, collaborative tools¹³, networking, communications tools, memos, databases, customer files¹⁴, contact management utilities¹⁵, awareness tools such as miniature views and radar,¹⁶ shared whiteboards, document markup, discussion groups¹⁷, and public and private calendars.^{18,19}

Implementation Issues With Groupware

For groupware implementation to be successful, organizations must have a clear and actionable plan, set metrics to assess progress and act with true commitment from management and staff alike. As the name implies, groupware is geared toward helping groups collaborate. More than a few individuals must perceive the benefit of a groupware implementation, or it could have a similar fate as many other corporate initiatives pushed by

¹³ Newning, Rod. (1997). Benefits of Groupware. *Management Accounting* 75(1), 56.

¹⁴ Lococo, Anthony, & Yen, David C. (1998). Groupware: Computer-supported collaboration. *Telematics and Informatics* 15, 80

¹⁵ Whittaker, Steve, Jones, Quentin, & Terveen, Loren. (2002). Contact management: identifying contacts to support long-term communication. *Computer Supported Cooperative Work '02 Proceedings*, (pp. 216-225), New York: Association for Computing Machinery.

¹⁶ Gutwin, Carl, Roseman, Mark, & Greenberg, Saul. (1996). A usability study of awareness widgets in a shared workspace groupware system. *Computer Supported Cooperative Work '96 Proceedings* (pp. 258-267), New York: Association for Computing Machinery.

¹⁷ Werbach, K. (2002). Bringing it all together: infrastructure for collaboration. *Release 1.0*. 20 (2).

¹⁸ Kyng, Morten. (1991). Designing for cooperation: cooperating in design. *Communications of the ACM* 34(12), 64.

¹⁹ James Patrick Williams, patrick@clockwerks.com, Knowledge Management Systems, April 22, 2003, <http://www.ischool.utexas.edu/~i385tkms/blog/archives/patrick/groupwarepaper.html#8> (4/27/05)

management. It is a considerable undertaking that requires ample capital and human resources to carry out.

While input from all departments in an organization is imperative for the success of a groupware implementation, Information Technology departments usually lead the implementation effort. This assures single point of contact for support, interpretability, and compatibility across the organization.

Any system implementation within a social context brings about design challenges. One of these design challenges, which exists for groupware systems, is that the use of the system cannot be anticipated or predicted in advance²⁰. Ciborra describes groupware as a technology that “drifts” when put into use²¹. This is based on observations of groupware implementation cases revealing a significant departure from the original intended plan of use to the way the system is currently being used by the organization²². In the case of introducing groupware to an organization which has had no previous experience with group-oriented software, it is particularly important that the introduction is carefully planned from beginning to end, and that beyond the initial introduction a process of continual training be established.²³ It is best to start by gaining a solid understanding of the prospective users, what their goals are, and how they go about their work. For broadly-targeted groupware applications, such as videophones or email, understanding users can boil down to understanding how human beings communicate in the first place.

The goal is to understand a particular type of group or organization that will be using the groupware system. A number of different studies can be conducted: interviews, surveys, analysis of artifacts used in the work process, examination of processes and workflows, etc. In all cases, the object is to identify the users' tasks and goals,

²⁰ Norman, D. (1991). Collaborative Computing: Collaboration First, Computing Second. *Communications of the ACM* 34(12) pp. 88-90

²¹ Ciborra, C. U. (1996). Introduction: What does groupware mean for the organizations hosting it? In Ciborra, C.U., *Groupware and Teamwork: Invisible Aid or Technical Hindrance?* (Wiley Series in Information Systems, pp. 1-19.). Chichester: John Wiley & Sons.

²² K. Sikkel, E.M. Gommer, and J.T. van der Veen (2002). Using Shared Workspaces in Higher Education. *Innovations in Education and Teaching International*, 39 (1), 26-45

²³ Anthony R. Thompson, Bentley College, <http://www.netspace.org/users/athomps/cs776/introduction.html>, 5/15/2005

understand how the group communicates and determine the power structures and roles.²⁴

When implementing a groupware solution, organizations may need to address the following issues:

- The more groupware is customized to address individual needs, the less useful it is for a group.
- Direct involvement of system users. What the IT department may think important might be unnecessary in the field. The system must be designed to address the needs of the users not the software developers. The knowledge shared comes from those users.
- The closer the groupware system mirrors users current interaction environment, the more users are inclined to use it and less resistance it would encounter.
- Level of communication desired between groups. This includes explicit (messages, video,) and implicit communications (indirect gestures, information about people's environment, etc.)
- Setting realistic goals and milestones for the implementation. Gradual rollout may prove more successful as issues are worked out and lessons learned on smaller scale. Any downtime is on smaller scale.
- Management must be committed to collaborative efforts. Such commitment is tied to the organization's goal of becoming a better learning organization.
- Privacy policy and rules governing how much information would be available about users.
- Training time must be factored in the organization budget. Without proper training on process workflow and groupware system, the implementation is certain to lose its luster and eventually fade away.
- Cultural differences between dispersed teams, especially for those global companies with functional teams across the world.
- Abilities for team member to connect to workspaces set by groupware. Inadequate connections and, at times, non-existence of suitable communication infrastructure at some locations may hinder collaborative efforts.

One critical reason that such care is necessary is that groupware technologies have the capability to inspire users to create new mental models concerning how to do business collaboratively, and in many businesses such a change requires a cultural shift. Wanda Orlikowski wrote that, "in the absence of mental models

²⁴ Usability First web site, Tom Brinck, <http://www.usabilityfirst.com/groupware/design-issues.txt>, 5/15/2005

that appreciate the collaborative nature of groupware... [it] will be interpreted in terms of more familiar and stand-alone technologies such as spreadsheets".²⁵ She also noted that in competitive business cultures, groupware would need extra care in implementation since collaboration is by nature counter-cultural in those cases.²⁶

Groupware Applications

Based on Sikkel's paper²⁷, groupware applications could be divided into two types based on their functional properties: general-purpose and special-purpose applications.

General-purpose groupware systems are those classes of groupware applications and products that support the social interactions that facilitate the performance of a business process regardless of its content or domain. As shown in the tables 1 and 2, the first level deals with the specialization type of the functional properties of an application. The second level is a taxonomical listing of the applications and products according to their application class or domain.

General-Purpose Groupware Applications And Products (See Table 1)

On the other hand, special-purpose groupware systems are those business information systems whose content and processes correspond to a particular business domain and business process.

Special-Purpose groupware applications and products (See Table 2)

²⁵ Orlikowski, Wanda J. "Evolving with Notes: Organizational Change around Groupware Technology," *Center for Coordination Science Technical Report #186*, June 1995

²⁶ Anthony R. Thompson, Bentley College, <http://www.netspace.org/users/athomps/cs776/introduction.html>, 5/15/2005

²⁷ K. Sikkel, E.M. Gommer, and J.T. van der Veen (2002). Using Shared Workspaces in Higher Education. *Innovations in Education and Teaching International*, 39 (1), 26-45

Conclusion

In order for groupware to play the desired role in helping organizations continually improve, organizations are faced with challenges that are more social than technical. It is imperative that a groupware system is implemented in a culture of continuous learning. Technology will not make that possible if the seeds have not been planted. Collaborative work allows stakeholders access to information, which would be converted into knowledge and then reused in formulating new ideas and accelerate business productivity. Open channels of communication

also allow for more accountability, if managed effectively.

Implementing groupware could prove difficult if taken lightly. Commitment from all involved parties is a must. Groupware is not “one size fits all,” but it is a good starting point for creating an organization that effectively uses the knowledge asset, which has frequently been mishandled. It starts with open willingness to share expertise across all levels of the organization and the realization that social and technical changes will take place while implementing and using groupware.

Figures and Tables – Available on Request

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Impact of Effective Collaborative Communication on the Success of Collaborative Commerce at FedEx Corporation

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Introduction

For companies to operate at peak efficiency and stay ahead of the competition, they must look beyond the enterprise and collaborate effectively throughout their supply chain. Effective collaboration includes both collaborative commerce and collaborative communication. One of the secrets of effective collaboration is the ability to communicate collaboratively from any location in the world via virtual teams. Virtual teams contain individuals who work toward a common goal utilizing computer technology to communicate and achieve their goal. By definition, virtual teams do not hold face-to-face (f2f) meetings. Rather, their communication and interaction is conducted through electronic mail (e-mail) and the Internet. Normal teams (co-located) are workgroups that meet f2f and communicate orally. This allows members to witness interaction, develop a visual picture of their group members, and see their reactions.

The arrival of business-to-business exchanges on the Web has created new ways for business partners to work together. By using Web servers as hubs for collaborative commerce efforts, companies are seeking to exchange proprietary data, jointly manage projects and cooperate on the design of new products. Collaborative commerce should help companies forge long-term relationships while reducing the costs of cooperation. Some experts say collaborative commerce will make it easier for smaller companies to partner with larger ones, since using a Web server as the data-transmission intermediary may eliminate the need for expensive private networks or electronic data interchange. Collaborative commerce may also speed up business cycle times. A company that can automate the flow of paperwork among its suppliers might increase

its efficiency by dealing with all of them in a uniform way (Alexander, 2000).

Companies have found that, after integrating the raw transactional fundamentals intrinsic to any aspect of collaborative commerce success, the new system requires more efficient communication and planning capabilities along the value chain (Borck 2001).

Research Design

The impact that effective collaborative communication has on the success of collaborative commerce at FedEx Corporation, headquartered in Memphis, Tennessee, with locations throughout the United States and around the world, was studied by the researcher.

FedEx provides access to a growing global marketplace through a network of supply chain, transportation, and business and related information services. It is an ideal model for study in order to better understand the role that effective collaborative communication plays in the success of collaborative commerce.

Secondary research of articles, forums, white papers, and case studies was conducted in order to document effective collaborative communication models used by FedEx to enhance collaborative commerce.

Review of Related Literature

Creating a collaborative network of trade partners is a key to strong business growth, according to a new study by Deloitte Consulting. Deloitte's survey shows that almost 75% of companies consider collaboration a top executive priority and those who already linked their business processes with other companies are showing 70% higher profitability than those

organizations that do not integrate with trading partners. Those numbers have jumped by about 20% from a survey of collaborative commerce done less than two years ago. The survey also shows that a growing number of companies are actually putting this into action. Thirty-three percent of large enterprises (companies doing more than \$5 billion worth of business) are conducting pilot programs, and another 45% are planning for a pilot program. Deloitte analysts predict that by 2005, 85% of companies will have implemented some collaborative commerce initiatives (Gaudin, 2002).

The role of collaborative communication through virtual teams and virtual communication become essential to the success of collaborative commerce. Virtual teams are an essential element of corporate America. The electronic tools for collaborating in a virtual environment are readily available. However, the collaboration skills necessary for strategic success in a virtual environment are often harder to obtain.

Virtual teams are *“groups of geographically and/or organizationally dispersed coworkers that are assembled using a combination of telecommunications and information technologies to accomplish an organizational task”* (Townsend et al. 1998, p. 18).

Virtual team members typically come from different locations within and outside an organization. They often become involved in more than one team situation. Some may have difficulty adjusting to a lack of non-verbal cues. A lack of trust is common. Many have problems with spontaneous communication (Majchrzak et al, 1999).

Team leaders can enable team members to be more successful by making sure that the attention of all team members is focused on team activities. Janice Klein and Feniosky Pena-Mora (2001), team leaders of an interdisciplinary MIT team, call this concept

“maximizing mindshare”. They suggest the following tips to maximize mindshare:

- Invest the time team members would have spent traveling to identify and manage cultural differences and geographical disparities at the onset of the project.
- Develop meeting norms and workgroup protocols that preserve and integrate cultural differences. Determine, for example, group expectations for punctuality to team meetings, and frequency of checking e-mails or group bulletin boards.
- Develop performance measurements that include the team member’s virtual work as well as assignments in the home office.
- Designate someone to mind the “virtual water cooler.” Regular one-on-one telephone conversations with team members will help clarify local priorities and concerns. This will help coordinate the players, manage the project and identify and bridge any gaps that arise.

Roger Ballentine, co-director of the Center for the Study of Work Teams (CSWT) at the University of North Texas in Denton, TX, makes some key points about virtual teams in a recent article in HR Magazine (Johnson, 2002):

- Virtual teams aren’t miracle cures.
- Virtual teams should exist only for the same reason that any team exists.
- Virtual teams must have a common purpose and share responsibility for specific outcomes and work interdependently.
- Virtual teams make sense when geography demands it.
- A virtual team without the “team” built in regresses to telephone calls and faxes pretty quickly.

The CWST has also found five areas of training that are especially useful for virtual team members:

- Understanding the technology infrastructure.
- Using technology tools.
- Collaborating effectively in a work group.
- Conducting virtual meetings.
- Planning and managing tasks (Johnson, 2002).

Specific terms are used to describe virtual team interaction and collaboration dimensions based on location and time of interaction:

- Working together at the same time - "realtime" or "synchronous"
- Working together at different times - "asynchronous"
- Working together in the same place - "colocated" or "face-to-face"
- Working together in different places - "non-colocated" or "distance" (Usability First, 2002)

Collaboration at FedEx

FedEx is a multi-billion dollar company that impacts four key areas: business, consumer, transportation/logistics industry, and macroeconomics (Global Impact, 2001). FedEx has seemingly mastered the art of collaboration. The use of collaborative communication to enhance collaborative commerce is at work in virtually every aspect of the company. FedEx's philosophy is that in today's world there are no borders, just time zones. FedEx has an international network serving more than 220 countries and territories worldwide. The FedEx network is divided into five international regions: Asia-Pacific; Canada; Europe, Middle East and Africa; Latin America-Caribbean; and the United States.

Collaborative commerce software "coordinates interactions among suppliers, manufacturers, distributors and retailers to improve acquisition, delivery and payment for goods and services" (Lamont, 2005). FedEx Corporation provides integrated transportation, information, and logistics solutions through a powerful family of companies that operate independently yet compete collectively. FedEx Express is the world's largest express transportation company. Some of the companies that collaborate with FedEx are:

- Kewill first announced its technology licensing (OEM) agreement with FedEx in September 1999, and an expanded partnership was announced in February 2001. In June 2001, FedEx introduced its new FedEx Certified Solutions Program. As a program participant, Kewill is now able to embed FedEx Ship Manager technology into Kewill's Clippership shipping application and provide customers of any size a fully integrated, multi-carrier shipping solution that includes FedEx services and connectivity (<http://www.kewill.com/shipping/strategic-partners.htm>).
- FedEx is marketing Zoovy e-commerce web sites to provide seamless FedEx checkout-integration for eBay sellers and other major marketplaces such as Shopping.com and Overstock.com (www.fedex.com/zoovy).
- Nortel automated all of its overseas third party logistics activities utilizing Cyclone. Nortel's collaborative partners include FedEx. Nortel has utilized intelligent logistics to significantly reduce unnecessary shipping costs between manufacturers and warehouses in North America and Asia/Pacific (<http://www.cyclonecommerce.com>)

FedEx provides a host of logistics solutions to enterprise customers. These are segmented based on the types of customer

needs, ranging from turnkey distribution centers to full-scale logistics services that incorporated expedite delivery. Following are the major services provided to the business customer:

- FedEx Distribution Centers: This service provides turnkey warehousing services to businesses, using a network of warehouses located in the US and abroad.
- FedEx Express Distribution Depots: This service is primarily U.S. based and provides a one stop source of express distribution capabilities. This service was particularly targeted at time critical businesses.
- FedEx Returns Management: FedEx NetReturn is designed to streamline the return area of a company's supply chain.
- Virtual Order: Virtual Order is touted as being "a fully integrated electronic commerce system that offers an easy solution to building an effective online catalog" (Rao, 1998).

Summary and Conclusions

FedEx has mastered the art of collaborative commerce by forming collaborative ventures with companies up and down the supply chain. Their motto should be, "If you don't own it, then partner with a company that does". They are a leader in the "new economy" through optimal use of technology, logistics, global positioning, and collaborative communications.

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Integrating Gartner Resources into the IT Management Curriculum

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Gartner, Inc., (www.gartner.com) is a “provider of research and analysis about the global information technology industry.”[1] The corporation’s approximate 3,900 employees provide clients research and consultative services relating to technology and IT management. The services span a wide range of topics in numerous markets and industries and assist business in solving problems and stimulating growth through technological advances.[2]

Educational institutions can subscribe to these services through the corporation’s Educause program to provide access to students, faculty, and IT staff on a campus for a set fee. This paper will summarize the services of Gartner and the deliverables that may be contracted by the campus. In addition, examples of IT management applications using Gartner resources will be presented.

Gartner Services

Gartner resources allow students to operate in a more realistic corporate environment. They have at their disposal current resources paralleling a business decision-making environment. Since Gartner is independent of any vendor or IT service provider, its information products provide an unbiased basis for solving business problems, unlike the often noncredible results of basic “Internet” searches.

Three categories of core research are provided in the services [3]:

- **Research and Advisory Services.**
Over 60 RAS programs assist organizations in focusing on IT strategy and technology needs.
- **Product Knowledge.**

Product comparisons are provided for more than 15,000 hardware/software products.

- **Dataquest Market Intelligence.**
Over 150 programs provide guidance for IT vendors based on market-focused metrics and trends.

Market analysis data (forecasts, statistics) are readily available for the following: Hardware (computing, security), Software, IT Services (consulting/integration, infrastructure, network, outsourcing), Communications (networks, equipment, mobile), and Business/Industry Strategies. Critical issues addressed are constantly evolving: Application Development and Integration, Consumer Technologies, Emerging Trends/Technologies, IT Asset Management, Network Services, Outsourcing, PCs/Handheld Devices, and Regulatory Devices. Research services are industry focused: banking, education, energy and utilities, government, healthcare providers, insurance, investment services, manufacturing, media, and retail.[4]

Example IT Strategy Applications

Three tools/services that are uniquely useful in teaching IT strategy are (1) Cool Vendors, (2) Hype Cycles, and (3) Magic Quadrant.

- **The Cool Vendors service** identifies upcoming IT-based small businesses that are innovative and have potential for major impact on the future of IT. These scenarios are very attention getting.[5] As students analyze emerging technologies and their integration into business systems, these vendors should be studied and tracked to gain insight into the evolution of technologies—

strategic vs. factory, for example. “Cool Vendors in Customer Relations Management, 2005,” one such report, relates the status of the seemingly mature customer relations management market and the potential impact of the newcomers in providing systems that could strategically impact an industry.[6]

- A Hype Cycle graphically depicts where a particular service is on a five-phased cycle of maturity. The cycle indicates when a technology has moved from over-enthusiasm or “hype” to a level of maturity, where benefits can more likely be realized. The phases are the following: “Technology Trigger,” “Peak of Inflated Expectations,” “Trough of Disillusionment,” “Slope of Enlightenment,” and “Plateau of Productivity.”[7] For example, Gartner’s “Hype Cycle for IT Services, 2005” rates selected services as follows: Globally Delivered Infrastructure Services, at the Technology Trigger phase, Plateau of Productivity to be reached in 5 to 10 years; Network Outsourcing, at the Trough of Disillusionment phase, Plateau of Productivity to be reached in 2 to 5 years; Remote IT Management Services, at the Slope of Enlightenment phase, Plateau of Productivity to be reached in 2 to 5 years; IT Outsourcing, on rise in the Plateau of Productivity phase, peak to be reached in less than 2 years.[8]
- The Magic Quadrant graphically plots vendors in relation to one another based upon their market performance. The vertical axis plots “Ability to Execute”; horizontal axis plots “Completeness of Vision.” The quadrants are “Challengers” (top left), “Niche Players” (bottom left), “Visionaries” (bottom right), and “Leaders” (top right).[9] The “MQ for Higher-Education Administrative Suites, 2004” plotted the

following: Datatel, SunGard SCT, and PeopleSoft in the Leaders quadrant. No “killer” challengers are identified. A complete analysis of the players is provided, based on identified evaluative criteria.[10]

Programmatic Deliverables

The Gartner service provides two levels of access to the core research services: reference access and advisor access. Usually one or more advisors are provided with the service contract.

Following is a listing of written deliverables that are provided to reference users of the service:

- Spotlights—hot client issues.
- Special reports—research theses or strategic analyses relating to vendor-based products/services, industry developments, or IT trends.
- Research notes—case studies or guidelines.
- Perspectives or research briefs—analyses and commentaries.
- Executive summaries—analyses/recommendations from Dataquest Cluster reports.

In addition, Advisor users have access to analysts for telephone meetings on current or focused issues facing the client. They also may attend one of Gartner’s theme conferences.[3]

Service Fees

The contract fee is based on services provided.

Conclusion

Exposure to Gartner services will provide students an experience in applying research and critical thinking to IT strategic decision making. This experience is seldom possible with typical instructional materials. In addition, the service is invaluable for faculty and IT staff research. Last, this product has a unique attractiveness that makes it ideal for seeking funding from a potential donor.

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The Use of LanSchool to Control and Enhance Management Lectures in Computer Classrooms

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Abstract

Computers in the classroom have forced educators to respond in innovative ways to meet the challenges accompanying the new technology. For example, in the traditional lecture class environment, computers have evolved into more of a distraction than an educational enrichment tool. LanSchool is a program that empowers the instructor by controlling student PC usage. Students reported that the software typically fostered an environment which promoted learning.

and performing instant messaging (Li & Newby, 2002). Yet, even though instructors repeatedly ask students to pay attention and not surf the web, many of them simply disregard all requests believing the teacher is powerless to stop them. Certainly, one solution is for instructors to ask that all PC monitors be turned off. Inevitably, however, a few students still attempt to use the computers surreptitiously. A superior resolution would be to implement a program such as LanSchool to guarantee control over student PCs (McDermott, 1998).

Introduction

When computers are brought into the classroom, they create an atmosphere that is not wholly under the teacher's control. It does not matter if the class meets in a computer lab or if wireless laptops are made available in conventional classroom settings. Students tend to use the computers for recreation or to work on projects for other classes. Such activities create situations in which learning is adversely affected.

Initially, Solitaire was the main culprit, and many LAN administrators were compelled to remove all computer games so students would remain on-task. More recently, it is the Internet and the World Wide Web that distracts students away from the teacher and the subject matter being presented (McDermott, 1998). Students trying to concentrate on the lectures complain that they are distracted by their fellow classmates who are playing games, typing e-mail,

LanSchool

LanSchool was developed in 1986 by Dana Dodgett and was originally called Chalk Point. Although the product was exclusively marketed by IBM and Intel, it can now be purchased directly from LanSchool at www.lanschool.com. The software has been used successfully in grammar schools, universities, and in corporate training seminars. Currently, LanSchool offers two products: (1) LanSchool, which is typically utilized in traditional classroom environments, and (2) LanSchool Monitor which is intended for public use in open computer labs and libraries. Although LanSchool Monitor has performed well for managing relatively large, open systems, the study reported here focuses on the use of the original LanSchool application in a traditional lecture class setting.

LanSchool software, currently in version 6.2, offers control as well as flexibility through various program

functions. It allows instructors to broadcast their input on their demonstration computers so that students see what is on the teachers' monitors. Instructors may also opt to blank out all screens when necessary, for example, on test days. Since many teachers reported that they wanted to keep students' screens active but to disable web browsing for a limited time, the program helped achieve this goal (LanSchool, 2004). Moreover, LanSchool can display thumbnail views of all student PCs, allowing the instructor to determine who is on-task and who is playing games, writing e-mail, blogging, or surfing the web. Additionally, if PCs are set up with power management features, the computers can be powered up or down via remote control. Another beneficial aspect of the program is that LanSchool is licensed per classroom and not per desktop. Therefore, the cost is the same for a lab of 5 or 100 computers. Since the initial capital outlay is less than \$800, the program is a cost effective alternative to buying LCD projectors in computer-equipped classrooms. Furthermore, LanSchool runs on most versions of Windows including 95, 98, ME, NT, 2000, and XP as long as they have a hard-wired Ethernet connection. LanSchool does not work on wireless networks because there are technical differences in Ethernet protocols (Doggett, 2004).

Readability is one of the most important advantages of displaying the instructors' screens on the students' monitors. Conversely, when an LCD projector is employed, there is no effective way to show an application that incorporates 10 or 12 point fonts and to expect all the students to be able to read

it. Consequently, it is impossible to maintain students' attention when they are unable to read the material. Using LanSchool, however, instructors broadcast exactly what they are doing on every student's monitor. Another characteristic of LanSchool is that it allows the instructor to see the students' screens and provide assistance when necessary. While it is true that LanSchool allows supervision of all student PCs, it is not considered spyware. When entering the system, each student acknowledges in a login box that their PC session is subject to being observed.

Furthermore, when instructors do not want to utilize the LanSchool program, it is easily disabled with a click of the mouse. This simple on /off toggle provides ultimate convenience to users. Finally, a deciding criterion in any program adoption is the length of time necessary for training. Instructors found the LanSchool program to be very intuitive and user friendly; faculty training can be accomplished in a short period of time.

Innovative Uses Of Lanschool

While PC control and monitoring are important applications, LanSchool also can be employed as an innovative tool to enhance lecture classes. The screen annotation feature allows instructors to write notes and to make comments directly on their screens and project it to students' monitors. Although this function is present in some programs, such as PowerPoint, it is not readily available in a format which meets the needs of lecture class applications. For instance, when students do not understand how to

perform a particular activity, the instructor can circle or highlight the appropriate menu. The instructor can then present the theory supporting an application and demonstrate it on the screen with explanatory notes. When used with a Tablet PC, the annotation feature of LanSchool makes drawing on the screen simple and does not require a significant capital expenditure on technology such as Smart Boards.

Conversely, Chandler (1996) notes some concern about the possible limitations of classroom presentation software. He maintains that it is easy for students to see what the instructor does in class. However, once students begin work on their own computers, they may not be able to see the instructor's example. LanSchool addresses this problem by offering the option of broadcasting the instructors' work in a window that appears on the same screen where the student is working.

Exploratory Research

Research revealed that LanSchool has been used in educational institutions since the late 1980s. Most instructors surveyed maintained that the programs' features and functions satisfied their needs. To determine if students also believed that LanSchool was a benefit in the classroom, a 27-item survey was administered. Students were provided a paper copy of the survey and a scantron form on which to record their responses. Researchers used a paper survey to negate any computer anxiety that could be associated with a web-based form. Three MIS classes, a total of 170 students, were surveyed in an environment where LanSchool was used. Participation was voluntary, and students

could withdraw from the study at any point. A total of 153 subjects (90 percent) provided complete responses. The sample demographics were 51 percent male and 49 percent female; 77 percent were under the age of 26; and only 7 percent answered that computers made them nervous. No significant differences were found on the demographics: age, gender, academic classification, levels of computing experience, amount of computer usage, computer anxiety, or any other category. Thus, statistical results indicate that LanSchool was perceived similarly by the students surveyed. Students noted that they generally liked LanSchool in the classroom. In fact, 86 percent said that they would take another class that used LanSchool, and that the program improved their classroom experience. Even though most students acknowledged that LanSchool positively affected their learning, 33 percent reported that they would prefer an open computer system. This suggests that many students would rather have played games, done e-mail, engaged in blogging, or surfed the web even though they believed that staying on-task improved the class and their learning.

Conclusion

In conclusion, LanSchool provides control, flexibility, and customization to teachers presenting their material in either a traditional lecture format or a hands-on laboratory setting. The program is cost effective, and provides a superior platform for delivery when compared to either LCD projectors or Smart Board technology. Additionally, the software is relatively simple to use, and educators report that the training time is minimal. Utilizing a

program such as LanSchool empowers instructors who teach in environments where computers are present to change the learning experience from a distraction to an enhancement.

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