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# Predicting Success of Small Business E-Commerce

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## Abstract

Small business electronic commerce (e-commerce) seems an invaluable tool for doing business and attracting new customers; however e-commerce is a new frontier in the business world. The quantity of e-commerce research is limited. 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 an online survey of small businesses in Texas. A model containing customer focus and on-going innovation was evaluated as having a useful level of explanatory ability.

**Key words:** e-commerce success, logistic regression, small business

## Introduction

This paper documents an analysis to identify critical success factors (CSFs) that exist in currently successful, small, U.S.A. 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 e-commerce programs, 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 U.S.A. business e-commerce programs involving CSFs.

## Literature Review

The Literature Review proceeds in four sections: (1) E-commerce Definitions and Incentives, (2) E-commerce Activity, (3) E-commerce Failures, and (4) E-commerce Success Factors.

(1) 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). 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 Thinker's Guide," 2000). Other important benefits of e-commerce to small business owners include improved information gathering and quick response capabilities (Pratt, 2002). The Internet makes it possible for companies to find new customers without relocating or paying expensive marketing costs (Barua et al., 2001; Burgess, Sellitto & Wenn, 2003).

(2) E-commerce activity is pervasive in the U.S.A. business world. Small businesses comprise one-fifth of e-commerce spending. Pratt (2002) states:

Sixty percent of small businesses with online access have a Net presence, either a homepage or a web site. But only about one-third of them sell

goods online—with 23% anticipating that online sales will affect their bottom line.

Twenty-four percent of small businesses stimulate purchases at their physical stores through email, fax, or online activities. Twenty-one percent of firms earn income from advertisement sales. Less than 10% of businesses make greater than 25% of total revenue online (Pratt, 2002). These numbers seem to indicate that there is room for small business e-commerce expansion.

(3) Not everyone who attempts e-commerce initiatives is successful. Lack of understanding of the capabilities and limitations of e-commerce is the most often reported cause of small and medium enterprise (SME) e-commerce failure. The apparent disconnect between business entrepreneurs and technical experts, along with not using technical experts in site creation are problems (Mulbery, Paper, & Pedersen, 2003).

Small businesses are often not effectively planning and evaluating their e-commerce programs. Burgess et al., (2003) found that, often, the contact information of small businesses was inaccurate, emails were not promptly answered, and backup plans were not available when servers failed. In addition, many businesses fail to track e-commerce performance measures the way they track traditional business measures such as inventory turn-over. One-third of business managers do not know how much money they spent on their web sites (Burgess et al., 2003; Barua et al., 2001; Pratt, 2002).

Distraction from core business activities is a concern (Poon & Swatman, 1999). E-commerce failure can also be attributed to the lack of reliable guides and information (Barua et al., 2001).

(4) 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 Kumar et al. (2004) derived measures of success from diverse sources because "no comprehensive measure for e-business success was available from the literature." Their measures of success include increased

return on investment, improved business processes, and improved flexibility (Kumar et al., 2004).

CSFs are defined as “the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization” (Rockart, 1979). In discussing the paucity of research in this area, Liu & Arnett (2000) note that “... existing empirical research focusing on success factors of Web sites is mainly anecdotal and exploratory in nature.”

Many relevant CSFs are summarized in Table 1. Companies that achieved rapid growth and had been in business at least 2 years demonstrated an average of 5.7 of 7 CSFs recommended by Chappell et al. (2002). Mulbery et al. (2003) logically derived 10 CSFs by interviewing 15 successful small business e-commerce CEOs. Kumar et al. (2004) derived 8 CSFs from a study of 34 Canada-based Internet firms. Barua et al. (2001) presented a very customer-focused set of CSFs. 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.

In related research, Sung & Gibson (2005) studied Korean e-commerce to identify CSFs relating to firm performance. The study by Mulbery et al. (2003) was the only one that involved U.S.A. SMEs solely.

Of the CSFs listed in Table 1, a reoccurring theme of 3 CSFs appeared from each of the researchers: (a) entrepreneurship, (b) customer focus, and (c) on-going innovation. These CSFs are described below.

(a) A recurring 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 [of success].” Entrepreneurship includes the ability to “create, innovate, bear risk, and manage and achieve targets” (Jennings, 1994). Discussion of several important aspects of entrepreneurship follow.

Fundamental skills and knowledge are the foundation for a successful e-commerce program (Mulbery et al., 2003). They say:

There was consensus from the informants that an e-commerce entrepreneur must possess a basic understanding of Internet use and Internet connectivity in order to maximize success.

When developed 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 integrate programmers, business developers, and designers to deliver a web site (Mulbery et al., 2003).

Some of the most successful small businesses have 1 or 2 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).

Risk is important entrepreneurial aspect; risk is defined as “exposure to possible loss or injury” (Phillips, 1997). Risk reduction in SMEs involves spending conservatively and using technically skilled employees. Risk reduction techniques include the use of sweat equity, partnerships, good hiring practices, and purchasing high-quality IT equipment (Mulbery et al., 2003). Finally, e-commerce entrepreneurs must demonstrate commitment to their projects (Chappell et al., 2002).

(b) Another reoccurring theme in the e-commerce literature involves customer focus. Most companies must be able to fall back on their customer relationships to maintain an advantage against competitors. Customer loyalty is important because the World Wide Web is a “sticky space” meaning that user-friendliness encourages customer loyalty (Chappell et al., 2002). Web-site related market research should address such questions as who the target customers are and what they want (Mulbery et al., 2003).

Finding and retaining customers is important to e-commerce success. Building a loyal customer base

Table 1  
*Critical Success Factors from Past Research*

<i>Researcher</i>	<i>CSFs</i>
Mulbery et al. (2003)	fundamental skills and knowledge, opportunity identification, market research, competitive assessment, strategy development, technical delivery, web review, risk assessment, initial launch implementation, continuous innovation
Kumar et al. (2004)	e-business organizational culture, customer focus, technical infrastructure, e-business strategy, website management, supplier orientation
Barua et al. (2001)	customer orientation, supplier orientation, internal operations, customer processes, supplier processes, internal operation processes, customer readiness, supplier readiness
Chappell et al. (2002)	content, convenience, control, interaction, community, price sensitivity, brand image, commitment, partnership, process improvement, integration

involves quick response to customer needs, order delivery, product/service satisfaction, and thorough post-sale support (Chappell et al., 2002)

Web design is a key component of attracting new customers. To be successful, a web site must deliver a satisfying experience to the customer. Particular requirements include dependability, reliability, and trustworthiness. Contact information must be easily available (Maheswari et al., 2004).

Once contact is made, businesses need to process feedback as quickly as possible in order to incorporate it into improved products and practices. Other important customer-related features of a web site include a frequently asked questions (FAQ) section, and the abilities to submit, track, and pay for orders (Barua et al., 2001).

Finally, web site review is a key factor of creating a successful, customer-friendly web site. Here, a third party evaluates the web site after it has been delivered, but before it goes public. Web sites that are reviewed seem to fare better than those that are not reviewed (Mulbery et al., 2003).

(c) A recurring theme that emerged from the literature of CSFs was on-going innovation. E-business requires rapidly paced innovation. Small businesses must be open to new ideas, opportunities, and partnerships. Key elements of innovation include continuously developing new products, developing partnerships, and acquiring other small ventures (Chappell et al., 2002).

### *Methodology*

We hypothesize that the 3 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 3 CSFs—entrepreneurship, customer focus, and on-going innovation—are important to e-commerce success in small businesses.

The first CSF detailed is 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 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. How the owner/CEO scores on these individual variables will determine his/her score on the composite variable. A high score should indicate that the owner/CEO is providing the entrepreneurial leadership necessary to succeed.

The second CSF suggested by 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.

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 employees educated while offering incentive to increase their knowledge of e-commerce and related technologies.

It is expected that all 3CSFs have high scores for small companies with successful e-commerce programs, and low scores for ones with unsuccessful programs. Since a definition of success is elusive in the literature, *perception of success* became the dependent variable.

### **Data**

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.

We considered a sample plan that would result in a group representative of small businesses engaged in e-commerce in the U.S.A. Unfortunately, plan was cost prohibitive. We decided that small businesses engaged in e-commerce in Texas would provide an acceptable subset.

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).

### *Procedure*

An email survey format was selected due to the low cost and apparent ease of reaching almost every small business e-commerce company in Texas. The expected response rate of email surveys is 6 to 25%. A disadvantage of email surveys is that potential respondents may identify the email as spam and delete it (Zikmund, 2003).

In addition to email surveys, follow-up telephone surveys were conducted to validate the content of the surveys and to solicit additional information. Systematic sampling was used for the telephone surveys. Zikmund (2003) describes the systematic sampling procedure whereby every 100<sup>th</sup> small business was selected from the database and contacted.

### **Email Survey**

The survey included a letter describing the research and the survey. Responses from companies engaged in e-commerce for less than 3 years were removed. The CEO of each company was asked the perceived success of their e-commerce program in a yes or no format. The rest of the questions asked information specific to each CSF on a Likert-type scale from 1 to 5, with 1 indicating strong disagreement and 5 indicating strong agreement. The first 5 questions applied to the CSF entrepreneurship, the next 5 applied to the CSF customer focus, the last 3 applied to the CSF on-going innovation. The scores for the group of questions for each CSF were averaged to yield an overall score.

The first survey attempt received 32 responses out of 5411 email addresses, or a response rate of 0.6%: well below expectations. 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 'undeliverables.' There was also concern that the major Internet service providers refused to deliver the surveys to protect their clients from spam. Due to these problems, the first email attempt became a pilot study which produced 30 usable surveys. 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.

Based on the pilot study, 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 a respondent may not want to answer "no" as this would admit defeat. To address this problem, it was decided to give the respondents 3 possible responses: very successful, marginally successful, and not successful.

#### Statistical Model

The objective of the research is to determine if the 3 CSFs are good predictors of the perceived success of a small business's e-commerce program. Logistic regression was selected as an appropriate model for the investigation. Logistic regression tests the ability of a group of independent variables to predict the category to which the dependent variable belongs.

In logistic regression, the dependent variable 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 can be written:

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

Where:  $\beta_1, \beta_2, \beta_3$  are coefficients of the calculated CSFs and  $x_i =$  the value of CSFi. For use in Minitab, the survey data was coded as described in Table 2.

Each composite variable was calculated by averaging the answers to a series of survey questions; this survey is available upon request. Here is an example of calculating a respondent's 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 CSF score of 3.8.

Table 2  
*Data Codes*

Data Label	Code
Perceived Very Successful	1
Perceived Marginally Successful	0
Perceived Not Successful	0
Strongly Agree	5
Agree	4
Neutral	3
Disagree	2
Strongly Disagree	1

#### Results

The combined response rate of the surveys was 1.8% of 5411 businesses. Of the 92 surveys returned, 64 were usable. The data gained from the survey was used to construct the composite variables: entrepreneurship, customer focus, and on-going innovation.

Minitab logistic regression was used to estimate the model shown in equation (2).

$$\ln \left( \frac{\hat{y}}{1-\hat{y}} \right) = -2.4829 + 0.0485*ES + 0.7271*CFS + 0.1698*OIS \quad (2)$$

From the output, the estimated coefficients for Entrepreneurship Score ( $p = 0.909$ ), Customer Focus Score ( $p = 0.112$ ), and On-going Innovation Score ( $p = 0.650$ ) have observed significances greater than 0.05, indicating that there is little evidence that the individual coefficients are different than 0 using  $\alpha$  of 0.05. The observed significance for the test of model



significance is 0.086; this result refers to the test of all coefficients in the model equal to 0. Somer's D is equal to 0.34. Collectively, this reveals that the first model is not useful.

A possible explanation of why the first model does not fit is multicollinearity—a condition that exists when two or more independent variables contribute redundant information. When significant multicollinearity exists in the model, it may become difficult to conclude that the independent variables are contributing to the prediction of the dependent variable when in fact they are (Mendenhall & Sincich, 1993).

One way to detect multicollinearity is to examine the independent variable correlation coefficients. The entrepreneurship and on-going innovation scores have a correlation coefficient equal to 0.62, which is statistically significant. Another way to detect multicollinearity is to examine how the observed significances of the estimated coefficient tests compare to the observed significance of the overall model test. If the individual coefficients are not significant but the overall model is, then multicollinearity may exist. (Mendenhall & Sincich, 1993).

In the case of the first logistic regression model shown in equation (1), the individual coefficient tests indicated that the independent variables were not significant. However, the test for the overall model resulted in an observed significance of 0.086. Although the overall test was not significant at  $\alpha$  of 0.05, it was very close; thus, we believe that multicollinearity was present.

There are several ways to remediate multicollinearity, depending upon the severity of the multicollinearity and the ultimate goal of the regression analysis. One way is to remove independent variables from the model. However, if the researcher is interested in using the model for prediction then we may keep the independent variables in the model (Neter, Wasserman, & Kutner, 1990; Mendenhall & Sincich, 1993).

In order to improve the original model, the independent variable with the highest observed significance, Entrepreneurship, was removed and the model re-estimated. The results are shown in (3).

$$\ln \left( \frac{\hat{y}}{1-\hat{y}} \right) = -2.4054 + 0.7286 * CFS + 0.1917 * OIS \quad (3)$$

The estimated coefficients for Customer Focus Score ( $p = 0.112$ ), and On-going Innovation Score ( $p = 0.650$ ) have observed significances greater than 0.05, indicating that there is little evidence that the coefficients are different than 0 using an  $\alpha$  of 0.05. However the observed significance for the model is 0.037. Although the results returned observed significances that are insignificant for the independent

variable coefficients, the model is significant; this indicates that one or more of the independent variables are contributing to the prediction of the dependent variable. Somer's D for this model is 0.34. Thus, there was no decrease in strength of association from dropping entrepreneurship from the original model.

To further investigate the significance of the variables customer focus and on-going innovation in predicting "Success," each independent variable was logistically regressed against the dependent variable. The customer focus CSF was significant ( $p=0.045$ ).

The On-going innovation CSF was marginally significant when logistic regression was used to model the dependent variable ( $p=0.055$  for coefficient and  $p=0.045$  for the model). It was decided to keep on-going innovation in the model. Therefore this research shows that customer focus and on-going innovation are useful in predicting perceived success of small business e-commerce programs.

### Discussion

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

Although the variable entrepreneurship was not significant in the study, there may be a good explanation for this. 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. It may be that a more detailed, focused series of questions should be formulated.

A possible criticism of this research involves the reliability of the composite variable constructs. That is, the symptoms of multicollinearity between the composite variables may also indicate a lack of internal consistency of the survey items that make up each composite variables. The procedure used by Liu & Arnett (2000) consists of (1) calculating Cronbach's alpha for each construct in pilot tests, (2) correlation analysis of the constructs, (3) principle component analysis of the construct components and (4) efficiently grouping the input data for interpretation. Hypothetically, our survey data could be considered pilot test data. As such, the Cronbach's alpha values for the CSFs range from 0.5 to 0.7. Hair, et al. (2006) recommend 0.6 - 0.7 as the "lower limits of acceptability." Based on this criterion, it is prudent to examine the components of the CSFs for possible inconsistencies.

### Conclusions and Recommendations

E-commerce is a valuable tool for businesses. There is much study that needs to be done to ensure

that businesses that use it, do so successfully. We sought to determine if entrepreneurship, customer focus, and on-going innovation were key to making a small business e-commerce program successful. From the results of the study, customer focus and on-going innovation are useful in predicting very successful e-commerce companies. Further research should be initiated to better define what parts of entrepreneurship are important to small business e-commerce programs.

Further study should include a better definition of small business e-commerce. The current definition of small business is one that employs 250 people or less (Pratt, 2002). As discovered, many companies employed less than four people.

Additional study should account for the different types of e-commerce businesses. Businesses in this survey used e-commerce for a variety of money-making operations. Treating these categories separately may give further insight as to what makes a small business e-commerce program successful.

Finally, we should find better measures of success for small business e-commerce. It is difficult to compel companies to divulge confidential information that is necessary for assessing success. With better measures of success it should be possible to improve the outcome of E-commerce activities.

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# Desirable Competencies for Systems Analysts: Ratings by IT Professionals

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**Michael Douglas, University of Arkansas at Little Rock**  
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## Abstract

According to the Bureau of Labor Statistics, the position of “systems analyst” is among the top 30 occupations to grow the fastest in percent growth and to experience the largest projected job growth in actual positions between 2004 and 2014. The literature identifies a combination of technical, business, and soft skills important to systems analysts. This study identified the comparative value of the knowledge, skills, and abilities needed by systems analysts as reported by industry professionals. The analysis was designed to provide guidance to educators and career counselors to assure that systems analysts have the skill set demanded in the strengthening job market

**Keywords: IT skill set, soft skills, systems analyst**

## Introduction

As organizations further realize the strategic value of information resources and as the hype surrounding outsourcing and offshoring subsides, the demand for computer-related professionals is again expanding. According to the Bureau of Labor Statistics, from 2004 to 2014 computer and mathematical science occupations are projected to experience the fastest growth of the eight professional subgroups. Thirty percent of all new jobs will be in computer systems design and related services. The position of “systems analyst,” a component of the computer systems design and related services subgroup, is expected to experience a 31.4 percent increase in employment with an additional 153,000 positions. This occupation is one of only two in the computer field in the top 30 in both fastest and largest job growth. When ranked by median annual earnings, systems analyst places in quartile 1, the “very high” quartile (Hecker, 2005).

To succeed in the continually changing and increasingly competitive business environment, organizations must demand that employees assure a return on the IT investment. This research study focused on the skill set needed by systems analysts in this evolving workplace.

## Literature Review

The literature documents the need for a well-rounded skill set for IT professionals: technical, business, and soft skills. Documentation of demand for a combined skill set for systems analysts, however, is less extensive. With the changing technical and competitive business environment, the breadth of skill base will likely become more important.

Strong business acumen and the ability to move between business and IT have become, in recent years, assets for IT professionals possessing them. CIOs are moving toward more alignment of business and IT (Pratt, 2006), with an obvious impact on systems analysts. Gartner analysts Morello and Blechar (2005) indicated that the rapidly evolving and expanding role of the systems analyst is becoming that of “business analyst.” They emphasized that today’s analyst must have strong expertise in the business domain and a “reasonable” understanding of how IT can enable business through redesign and strategic directioning. Lee (2005) reported in a study of job ads that knowledge of the business is a critical requirement in 80 percent of ads. The increased demands for higher levels of business performance make necessary an understanding of business processes and how to exploit technology. Further, outsourcing strengthens the need for analysts to understand business systems and their interdependencies and relationships to IT (Morello & Blechar, 2005).

The literature reflects that in the IT job market soft skills are increasingly demanded in addition to technical and business skills. Authorities have indicated diverse skill sets needed by 21<sup>st</sup> century IT professionals—team, flexibility, change management, creativity, interpersonal, communication, problem solving, conceptual, strategic management, continuous improvement, and technical skills; some of these studies reflected that these skills are needed by systems analysts (Buhler, 1997; Gupta & Wachter, 1998; Kendall & Kendall, 1999; Lee, 2005; Nakayama & Sutcliffe, 2001; Schenk, Vitalari, & Davis, 1998; Shah & Martin, 1997). Schenk, Vitalari, and Davis (1998) reported that a systems analyst’s problem-solving skills are key to

success, even though technologically advanced tools are available. A synthesis of research by Nakayama and Sutcliffe (2001) indicated that employers want IS professionals who are more knowledgeable of their industry, have business acumen and management expertise, and possess human relations and behavior skills. Globally IT professionals are expected to be strategic business enablers and contribute to the success of the organization (“Update IT skills in the line of change,” 2002).

Based on a 2000 study of hiring directors by the Information Technology Association of America (ITTA), Harris Miller, president of ITAA, stated that technical skills must be combined with “employability skills”—written and oral communications, project management, problem solving, and analytical skills (The 21<sup>st</sup> Century Work Force Commission, 2000). Other researchers used additional descriptions of the desired nontechnical skill set, such as “emotional intelligence.” Identified emotional intelligence traits include self-awareness, trust, attitude toward others, adaptability to ambiguous situations, self control, motivation, and other factors that impact productivity and socially appropriate behavior (Abell, 2000; Barbian, 2001; Caudron, 1999; Nukayama & Sutcliffe, 2001; Tucker, Sojka, Barone, & McCarthy, 2000; Yost & Tucker, 2000).

The importance of the combined technical/soft skill set for systems analysts was validated by Lerouge, Newton, and Blanton (2005) in a study of 124 systems analysts. Although the responding systems analysts viewed all of these skills to be at least somewhat important, they seemed to perceive interpersonal skills more important than political skills and knowledge, technical skills, and business task knowledge. A study by IDC Canada and Mastech Quantum reported the importance of an IT professional fitting into the culture of an organization and the relationship of cultural fit and increased performance (Himmelsbach, 1999).

The literature has identified a skill set of knowledge, skills, and abilities — including technical, business and soft skills—needed by IT professionals. This study investigated the integrative skill set needed specifically by systems analysts. A similar article, based on the same data set, investigating the skills needed by computer programmers was published by Bailey and Mitchell (2006-2007).

### **Methodology**

Industry input was sought in a four step process involving web research, site interviews, focus groups, and a web-based survey to identify the knowledge,

skills, and abilities (KSAs) needed by systems analysts. Participants from five major Arkansas IT companies took part in site interviews and focus groups. Industry CEOs and other top-level executives examined, analyzed, and validated data from the web research, site interviews, and focus groups prior to its incorporation into the web survey to insure that IT industry needs would be identified accurately by the process.

The questionnaire was administered via WebSuvveyor and was available over a two-and-a-half-week period to all IT professionals in Arkansas. Three hundred twenty-four IT professionals responded to the survey; of these, 124 responded to the systems analyst section of the survey. The respondents possessed a wide range of experience, skills, and abilities. The survey instrument consisted of four main sections: demographic information, nontechnical soft skills, business concepts, and technical KSAs. The importance of each skill was identified using a five-point Likert scale. The technical KSAs were subdivided into job clusters. Demographic, soft skill, and business concepts sections were completed by all respondents; however, individuals only responded to the technical sections for which they had expertise.

The rated KSAs were then classified into the following categories for analysis: broad-based business, communication, interpersonal, narrow-based business, personal, project management, and technical. Six experts reviewed the 64 items on the questionnaire and assigned each to one of the seven categories of KSAs. In cases of differing categorization, the majority assignment was used. The average of the items in each category was determined. ANOVA was then conducted on the overall means of the items within each of the seven categories. The dependent variable was “mean ratings”; the independent variable was “category.”

As previously stated, this paper focuses on the desired KSAs for systems analysts. By understanding which skills are the most important to a systems analyst in the field, academic and industry training programs can be better structured to help individuals develop an appropriate skill set.

### **Findings and Conclusions**

The focus groups identified a total of 64 skills that were important to systems/business analysts; these skills were later classified into 7 KSA categories. Tables 1-7 report the mean ratings for each item. The categories of responses for the questionnaire were based on a 5-point Likert Scale: extremely important (5), very important (4), somewhat important (3), not very important (2), and not important (1). Thus the closer the mean rating is to “5,” the more important the skill is perceived to be.

Table 1

*Rating of Broad-based Business KSAs*

<b>KSA Description</b>	<b>Mean Rating</b>
Ability to Determine Customer Needs	4.661
Ability to Analyze Business Process	4.460
Knowledge of Basic Business Concepts	4.240
Business Culture (priorities, schedules, self-initiating)	4.230
Ability to Anticipate Future Needs	4.153
Knowledge of Business/Technology Integration	4.090
Knowledge of Business Processes	4.008
Knowledge of Customer Industry	3.887
Knowledge of Departmental Interdependency	3.548
Knowledge of Business Management	3.484
Knowledge of Business Administration	3.480
Average Rating	4.022

Table 2

*Rating of Communication KSAs*

<b>KSA Description</b>	<b>Mean Rating</b>
Ability to Communicate with Customers	4.659
Ability to Maintain Open Communication with Customers	4.613
Ability to Ask Probing Questions to Determine Customer Needs	4.573
Listening	4.556
Verbal Communication	4.486
Constructive Criticism (delivery and receipt)	4.108
Inter-team Communication	4.041
General Writing Skills	3.905
Technical Writing	3.554
Presentation Skills	3.472
Mediation Skills	3.233
Interviewing Skills	3.068
Average Rating	4.022

Table 3

*Rating of Interpersonal KSAs*

<b>KSA Description</b>	<b>Mean Rating</b>
Team Work (long-term)	4.432
Ability to be Diplomatic	4.363
Ability to Act as Liaison Between Customers and Programmers	4.347
“Be the Customer” Mentality	4.319
Interpersonal Skills	4.189
Leadership (interactions with peers, servant leadership)	3.851
Diversification (different culture)	3.432
Average Rating	4.134

Table 4

*Rating of Narrow-based Business KSAs*

<b>KSA Description</b>	<b>Mean Rating</b>
Knowledge of Accounting	3.250
Knowledge of Corporate Finance	2.968
Reading a Budget (and understanding)	2.838
Use of Capital (risk and return)	2.808
Marketing	2.781
Role Playing	2.548
Basic Accounting	2.534
Reading a Balance Sheet and Income and Expense Summary	2.315
Average Rating	2.755

Table 5

*Rating of Personal KSAs*

<b>KSA Description</b>	<b>Mean Rating</b>
Problem Solving Process (decision tree, problem identification, analysis, solving)	4.622
Ability to Multi-Task	4.405
Time Management	4.351
Investigative Skills (probing questions)	4.329
Visualize/Conceptualize	4.257
Organizational Skills	4.027
Stress Management	3.986
Idea Initiation	3.945
Average Rating	4.240

Table 6

*Rating of Project Management KSAs*

<b>KSA Description</b>	<b>Mean Rating</b>
Ability to Prioritize Project Needs	4.306
Knowledge of Project Management Principles	4.153
Ability to Implement Project Management Methodology	4.040
Ability to Control Project	4.024
Ability to Define Project Management Critical Paths	4.016
Project Management	3.918
Ability to Manage a Meeting of Ten Users	3.726
Average Rating	4.026

Table 7

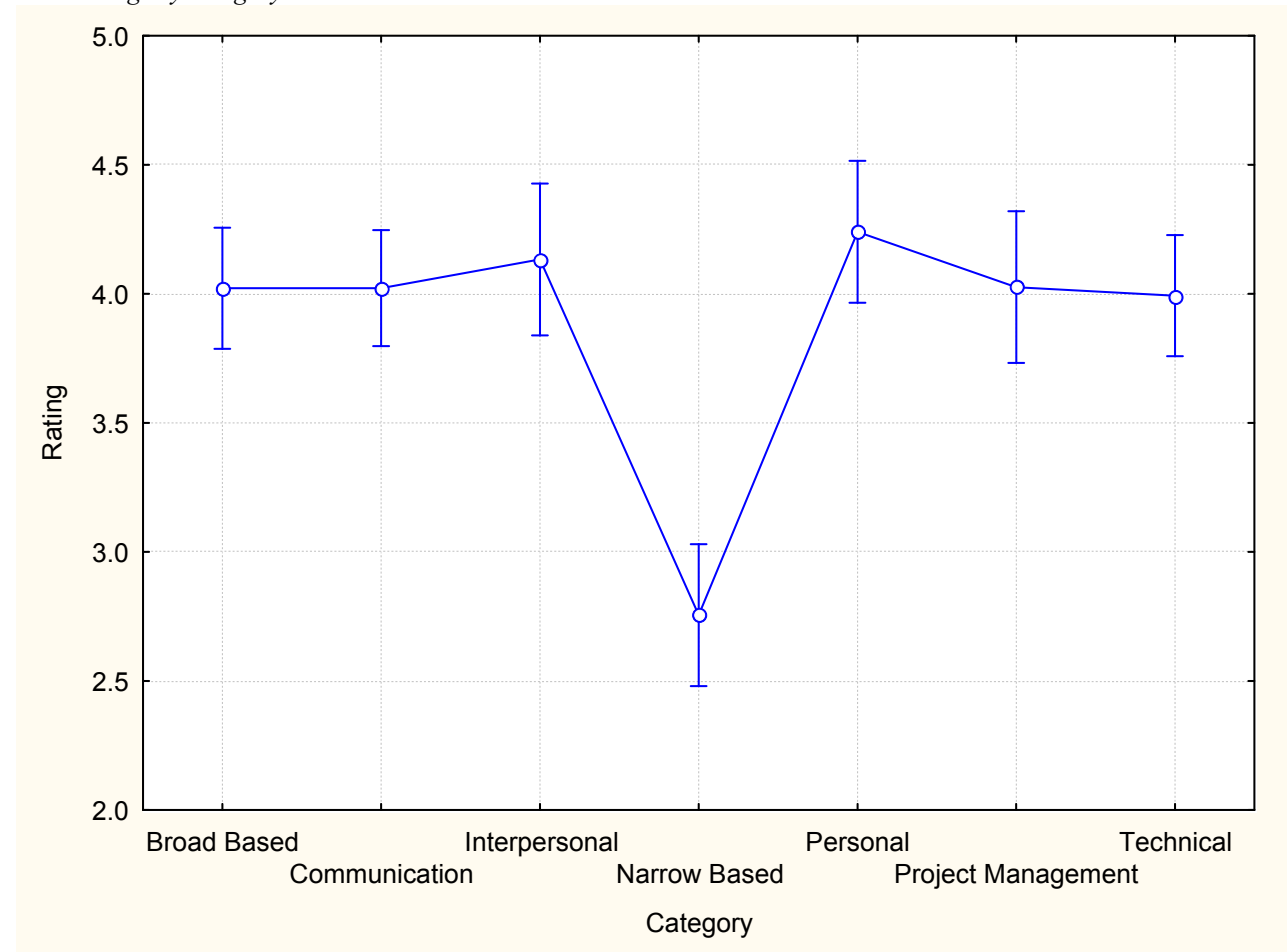
*Rating of Technical KSAs*

<b>KSA Description</b>	<b>Mean Rating</b>
Transferring Knowledge to Application	4.446
Adaptability to New Technology, New Languages	4.405
Ability to Conduct Needs Assessment	4.290
Ability to Analyze Systems Inputs and Outputs	4.236
Knowledge of System Processes	4.180
Knowledge of Data Flows	4.164
Ability to Write a Functional Business/System Analysis	3.968
Knowledge of Database Design and Utilization	3.748
Knowledge of Hardware/Software/OS Interactions	3.634
Knowledge of Distributed Computer Environments	3.574
Knowledge of E-Commerce	3.279
Average Rating	3.993

The ANOVA found significant differences between groups with a reported p-value of <0.0001. A Tukey’s Honestly Significantly Different Post Hoc Test was performed to find which groups were significantly different. Analysis revealed that the category “Narrow-

based Business” was rated significantly lower than the other categories of KSAs; no other statistically significant differences were observed. This analysis is graphically displayed in Figure 1.

Figure 1.  
*Mean ratings by category*





The only KSA category with mean ratings of less than 3.0 is “Narrow-based Business.” While these skills may be important as a student is developing a broad view of the business environment, they are not perceived as critical to effective performance in the systems analyst role.

Systems analysts need an eclectic mix of skills—technical, soft, and business. The findings of this study support the contention that the skills most needed by systems analysts are broad in nature: the ability to analyze and solve problems, the ability to interact with users and technical staff, and the ability to manage projects. Analysts’ performance depends more on collecting and understanding the concepts provided by customers to meet the customers’ needs than possessing the detailed knowledge themselves. In addition, broad-based skills cut across all technologies and applications and thus provide a mechanism for success in a dynamic and rapidly changing environment.

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# Should Home and Micro-based Businesses Take Disaster-Planning Advice from On-line Sources?

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## Abstract

While all businesses should have a disaster or continuity plan in place, the needs of micro-based and home-based businesses are less complex than small, medium, or large businesses. Rather than relying on comprehensive planning guides involving pages of forms and detailed procedures, a firm of one to five employees might easily manage with a simple one-page checklist. Many of these checklists or guides are readily available on the Internet using a simple Google search. But, do they provide sound advice on disaster planning for home and micro-based businesses?

The purpose of this study was to investigate (1) who is offering disaster-planning advice on the Web and (2) what type of guidance they are providing. A pilot study of ten Web sites was used to develop a framework for analyzing sites and content. Fifty additional sites offering disaster-planning guidance were then examined using the framework developed from the pilot. The authors concluded that individuals searching the Web for help with micro business disaster planning and business continuity would find helpful but incomplete information in typical searches. The topics identified most frequently in both stages of the study included backing up data, keeping an offsite copy of data, and preparing a disaster preparation and recovery plan. A search for various small business administration websites or those of university extension programs may generate the most information on the topic in the least amount of time.

**Keywords:** Micro business; Home-based business; Disaster Planning; Web-based Disaster Planning Advice

## Introduction

A disaster can strike any business, large or small. Disasters can arise from natural events such as hurricanes, tornadoes, earthquakes, and floods, or man-made events such as crime, terrorism, and hazardous material accidents. While disasters affect all businesses, not all businesses are equally prepared to respond. Small businesses do not have the financial resources to cope with disruptions for any length of time (FEI, 2004). Many of the technologies available in the marketplace to assist with recovery and resource protection are costly and only within the budgets of large businesses (Baltazar, 2005). For many small business owners, the plan for disaster recovery is eight simple words: "It never is going to happen to me" (Barrier, 1998).

Micro-based and home-based businesses, those with five employees or less, face even greater "size" challenges than other small businesses in preparing for disasters. Many of these businesses are home-based, meaning that the primary office is the owner's home. These very small companies often suffer from mistakes of poor record keeping, excessive debt, and failure to plan (Van Riper, 2005). Additionally, many micro and home-based businesses do their own taxes (NASE, 2006). Home-

based businesses in particular are inadequately insured (Landsbaum, n.d.).

Continuity of operations after a disaster is critical in order for a small business to survive. While customers may be initially sympathetic to the plight of a company in recovery, they will not wait long before taking their business elsewhere. About 60% of small companies that are forced to close following a hurricane or other emergency never reopen (Van Riper, 2005). Being prepared for disaster is essential, yet owners of very small businesses are often inadequate planners. Their lack of sound recordkeeping practices makes recovery of lost data and information difficult to impossible. Insufficient insurance means funds may not be available to replace damaged equipment such as computer hardware.

While all businesses should have a disaster or continuity plan in place, the needs of micro-based and home-based businesses are less complex than larger small businesses. Rather than relying on comprehensive planning guides involving many pages of forms and information, a firm of one to five employees might easily manage with a simple one-page checklist. Such checklists can be found on the Web using popular search engines.

## Research Questions and Methodology

The quality of any content found on the Web is always a concern, and disaster planning is no exception. For home and micro-based businesses, the need for reliable information is of particular priority since expertise is typically not available in-house. Do on-line sites provide sound advice on disaster planning for home and micro-based businesses?

To answer the question, the authors investigated (1) who is offering disaster-planning advice on the Web and (2) what type of guidance they are providing. The researchers conducted an initial pilot study of 10 URLs obtained using Google search terms “small business,” “micro-based business,” and “home-based business” in combination with “disaster plan.” Each site was categorized by its purpose using site type definitions found on Wikipedia (“Types of Websites,” 2007). The content of the site was then examined to develop a framework analyzing disaster-planning advice. Using the same site classification scheme and content framework, the authors conducted a follow up study using an additional 50 URLs obtained through Google searches. Analysis of both the initial pilot study of ten sites and the follow-up study of 50 sites is presented and discussed below.

### Results of the Pilot Study (10 Sites)

The results of the pilot study using ten sites are summarized in Tables 1 and 2. A total of 20 different disaster planning topics were found across the ten sites. Table 1 identifies the ten sites, their classification, and the number of disaster planning topics addressed from the content analysis. The sites are listed in order from those with the most topical to least topical coverage. Table 2 lists the 20 topics found among the ten sites in order of frequency.

#### Who is giving advice?

Wikipedia identifies more than 25 different site types; some Web sites can fall into multiple categories. The sites visited in the pilot study fell into six of the categories:

- Affiliate: portal containing custom and syndicated content from other providers.
- Blog: site used to post on-line diaries which may include discussion forums.
- Content: site whose business is the creation and distribution of original content.
- Corporate: site used to provide information about a business, organization, or service.

- Information: site intended to inform visitors, but not necessarily for commercial purposes; government, educational and non-profit institutions have an informational site.
- News/Magazine: similar to an information site, but dedicated to dispensing news and commentary. The authors included magazine formats in this category.

Four of the Web sites were primarily informational and two were on-line magazines. Each of the remaining categories was only represented once. The sites with the most “complete” information contained between 50 and 55% of the twenty topics identified in the content analysis. Three of the four sites with the greatest topical coverage were information sites.

**Table 1**

**Pilot Study Site Summary**

Web Site	Type	No. of Topics	% of Topics
HomeBusinessMag.com	News/magazine	11	55%
Myhurricanecenter.com	Information	11	55%
Small Business Association	Information	10	50%
U of Missouri Extension Office	Information	8	40%
Ebusinessmoms.com	Blog	7	35%
ArriveNet.com	Affiliate	6	30%
Microsoft.com	Corporate	5	25%
Rocky Mountain Info Insurance Assn	Information	5	25%
Forbes.com	News/magazine	4	20%
Allbusiness.com	Content	3	15%

#### What advice are they giving?

Backing up data, keeping an offsite copy of data, creating a plan, and purchasing/reviewing insurance coverage were mentioned by at least 80% of the sites. Backing up data was the only topic mentioned consistently across all sites. Only four sites mentioned the point of purchasing backup power sources as part of the pre-disaster planning.

Although a large percentage of business records are electronic today, only some of the sites reminded business owners to look beyond the electronic records to other vital records available in paper format only. This is particularly critical for home and micro-based businesses that may have a good number of records in hard copy only. Two sites discussed the need to provide backups of data such as company statistics, names of attorneys,

banks, accountants, insurance, etc. Three mentioned the use of digital photography and the accompanying ability  
**Table 2**

**Disaster Planning Topic Frequency Analysis (Pilot)**

Topic	No. of Sites
Back up data	10
Keep offsite copy of data (only 3 sites mentioned storing data through online service, encrypted to a secure server)	9
Prepare a disaster preparation and recovery plan	8
Purchase/Review insurance coverage	8
Provide for backup power (backup battery)	4
Find alternate facilities, hardware, other equipment, and supplies beforehand	4
Let others know your disaster strategy (employees/customers/clients)	3
Purchase business interruption insurance (disrupted due to disaster)	3
Take digital photos of difficult to value assets—preserve photos online	3
Safeguard your customer list (contact info.) for contact about your status, new location, etc.	3
Contact help organizations EARLY for help	3
Write down company stats, business partners, etc. (make sure someone has a copy)	2
Communicate/share copies of your disaster plan	2
Keep customers updated on a frequent basis	2
Inventory valuables – prepare serial number lists and descriptions – keep offsite	1
Categorize documents and files into 3 categories: vital, important, useful	1
If business has voice mail, select a remote number on which to record messages employees can reach	1
Review disaster plan at least once a year and update	1
Actually test disaster plan at least once a year	1
Make certain everyone knows locations and numbers of alternative phones	1

**Results of the Follow-Up Study (50 Sites)**

To determine whether or not the ten sites initially examined were representative of disaster planning Web sites in general, the authors repeated the pilot study using the site categorizations and content framework from the

to store digital photos of assets for possible insurance claims later.

pilot. Fifty addition URLs were obtained through a Google search using the terms “micro business disaster planning.” Researchers such as Jansen, Spink, Blakely and Koshman (2007) have concluded that an individual addressing a single information need using a service such as Dogpile.com has a session length fewer than three queries and that the mean session duration is less than 30 minutes. Although 50 sites may possibly not be reviewed in 30 minutes, the current researchers chose to review 50 sites to assess how much information a more persistent individual could find going through that many hits. The sites were analyzed using the same four characteristics as the pilot study. The results are summarized in Tables 3 and 4.

**Who is giving advice?**

The first 50 sites found using the above search terms fell into the categories of blog, corporate, commercial, information, and news/magazine. Two of the 50 sites listed were not accessible.

Corporate sites were most frequent among the first 50 sites listed. Theses sites were selling products or services to help a business provide for its continuity following a disaster, and the average number of topics specifically addressed without further consultation with the company employees was 3.3. Another 15 sites were information sites; the sites were often limited in the number of topics actually addressed, averaging 2.7 topics per site. Another 10 sites were news/magazine sites, with an average of 2.9 topics per site. The single site with the most topics appropriate for a micro-based business was the Hampton Roads Small Business Development website. Table 3 provides number of sites and average number of topics for all types of sites found in the follow-up study.

**Table 3**

**Follow-Up Study Site Summary**

Type of Site	No. of Sites	Average No. of Topics
Affiliate	0	
Blog	5	3
Corporate	16	3.3
Commercial	2	
Content	0	
Information	15	2.7
News/magazine	10	2.9
Not accessible/available	2	

### What advice are they giving?

The authors found no additional topics that related to disaster planning and recovery beyond those identified in the pilot study. As in the pilot study, the topics identified most frequently included backing up data, keeping an offsite copy of data, and preparing a disaster preparation and recovery plan. However, as illustrated in Table 4, the home or micro-based business owner who searches only the first fifty sites that list from a Google search of “micro business disaster planning” will only find these recommendations in about half of the sites. The step of finding alternate facilities, hardware, other equipment, and supplies beforehand was mentioned only in 20% of the fifty sites. All other topics were mentioned in less than that, if at all.

Even though the search words included micro business, some of the sites clearly provided IT support for company technology only larger businesses would have. Almost one-third of the sites were classified as corporate sites; at some of those sites no help was provided other than the message to hire that particular business for disaster planning assistance. One of the sites contained a disaster plan for a university library that would not offer much support for the very small business owner. In at least one site, the researchers identified NO content related to disaster planning or recovery. Those sites offering a book for sale would most likely be abandoned by the home or micro-business owner operating with limited funds. Sites that require the visitor to register before being able to see any content may also be abandoned unless there is a direct promise of significant help on the topic of disaster planning available once a web visitor registers.

### Conclusions and Recommendations

This study provides a better understanding of the availability and suitability of Web-based resources for disaster planning. An initial content analysis was performed for ten Web sites that provide simple disaster planning guidance. Preparation activities were extracted from each Web site. Activities common to all or most guides are identified. A follow up study of 50 sites generated from a Google search of “micro business disaster planning” was then conducted using the framework developed from the pilot.

Taken together, the Web sites provided helpful information on activities to undertake as part of the disaster planning process. The topics identified most frequently in both stages of the study included backing up data, keeping an offsite copy of data, and preparing a disaster preparation and recovery plan. None of the sites individually provided a complete picture of what steps to

take. As background reading, the Web sites contained useful information. As a planning tool, their usability was limited.

**Table 4**

**Follow-up Study Analysis of Disaster Planning Topic Frequency**

Topic	No. of Sites	Topic	No. of Sites
Back up data	28	Contact help organizations EARLY for help	1
Keep offsite copy of data (only 3 sites mentioned storing data through online service, encrypted to a secure server)	25	Write down company stats, business partners, etc. (make sure someone has a copy)	2
Prepare a disaster preparation and recovery plan	24	Communicate/ share copies of your disaster plan	1
Purchase/Review insurance coverage	3	Keep customers updated on a frequent basis	2
Provide for backup power (backup battery)	4	Inventory valuables – prepare serial number lists and descriptions – keep offsite	0
Find alternate facilities, hardware, other equipment, and supplies beforehand	10	Categorize documents and files into 3 categories: vital, important, useful	0
Let others know your disaster strategy employees/customers/clients	7	If business has voice mail, select a remote number on which to record messages employees can reach	2
Purchase business interruption insurance (disrupted due to disaster)	0	Review disaster plan at least once a year and update	5
Take digital photos of difficult to value assets—preserve photos online	3	Actually test disaster plan at least once a year	0
Safeguard your customer list (contact info.) for contact about your status, new location, etc.	0	Make certain everyone knows locations and numbers of alternative phones	6

An individual conducting a Google search of “micro business disaster planning” would very likely find incomplete information on activities necessary to plan for disasters and support business continuity in a search session. Those who search for less than 30 minutes on a topic may find very limited information in the sites they link to in that short amount of time. Many people would not continue through 50 sites, but stop searching much earlier. Searching Small Business Administration websites or those of university extension programs may result in a larger amount of disaster planning information in the least time.

The current study included initial steps in understanding the activities involved in micro- and home-based business disaster planning and what help is available through the Web. As a next step, research should be conducted to learn more about what micro- and home-based businesses actually do to prepare for disasters.

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# Hurricane Katrina's Silver Lining: E-Learning at Southern University at New Orleans

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## Abstract

Most universities view E-learning as the wave of the future. However, at Southern University at New Orleans (SUNO), E-learning has become a necessity for the school's survival. For the past several years, universities regarded E-learning as a means to meet the needs of their students, thereby increasing enrollment, retention and quality while lowering tuition. However, after Hurricane Katrina, several Gulf Coast Universities have resorted to E-learning as a means to simply provide basic education to their students. SUNO's E-learning program has grown from 15 to 148 courses within two years, partly out of necessity but also for convenience. Not only has E-learning allowed SUNO to keep its doors open, but it has also allowed the school to move forward with its mission of providing higher education to students from diverse backgrounds. Furthermore, E-learning will allow the University to not only recover but also play a vital role in preparing individuals to meet the labor needs of the city.

*Key Words: E-learning, Disaster, Displaced, Recruiting, Retention, Enrollment, Katrina.*

## Introduction

Technology can make a particularly significant contribution when coordinated with the training of teachers to integrate technology into their teaching, with applications that draw on the unique capabilities of technology, and with supportive curricular, assessment, and school contexts that advance complex problem solving, creative thinking, and life-long learning – skills that are needed to support an information society and knowledge economy. (Deubel, 2007)

The latest educational research promotes the theory that a university can achieve its educational objectives through the use of E-Learning to the same extent that can be achieved through traditional classroom instruction. According to such theories, the subject matter of most university courses can be successfully conveyed to students through E-Learning modes. Not only can E-Learning convey knowledge, it can also provide the elements of interactivity and student-teacher interaction that are the hallmarks of the tried and true lecture method. Furthermore, some theorists have gone so far as to claim that E-Learning has added advantages over classroom instruction, namely: Greater convenience, improved pacing, and higher levels of communication between instructor and learners, instructors and instructors, and students and students.

Since the day after Hurricane Katrina's landfall, the Louisiana Board of Regents, the state's coordinating board for higher education, has hosted regular meetings of the Louisiana Higher Education Response Team (LaHERT)

LaHERT is composed of system presidents, university presidents/chancellors, campus representatives, and invited guests who address the many issues facing higher education as a result of the two hurricanes. More than 80,000 Louisiana public and private college students and 10,000 faculty and staff were displaced by the two storms. "The impact of the storms on postsecondary education in Louisiana has been both broad and deep ([www.regents.state.la.us](http://www.regents.state.la.us)).

## Literature Review

Education is the root of our future growth. Both skills and technology advance every minute in an effort to strengthen our educational process, to better focus our teaching skills, and to incorporate interactive learning tools to work with students rather than for them. Above all, such educational measures must be available to every student regardless of geographic location. E-learning revolutionized the learning experience by making vital material available on-demand via the web and a company's intranet. Now the same content can be offered using familiar wireless tools, making the learning experience even more convenient and flexible (Koschembahr, 2005, Glenn, 2001 & Kinnaman, 1995).

In the hands of able teachers, distance learning plays a prominent role in fostering the development of important skills in students such as critical thinking, problem solving, written communication, and the ability to work collaboratively. Thus, teachers can encourage students to employ all available technology with the goal of having them weigh evidence, judge the authenticity of data, compare different view points on issues, analyze and synthesize diverse sources of information, and construct their own understanding of the topic at hand. By doing so, students will be well on their way to developing invaluable critical thinking and problem solving skills (Weinstein, 1997).

In order for E-learning to become successful students need uninterrupted access to technology, curriculum, and activities that are meaningful to students' lives, and immediate feedback in order to maximize student achievement. (Starkman, 2006).

Students who successfully complete distance learning programs are generally very motivated, highly disciplined, and have a clear vision of the goals that they want to accomplish. Furthermore, successful students tend to be independent leaders and mature adults who are comfortable in the realm of textual materials (Glenn, 2001).

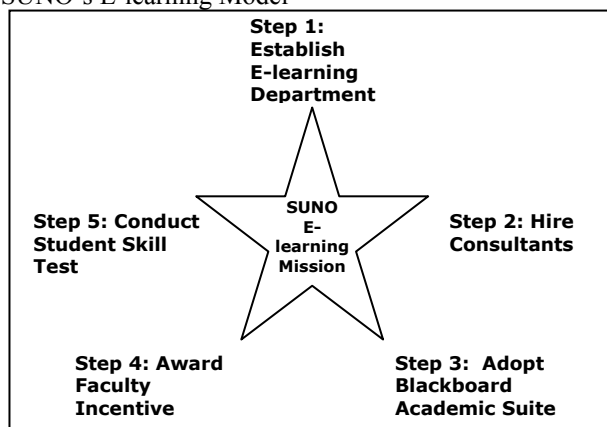
## The Pathway to E-Learning

With Katrina a not so distant memory, SUNO is faced with new challenges. Perhaps even greater than rebuilding is the need for a tested and time efficient recovery plan for the next disaster, whether natural or man-made. SUNO has taken an aggressive approach to protect its electronic welfare. Existing university websites were enhanced and updated with links to guide students, faculty, and staff in case of future disasters. Elaborate data backup systems are also employed to ensure security and maintenance of vital data. In addition to SUNO's on-line academic blackboard suite, remote data backup and recovery systems are used to store and update data daily. Finally, SUNO's mainframe is also hosted off campus at Loyola University at New Orleans. The purpose of this paper is to evaluate SUNO's post-Katrina disaster recovery efforts. SUNO's E-learning mission which is to design and implement a model for teaching and learning that will meet the needs of all learners through the use of best practices, adaptive technologies and instructional techniques.

During the wake of Hurricanes Katrina and Rita, SUNO administration assumed an aggressive approach to reach, retain, and recruit students by establishing the Department of E-learning and implementing on-line curricula. All faculty were encouraged to implement at least one on-line course in his/her field. Consultants from the Tennessee Board of Regents specializing in the design of on-line curricula conducted workshops aimed at teaching SUNO faculty instructional design for on-line courses. An academic blackboard suite was established for on-line course materials, thereby providing students with unlimited access. Faculty members were awarded wireless laptops and financial incentives for successful course implementation as set forth by the standards and recommendations of the consulting firm. All online students enrolled were required to complete the SUNO Online Orientation and the Online Knowledge and Skills Mastery Test at the beginning of each semester. The test assisting students in assessing their knowledge, skills, technical requirements, support students services, technical assistance, and listing of academic resources to support students online (Figure 1).



Figure 1  
SUNO's E-learning Model



### Data Analysis

#### a) Enrollment and retention

With the implementation of E-learning, the number of on-line classes at SUNO has increased from 15 courses pre-Katrina to 148 courses post-Katrina (Table 1). Furthermore, the Departments of Criminal Justice, Early Childhood Education, and General Studies currently offer on-line undergraduate degree programs. An on-line Master degree program in Museum Studies is also available. The number of students enrolled in on-line courses also increased from 558 pre-Katrina to 3,117 post-Katrina for the same duration (Table 2).

Table 1  
On-line Classes Offered at SUNO Pre/Post Katrina

Semester	Number of Classes
Spring 2005*	15
Spring 2006	89
Fall 2006	128
Spring 2007	148

\* (Pre-Katrina)

Table 2  
On-line Enrollment Pre/Post-Katrina

Semester	Number of Students
Spring 2005 *	558
Spring 2006	2445
Fall 2006	3085
Spring 2007	3117

\* (Pre-Katrina)

The E-learning program has also positively impacted university enrollment and retention. Overall, enrollment has increased from a student

body of about 700 in the Fall of 2005 to 2196 in the Spring of 2006. Currently, the university has an enrollment of 2600 (Table 3).

Table 3  
Student Enrollment at SUNO Pre/Post-Katrina

Semester	Number of Students
Fall 2005*	3,729
Fall 2005**	700
Spring 2006	2,040
Fall 2006	2,196
Spring 2007	2,344

\* (Pre-Katrina)

\*\* Post-Katrina, Southern University-Baton Rouge

#### b) Perceptions of the Student Body Concerning the Quality of Online Courses

Student engagement in E-learning is critical to active participation in their learning process. This participation is composed of two elements: the students' willingness to use available academic resources, such as communication with professors through chat rooms, discussion boards, e-mails, and messages. The second element includes the ability to self manage learning wisely. Self-efficacy and goal setting have important implications for academic successes.

A survey entitled "Student Satisfaction Survey: Fall 2006 and Spring 2007" was conducted by the office of the vice chancellor of student affairs consisting of twenty-six questions. Out of the twenty-six questions, three pertained to E-learning, which are listed below. The results of the questions are shown in Table 4 through 6.

1. How would you rate on-line courses at Southern University at New Orleans?
2. Have you activated your SUNO student email account?
3. Have you activated your SUNO Blackboard account?

In summary, the result of the survey, for the Fall and Spring of 2007 indicated that an average of 64% online courses are rated excellent and good (Table 4).

Table 4  
Evaluation of On-line Courses for Fall 2006 & Spring 2007

	Does Not Apply	Poor	Satisfactory	Good	Excellent	Total
<b>Fall 2006:</b>						
Number	8	11	22	55	49	145
Percentage	5.5	7.6	15.2	37.9	33.8	100
<b>Spring 2007:</b>						
Number	24	33	53	82	58	250
Percentage	9.6	13.2	21.2	32.8	23.2	100
<b>Total</b>						
Number	32	44	75	137	107	395
Percentage	8.1	11.1	19.0	34.7	27.1	100

The number of students that have activated their SUNO Blackboard accounts are 98% (Table 5). The number of students that have activated their SUNO E-mail accounts are 56% (Table 6). The result indicates a favorable opinion on the part of the

Despite the above mentioned success with E-learning, the university should address the following concern as part of an ongoing educational improvement process. Data indicates that 44% of students do not have an active E-mail account. Such a problem hinders communication and should be immediately addressed by the administration.

#### Conclusion

Not only did E-learning play a key role in the survival of SUNO post-Katrina, but it also revitalized the academic environment with motivated faculty/staff and eager students. Pre-Katrina,

student toward the courses and SUNO E-learning effort.

Table 5:  
Have you not activated your SUNO e-mail account?

	Yes	No	Total
<b>Fall 2006:</b>			
Number	95	45	140
Percentage	67.9	32.1	100.0
<b>Spring 2007:</b>			
Number	132	111	243
Percentage	54.3	45.7	100.0
<b>Total</b>			
Number	227	156	383
Percentage	59.3	40.7	100.0

Table 6  
Have you activated your SUNO Blackboard Account?

	Yes	No	Total
<b>Fall 2006:</b>			
Number	140	2	142
Percentage	98.6	1.4	100.0
<b>Spring 2007:</b>			
Number	242	5	247
Percentage	98.0	2.0	100.0
<b>Total</b>			
Number	382	7	389
Percentage	98.2	1.8	100.0

approximately 9% of the SUNO student body participated in on-line courses. In the spring 2006 semester, 41% of the student body participated in on-line courses. Such statistics attest to the success and popularity of SUNO's E-learning program and signify the start of a new beginning. Based on its overall positive result, the E-learning program implemented by SUNO may serve as a model for other institutions in regions affected by natural disasters. This model has shown that change in teaching and learning, and in attitudes on campus, can be affected by including E-learning technologies as part of a pedagogical design change

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