EXAMINATION OF FACTORS IMPACTING STUDENT SATISFACTION WITH A NEW LEARNING MANAGEMENT SYSTEM

Lucy Santos GREEN
Fethi A. INAN
Bree DENTON
Texas Tech University
2500 Broadway Drive
Lubbock, TX 79409, USA

ABSTRACT

The purpose of this study was to determine factors that influenced student satisfaction with a new learning management system and to identify which of these factors were most important. The data was collected using an an online survey tool that was administered to students enrolled in courses designed and taught by faculty who participated in a pilot group testing a new learning management system (LMS). The findings support previous research in this area, indicating that usability of the LMS and availability of technical assistance is strongly correlated with student satisfaction. Study findings will be used to improve LMS training and institution-wide technology support.

Keywords: **Learning management system, usability, student satisfaction, online learning, course design.**

As universities grow in population size, more emphasis is placed on e-learning. In fact, Olgren (2000) indicates that distance learning is growing at an annual rate of 25% in the United States in both the corporate and academic worlds. Urdan and Weggen (2000) define e-learning as the delivery of course content through electronic media (e.g. internet, interactive TV, satellite, audio/video tape, etc.). Khan (2001) provides multiple synonyms for e-learning, including web-based learning, internet-based training, advanced distributed learning, web-based instruction, online learning, and open/flexible learning. There are multiple definitions and synonyms for distance learning, however, there is a common theme. E-learning is a method of course delivery that requires internet connectivity, used to deliver content both synchronously and asynchronously via electronic media or software to the learner (Allen & Seman, 2009; Ko & Rossen, 2010). In the context of this study, web-based learning is defined as instruction delivered to the learner over the internet asynchronously, synchronously, or both (Koohang & du Plessis, 2004).

Much web-based learning is facilitated via a learning management system (e.g., Blackboard, Moodle, and Sakai). One of the most important functions of an LMS is its ability to address the needs of the end user, or the learner (Lewis & MacEntee, 2005). In web-based learning, students must have high self-regulation, motivation and commitment to the learning process (Selim, 2007; Artino, 2008). Unfortunately, the majority of students do not have those necessary cognitive skills.

Therefore, the facilitation of student learning becomes a vital component of online teaching. To meet the educational needs of students, it is necessary to ensure that e-learning, or web-based learning, is quality learning. In order to keep students motivated and committed, student satisfaction is very important and has been found to be a major contributor to continued student participation in web-based learning (Palmer & Holt, 2009). Furthermore, learner satisfaction has been found to be positively correlated with the quality of learning outcomes (Artino, 2008; Bolliger & Martindale, 2004; Inan & Yukselturk, 2004; Palmer & Holt, 2009).

FACTORS LINKED TO LEARNER SATISFACTION

According to Palmer and Holt (2009) learner satisfaction "with an online environment is complex and multi-dimensional and includes a wide range of factors" (p. 101). Even so, there are several factors that are common throughout the literature. In previous research, these factors have been categorized in various ways. Sun et al. (2008) categorized these factors into five dimensions: the learner dimension, the instructor dimension, the technology dimension, the course dimension, and the design dimension. Menchaca and Bekele (2008) categorized these factors into five dimensions as well, including technology-related factors, user characteristics, course-related factors, learning approach, and support services. For this study, factors were organized into two main categories: learner-related factors and learning environment-related factors (Inan & Yukselturk, 2004).

Learner-Related Factors

Student satisfaction with web-based learning has been shown to be strongly related to prior experience. Selim (2007) found that a student's prior experience with using a learning management system is very important to online learning success. After surveying students and faculty looking at technical proficiency, Menchaca and Bekele (2008) found that at least a basic or moderate technical skill was also necessary for success in an online program. A student's participation and utilization of the learning management system strongly influences his or her level of satisfaction with an online course (Inan, Yildirim, & Kiraz, 2004). Palmer and Holt (2009) found that the more students participate frequently online, the more satisfied they feel with online courses. Conversely, a student's rare use of the LMS is related to feelings of dissatisfaction with online learning (Hong & Koh, 2000; Sun et al, 2008; Palmer & Holt, 2009). Basically, the amount of time spent online using the learning management system influences student satisfaction.

Learning Environment-Related Factors

Technology support is essential to the successful use of the LMS in delivering online courses and is strongly related to student satisfaction. Technical assistance has to be in place, or the online learning experience will not be successful (Koohang & du Plessis, 2004; Selim, 2007). Palmer and Holt (2009) state that access to campus-based resources and technical support contributes to learner satisfaction. Conversely, Selwyn et al. (2000) found that a lack of technical support contributes to learner dissatisfaction and is a significant problem for those participating in online learning. One of the major subjects regarding student satisfaction discussed in the literature is usability (Nokelainen, 2006; Reeves et al., 2002; Storey, Phillips, Maczewski, & Wang, 2002). Usability is defined by Koohang and du Plassis (2004) as "the influential dynamic of a product or system's capacity to fulfill the users' interactive needs and expectations" (p. 40).

Usability is critical to the web-based learning environment and includes attributes such as reliability, operability, understandability, functionality, learnability, and efficiency (Koohang and du Plassis, 2004). Chiu et al. (2005) suggest that usability of the learning management system is a major determinant of student satisfaction in online courses.

Previous studies show that the degree to which a course is online can influence student satisfaction (Bolliger & Martindale, 2004; Inan & Yukselturk, 2004). There are various degrees of online instruction ranging from hybrid, or a mixture of face-to-face and online to distance, or fully online courses. In a qualitative study by Zhang and Perris (2004), some students indicated that they were more at ease when learning in a face-to-face environment rather than an online environment.

Thomas (2002) found that 51% of students surveyed preferred face-to-face discussions over online discussions. Despite these findings, several studies have also noted that the ease and flexibility of fully online courses positively impact student satisfaction with online instruction.

PURPOSE OF THE STUDY

Learner satisfaction is a key factor in continued participation in web-based learning. Therefore it is important to evaluate learner satisfaction with the LMS currently being used. This study focused on evaluating learner satisfaction and the factors that may contribute to or take away from the learning experience. Specifically, this study explored the impact of learner-related (prior experience, frequency of use) and learning-environment related factors (delivery format, technical assistance, usability) on student satisfaction with a new learning management system and identifies which factors were most important.

METHODOLOGY

Participants

This study took place in a southwestern research institution. In the fall of 2008, the university began migrating from WebCT 4.1 to Blackboard CE 6. The study survey was sent to 2,922 students who participated in a course designed by a faculty member in the spring 2009 pilot cohort. Of the 2,922 students, 390 responded, resulting in a 13% response rate. Students came from all different disciplines. Of the 390 students who replied, 13% were freshmen, 13% were sophomores, 24% were juniors, 25% were seniors, and 24% were graduate students. More males than females responded; 38% of respondents were female while 62% of the respondents were male.

Data Collection Instrument

Data for this study was collected through a survey developed by a team of professionals who offer teaching assistance and professional development for online teachers in the university. Utilizing the online survey tool, Qualtrics, students who were enrolled in online and hybrid classes for the Blackboard pilot groups were given a link to the survey on the homepage of their course. They were asked to fill out the survey via a course announcement and were then redirected to the data collection website. The survey had 19 questions.

These questions ranged from "How much, approximately, do you access your course in a week?" to "Have you previously used a course management system (Blackboard, WebCT, Moodle, etc.) in a university course?" Students were asked to give basic information such as gender and classification. They were also asked to respond to statements using a five-point likert-type scale. For this study, specific questions were used, including "When I had problems with the course management system (Blackboard), it was easy for me to obtain prompt and helpful assistance" and "How easy did you find Blackboard to use?" Students were also asked to rate overall satisfaction with the use of blackboard in their course.

DATA ANALYSIS AND RESULTS

Ordinary least squares multiple regression was used to determine factors influencing students' satisfaction with a new learning management system and which factors were most important. The dependent variable, student satisfaction, was measured by students' perceptions and satisfaction with the new learning management system.

Among the independent variables were students' prior online course experience, frequency of learning management system usage, availability and amount of technical assistance, format of the course delivery, and the usability of the learning management system.

The sample size for analyses was 267 representing all students who had completed a report on all of the variables used in the analyses. The means, standard deviations, and correlations among all the variables are given in Table 1.

Table: 1
Correlations, Means, and Standard Deviations (N = 267)

Variables	1	2	3	4	5	6
1. Prior Experience	1					
2. Frequency of Use	.001	1				
3. Delivery Format	-.190	-.243	1			
4. Technical Assistance	.083	.035	-.070	1		
5. Usability	.077	.022	-.062	.503	1	
6. Student Satisfaction	.104	.094	-.066	.559	.783	1
Mean	1.16	3.45	2.58	3.16	3.63	3.57
SD	.551	1.137	1.212	1.045	1.080	1.099

The five independent variables were entered into the regression equation simultaneously. Preliminary examination of the results indicated there was no extreme multicollinearity in the data (all variance inflation factors were less than 3) nor were there any influential data points. The regression results indicate that the set of independent variables explained 64.3% ($F(5,258) = 95.6$, $p < .001$) of the variance in student satisfaction; with three of the five variables having a significant unique influence on satisfaction (see Table: 2).

In order of importance, they are usability (*Beta* = .67), technical assistance (*Beta* = .22), and frequency of LMS use (Beta= .08). The findings suggest that the usability of learning management system and the availability of technical assistance are very important factors influencing student satisfaction with online learning management systems.

Table: 2
Results of Regression of Student Satisfaction

Variables	b	β	t
1. Prior Experience	.075	.038	1.017
2. Frequency of Use	.073	.076	2.023*
3. Delivery Format	.015	.017	.437
4. Technical Assistance	.228	.217	5.142**
5. Usability	.683	.671	15.942**
R Square= .643			

*p < .05; ** p < .01

DISCUSSION

This study examined factors -usability, frequency of use, delivery format, technical assistance, and prior experience- contribute to student satisfaction. Three of the five factors examined were found to be important, two of which were strongly significant. Usability was found to be very important in contributing to student satisfaction.

The more students view the LMS as usable, the higher their satisfaction with the system. This supports the findings of Koohang and Duplassis (2004) and Wu, Tennyson, and Hsia (2010). Therefore, it is imperative that an LMS be effective, reliable, operable, understandable, functional, learnable, memorable, and efficient. Students must feel comfortable with the system in order to focus on learning the content rather than system navigation and usability. If it takes more time to learn to use the system, or if it is difficult in some way or another, students are less likely to be satisfied with the LMS, which in turn would keep them from being satisfied with their learning experience. As usability was found to be a significant contributor to student satisfaction, it is of utmost importance for an educational institution to consider the usability of online learning environments in order to ensure quality online learning.

Technical assistance was found to significantly contribute to student satisfaction. Noted by Palmer and Holt (2009), Selwyn (2000), Selim (2007), and others, the availability and quality of technical assistance are significant contributors to student satisfaction.

The support students receive from institutional support staff for an LMS is invaluable. When using an LMS in an institution, it is important that technical assistance be one of the top priorities to ensure student success in an e-learning environment. Additionally, student usage of the LMS was found to be another important factor impacting student satisfaction.

The more a student uses the system, the higher his or her level of satisfaction (Hoskins & Van Hooff, 2005; Hrastinski, 2008). Students who access their courses more may have become more accustomed to the course and may have learned more about the use of the LMS.

Therefore, course designers and instructors should design and deliver instruction in ways that encourage students to utilize the LMS more frequently so as to improve student feelings of self-efficacy and comfort with the LMS (Inan, Yildirim, & Kiraz, 2004).

Students' prior online experience was not found to be important for satisfaction with the LMS. However, current college students may be overall, more comfortable with computer technology and adapt more easily to an online environment (Birdsong, 2009; Koroghlanian & Brinkerhoff, 2008)

Therefore, prior experience may not have been found to be a contributor to student satisfaction as online environments may no longer be such a challenge for students to learn. Study findings also did not show any significant relationship between the delivery format and student satisfaction. This substantiates the idea that a well-designed online course can compete with a face-to-face course. For example, the use of communication tools can replace discussion in a face-to-face class. Also, students who enroll in online courses usually do so in order to have more flexibility in their learning process. So, student satisfaction may not necessarily be tied to a face-to-face element in the delivery of the course.

CONCLUSION

This study did not attempt to measure all contributors to student satisfaction. However, from its findings, student satisfaction can be clearly linked to usability, availability and quality of technical assistance, and frequency of use. This research has implications for educational institutions wishing to provide students with a quality e-learning experience. It is important that the system be usable, that students have access to technical support, and that they be encouraged to use the system frequently. In this way, quality online learning can be a reality for students and for educators.

BIODATA and CONTACT ADDRESSES of the AUTHORS

Lucy Santos GREEN is a doctoral student in Educational Instructional Technology at Texas Tech University. Her research interests are web 2.0 technologies, e-learning for K-12 students, and school librarians as instructional partners.

Lucy Santos GREEN
Texas Tech University
2500 Broadway Drive, Lubbock, TX 79409, USA
Phone: 806.742.1997
Email: lucysantosgreen@gmail.com

Fethi A. INAN is an Associate Professor of Educational Instructional Technology at Texas Tech University. He researches and publishes in technology integration in K-12, adaptive web-based learning environments and instructional applications of emerging technologies.

Fethi A. INAN
Texas Tech University
2500 Broadway Drive, Lubbock, TX 79409, USA
Ohone: 806.742.1997
Email: fethi.inan@ttu.edu

Bree DENTON is a doctoral student in Educational Instructional Technology at Texas Tech University. Her research interests are in technology education, technology integration in K-12, and instructional design for higher education.

Bree DENTON
Texas Tech University
2500 Broadway Drive, Lubbock, TX 79409, USA
Phone: 806.742.1997
Email: bree.denton@ttu.edu

REFERENCES

Alexander, S., & Golja, T. (2007) Using students' experiences to derive quality in an e- learning system: An institution's perspective. *Educational Technology & Society, 10*(2), 17-33.

Allen, I. E., & Seman, J. (2009). *Learning on demand: Online education in the United States*. Nedham, MA: The Sloan Consortium.

Artino, A. R. (2008). Motivational beliefs and perceptions of instructional quality: predicting satisfaction with online training. *Journal of Computer Assisted Learning, 24*(3), 260-270.

Birdsong, L. (2009). Information literacy training for all? The outliers. *Searcher, 17*(8), 18-54.

Bolliger, D. U., & Martindale, T. (2004). Key factors for determining student satisfaction in online courses. *International Journal on E-learning, 3*(1), 61-67.

Chan, M. S-C., & Waugh, R. F. (2007) Factors affecting student participation in the online learning environment at the Open University of Hong Kong. *Journal of Distance Education, 21*(3), 23-38.

Chiu, C-M., Sun, S-Y., Sun, P-C., & Ju, T.L. (2007). An empirical analysis of the antecedents of web-based learning continuance. *Computers & Education, 49,* 1224-1245.

Davis, F. D., Bagozzi, R.P., & Warshaw, P. R. (1989) User acceptance of computer technology: A comparison of two theoretical models. *Management Science, 35*(8), 982-1003.

Gilbert, S.W. (1995) Why distance education? *American Association for Higher Education Bulletin, 48*(4), 3.

Hong, K-S., & Koh, C-K. (2000). Computer anxiety and attitudes towards computers among rural secondary school teachers: A Malaysian perspective. *Journal of Research on Technology in Education, 35*(1), 27-48.

Hoskins, S. L., & Van Hooff, J. C. (2005). Motivation and ability: which students use online learning and what influence does it have on their achievement? *British Journal of Educational Technology, 36*(2), 177-192.

Hrastinski, S. (2008). What is online learner participation? A literature review. *Computers & Education, 51*(4), 1755-1765.

Inan, F. A., Yildirim, S., & Kiraz, E. (2004). A design and development of an online learning support system (OLSS) for preservice teachers: A discussion of attitudes and utilization. *Journal of Interactive Instruction Development, 17*(4), 1-15.

Inan, F. A., & Yukselturk, E. (2004). Student perception and satisfaction in online certificate courses. *Proceeding of the World Conference on E-Learning in Corp., Govt., Health., & Higher Ed., 2004*(1), 314-318.

Khan, B. H. (2001). *A framework for web-based learning.* Engelwood Cliffs, NJ: Educational Technology Publications

Ko, S., & Rossen, S. (2010). *Teaching online: A practical guide* (3 ed.). Boston, MA: Houghton Mifflin.

Koohang, A., & du Plessis, J. (2004) Architecting usability properties in the e-learning instructional design process. *International Journal of E-learning, 3*(3), 38-44.

Koroghlanian, C., & Brinkerhoff, J. (2008). Online students' technology skills and attitudes toward online instruction. *Journal of educational technology systems, 36*(2), 219.

Lewis, B. A., MacEntee, V. M., et al (2005). Proceedings from the 2005 Informing Science and IT Education Joint Conference: *Learning management system comparison.* Flagstaff, AZ

Menchaca, M. P., & Bekele, T. A. (2008). Learner and instructor identified success factors in distance education. *Distance Education, 29*(3), 231-252.Olgren, C. (2000). Distance learning in higher education. In K. Mantyla, *The 2000/2002 ASTD Distance Learning Yearbook* (pp.19-25). New York: McGraw-Hill.

Nokelainen, P. (2006). An empirical assessment of pedagogical usability criteria for digital learning material with elementary school students. *Educational Technology & Society, 9*(2), 178-197.

Palmer, S. R., & Holt, D. M. (2009). Examining student satisfaction with wholly online learning. *Journal of Computer Assisted Learning, 25*(2), 101-113.

Reeves, T., Benson, L., Elliott, D., Grant, M., Holschuh, D., Kim, B.& Loh, S. (2002, June). *Usability and instructional design heuristics for e-learning evaluation.* Paper presented at the World Conference on Educational Multimedia, Hypermedia,and Telecommunications, Charlottesville, VA.

Selim, H. M. (2007) Critical success factors for e-learning acceptance: Confirmatory factor models. *Computers & Education, 49,* 396-413.

Selwyn, N., Marriott, N., & Mariot, P. (2000). Net gains or net pains? Business students' use of the internet. *Higher Education Quarterly, 54*(2), 166-186.

Sun, P-C., Tsai, R.J., Finger, G., Chen, Y-Y., & Yeh, D. (2008). What drives a successful e- Learning? An empirical investigation of the critical factors influencing learner satisfaction. *Computers & Education, 50,* 1183-1202.

Storey, M. A., Phillips, B., Maczewski, M., & Wang, M. (2002). Evaluating the usability of Web-based learning tools. *Educational Technology & Society, 5*(3), 91-100.

Thomas, M. J. W. (2002) earning within incoharent structures: The space of online discussion forums. *Journal of Computer Assisted Learning, 18,* 351-366.

Urdan, T. A. & Weggen, C.C. (2000) *Corporate e-learning: exploring a new frontier*. San Francisco, CA: WR Hambrecht + Co

Wu, J. H., Tennyson, R. D., & Hsia, T. L. (2010). A study of student satisfaction in a blended e-learning system environment. *Computers & Education, 55*(1), 155-164.

Zhang, W-Y., & Perris, K. (2004) Researching the efficacy of online learning: A collaborative effort amongst scholars in Asian open universities. *Open Learning: The Journal of Open and Distance Learning, 19,* 247-264.