

Creating the Online Learning Environment: What Works and What Doesn't

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Abstract

As online education becomes more popular and the field matures, attention is increasingly focused on factors affecting completion of courses especially since rates of non-completion as high as 50% are commonly reported in literature. Factors affecting completion have been categorized in literature into the areas of environment, design, technology, and learner motivation. This triangulated study involves both quantitative and a qualitative dimensions. Initially, the study involved a census of students who had enrolled but dropped out of the 2006 spring semester online courses offered through the University of Tennessee at Martin (n=78). The timeframe of the study was from January 20, 2006 through March 10, 2006. The study involved use of a one-shot questionnaire. The questionnaire was designed using Dragon software so it could be made available for online distribution. Participants were notified by e-mail and asked if they would participate. Persons who did not respond to the first e-mail were e-mailed a second time and everyone was provided with a link to the questionnaire. Eighteen e-mails were returned as undeliverable resulting in a population of 60 which could respond to the sampling. Thirty three students completed the survey resulting in a 55% volunteer response rate for those students able to participate in the survey. Analysis using the Wilcoxon Signed-Ranks Test revealed significance at the .05 level in four factors relating to motivation and in one factor relating to design. Additionally, a trend was noted whereby females had a higher drop rates than males. A follow up qualitative study involved a focus group of graduate and nongraduate students at Light and Life Bible College and the Light and Life Graduate School of theology in Butuan, Philippines in May 2008 with the student feedback compared the quantitative findings in the earlier portion of the study of the more informal student observations reflecting the students' perceptions of aspects of online learning which they found most conducive to study.

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INTRODUCTION

Online education through use of the World Wide Web has changed the face of education by extending the reach of educational programs and allowing persons who may not have been formerly able to pursue educational opportunities to become active participants. The semantics to describe the phenomena may vary; however, in general, Blotzer (2000) notes that distance learning is any event where the learner is not required to travel to a specified location and the training is delivered electronically. This can further be broken down into how the training is received. Online training can include computer-based training (CBT), Web-based training (WBT), computer-based instruction (CBI), and technology-based instruction (TBI) (Blotzer, 2000). Downing (1988) points out that online training, internet-based training, and web training are often synonymous in literature.

The online education approach offers a variety of advantages both in the academic and corporate sectors. This approach reduces training and travel costs and also enables the educator to quickly reach larger geographically dispersed audiences (Persun, 2000). Carliner (1999) notes, it is not only valuable for educational degree programs, but can also be used for employee orientation, basic skills, as supplements to classroom training, training mandated by business, refresher courses, software training and quality control education. Cost is another area where online training or education provides benefits. With globalization, many international organizations use distance education to keep up with the fast changes affecting businesses. Doug Stefano, director of e-learning for international accounting consultancy, KPMG, estimates that KPMG's web-based learning programs cost 70 percent less than traditional training and can be completed more quickly (Dobbs, 2000). IBM used online learning to avoid more than \$80 million in travel and housing expenses in 1999 (Delio, 2000).

Multiple authors highlight advantages offered through online training (Glener, 1996; Hall & Brown, 2000; Dobbs, 2000; Abernathy, 1999). Online modules are updated easily, are inexpensive to create. They can also be constructed in one location and conducted simultaneously at many locations. Learners can complete sessions at their own pace and repeat them as often as needed to reinforce learning. Learning can be done personally and can be asynchronous (taken at any time). Audio and video elements in online lessons in addition to narrative can further enhance learning.

There is however a major disadvantage with online education versus traditional classroom instruction. While more than 90 percent of those who chose classroom training complete their experience, an average of only about 50 percent of self-paced web learners complete their courses (Zielinski, 2000). The American Society for Training and Development (ASTD) has studied why employees drop out of training before completing the courses and have identified the factors influencing drop out which include: Environmental factors, design factors, technology factors, and motivational factors (Zielinski, 2000).

Lack of management support, noise, interruptions, distractions, work demands, time issues, lack of social interaction, and inadequate planning are identified in literature as “environmental” obstacles affecting online class completion rates (Delio, 2000; Carliner, 1999; Zielinski, 2000; Parks, 2001; Jiang, 1998; Harris, 2000). Hoyer and Southard (2006) found that among the 40 and younger age group, environmental issues were a significantly higher influence for not completing courses than for 41-50 year olds, but there was no significant differences between the 40 or younger group and those older than 51.

Another obstacle to completing online coursework is design. The design of the course needs to take into consideration the learning styles of the participating students (Carliner, 1999). The online environment demands clear instructions and feedback mechanisms. Also, boring or text-heavy instructions can negatively impact student participation. The online setting is more intense than the traditional classroom and any errors in instruction or failure to provide feedback is magnified compared to the traditional class setting. United States Department of Defense (DOD) studies on evaluation of technology-based (online) training suggest that online training needs to be more learner-centered and have outcome-based results rather than tests for evaluation (Van Buren, 2000)

Technology obstacles have also been shown to affect student completion of online studies. Technical obstacles could include such things as media choice and even network or bandwidth equipment incompatibility. Literature suggests that if a student encounters repeated technical difficulties, regardless of how good the content of the course is, frustration will drive the student to disengage from the course (DLRN-J: *The Electronic Journal*, 1998). Although many of the problems in this area are being remedied with the advent of new technology, the use of audio and video within online courses can put a strain on Wide Area Network (WANs) or intranets and bandwidth. Voice transmission can be garbled, video’s can start and stop, and shared applications can flicker or slow down when streaming media competes for bandwidth on a network with other data intensive applications or uses such as e-mail (Cisco Systems, 2001). Even with such problems the demand for such uses is increasing. According to the Gartner Group, from May 1999 to October 1999 the quantity of streaming audio sent over the Internet grew by 487 percent, while streaming video grew by 299 percent compared with the previous six months (Patrizio, 2000). Regardless of how much such innovation could enhance the student’s learning experience, if the technology does not work, the student’s desire to complete online coursework can be negatively impacted.

Motivational obstacles also influence completion rates. Motivational obstacles mentioned in literature include areas such as: lack of reinforcement or incentives. Self-efficacy issues, learner communication styles, and learner preferences. If incentives are included in online training there is an increase in test scores, retention, and user satisfaction (Ball, 2000). Self-efficacy relates to a person’s internal ability to deal with or control their environment. Brown (1999) developed a theory regarding how learners use self-efficacy during training. The author suggests that learner goals, attitudes toward content, self-efficacy for learning the content and using the technology are a precursor to two choices the learners must make during the training. The two choices involve strategy and effort, which influence knowledge gain and post training attitudes such as applying the learning

in the work environment. Learner communication style and preferences also relate to a student's motivation to complete a course. According to some authors, students find it more difficult to provide feedback in written form than to provide similar feedback orally in a traditionally classroom. Therefore, hesitation in using even using good learning software can affect student motivation for completing a course (Boehle, 2000; Vuepoint & Carlson, 2000).

PURPOSE

The improvement of online learning and approaches taken to facilitate it is of major importance not only to students enrolled in such courses, but also for academic institutions, corporations, and organizations who are turning to this as an effective vehicle to reach a larger and more diverse student body or to maintain their competitive edge in an increasingly competitive world with a global economy.

The purpose of the research presented in this paper was to determine factors influencing those who have dropped out of online courses offered through the University of Tennessee at Martin, compare those factors to focus group feedback, and to use the results of the study to improve the program and to better serve the students. By learning why students have withdrawn from courses, we can also better determine what works in online learning.

METHODOLOGY

A census was taken of students who dropped out of online courses offered through the University of Tennessee online program during spring semester from January 20, 2006 through March 10, 2006. Out of a possible 78 who had dropped courses, 60 were able to be sent e-mails notifying them of the survey and asking them to participate. Initially 24 students responded and a second e-mail was mailed to persons who had not responded resulting in 33 students participating from the 60 who were able to be contacted. The final usable "n" was 29 since four could not be used since the survey was not completed in its entirety by four students. The statistic used for analysis was the Wilcoxon Signed-Ranks Test requiring the pairing of data so surveys with missing data were unusable. The one-shot survey questionnaire used in the study was one which was modified from a former online completion factor study (Southard, 2000). The questionnaire was designed using Dragon software so it could be posted on the internet and filled out there. The link for the survey was distributed using the university e-mail system. The survey instrument used in the study was a questionnaire containing questions on demographic areas such as sex, age, race, position, number of courses dropped and Likert Scale questions about online courses pertaining to: 1) environment, 2) course design, 3) technology issues, and 4) learner motivation. Data from the completed survey was transferred into a Microsoft Excel

spreadsheet. Once data transfer was complete, all data was transferred from the Excel file into the StatView Statistical Package for statistical analysis.

RESULTS

Twenty nine of the surveys were used out of the 33 surveys received because the Wilcoxon Signed-Ranks Test statistic required for the study required the pairing of elements for analysis making surveys with missing data void for analysis.

SAMPLE PROFILE

Table 1 reveals sample demographic profile information regarding gender, number of participants, and average number of courses taken online, average number of online courses completed and average age. Of those surveys which were used for analysis, twenty three (79%) of the 29 respondents were female and six (21%) of the respondents were male. The average age of the male respondents was 44.5 while the average age of the female respondents averaged 9.1 years younger at 35.4 years. Both males and females in this survey completed a similar number of online courses with males having completed six courses on the average and females completing an average of seven. The number of courses dropped on the average by gender revealed major differences. Males on the average dropped .83 classes while females had a higher drop rate of 1.65.

Table 1
Sample demographic profile

Gender	Number of Participants	Percent of Sample	Ave. No. of Classes Taken	Ave. No. of Classes Dropped	Ave. Participant Age
Male	6	21	6	.83	44.5
Female	23	79	7	1.65	35.4

Table 2 shows the participant racial profile of the survey participants. The distribution of females in the study by race was 15 Caucasians, six African Americans and two Orientals. Distribution of males in the study by race was five Caucasians and one African American.

STUDY PROFILE

The survey instrument used Likert-type questions to assess the respondent's views regarding the four main factors (Design, Motivation, Technology, and Environment) revealed in the literature as obstacles to completion of online education. A mean of 3.0 was considered to be neutral while 5.0 indicated the

highest level of dissatisfaction and 1 indicated the lowest level of dissatisfaction with the item listed.

Table 2

Sample participant racial profile

Gender	Caucasian	African American	Oriental
Male	5	1	0
Female	15	6	2
Totals	20	7	2

Items assessing the four factors were modified from those developed by Southard (2001). Dissatisfaction with the environment factor was tested using survey items 1, 2, 3, 4, and 5. Dissatisfaction with the technology factor was tested using survey items 6, 7, 8, and 9. Design was assessed using items 10, 11, 12, 13, and 14. The survey factor was represented by items 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, and 26 (note Appendix 1).

The analysis statistic used in the survey to test for the significance of the items making up the factors was the Wilcoxon Signed-Ranks test which uses a z value to make comparisons. The cut off value was set at 5% level using a one-tailed test and a critical z value of 1.645. The completed survey revealed the highest level of dissatisfaction was item 19 on the survey with a score of 95. Using the Wilcoxon Signed-Ranks test and comparing z values to make comparisons, four additional items when compared to item 19 had z-scores below the critical value of 1.645 at the .05 level of significance suggesting they were statistically comparable in value to item 19. All other items did not fall below the critical value, hence they were statistically different than the value of item 19, are shown in Table 3. Significantly comparable motivational items affecting completion rate of online courses in this survey included: Item 19, “Home demands/responsibilities affected by ability to complete the online course(s); Item 18, “Work demands/responsibilities affected my ability to complete the course(s); Item 20, “Not being able to schedule enough time to take the course affected my ability to complete the online course(s),” Item 23, “Before taking an online course I was apprehensive about taking online classes.” One design item was identified significantly comparable in dissatisfaction. Design item 14, “The course failed to encourage my interest in the way it was designed” fell below the critical value and was comparable to the other high items of dissatisfaction.

Table 3

Significantly comparable items affecting online course completion rates

Item	Factor	Description	Score	z * value
19	Motivation	Home demands/responsibilities affected my ability to complete the online course(s).	95	Baseline for Comparison
18	Motivation	Work demands/responsibilities affected my ability to complete online course(s).	94	-.102
20	Motivation	Not being able to schedule enough time to take the course affected my ability to complete the online course(s).	92	-.502
23	Motivation	Before taking an online course I was apprehensive about taking online classes	91	-.336
14	Design	The course failed to encourage my interest in the way it was designed.	79	-1.512
*The critical value of significance of a one-tailed test at the .05 level is a z value of 1.645. Values below this critical value indicated they were significantly comparable.				

During May 2008 the author was involved in working with a focus group of graduate and undergraduate students in Butuan, Philippines as part of an effort to assess the possibility of converting some of a college and seminary's curriculum to web-based instruction. Although, undoubtedly there were cultural differences, and focus groups cannot be generalized, it is interesting to compare the students' perceptions with those identified above as significant factors in the initial quantitative study. Design could not be considered as it is at the preliminary construction stage, but the main negating factor of utilizing online study appeared to be technology. Motivation is high as approaches to education used now involve high cost and relocation; whereas; web-based delivery would reduce costs, even if some travel was involved to more localized training centers. The students at Butuan are also in a situation where education is not seen as a right, but a privilege. Therefore, they appear to be more motivated as learners. As the system there matures, it will be interesting to see if technology becomes less a concern and motivation and environment parallel more closely the situations stateside.

CONCLUSION

Although technology and environment were not identified as significant factors in this study in relation to failure to complete online classes, the significantly comparable findings in this study for motivation and design were consistent with earlier studies cited in the Introduction which showed that design, motivation, technology, and environment can be obstacles to completion of online studies. In this particular study motivation appeared to be the dominant comparable dissatisfaction factor with four items that were comparable, followed by design with one item comparable to item 19 used as the standard. As noted earlier, the selected items listed in Table 3 were selected because they were deemed similar and were not significantly comparable to others in this group. All other items were deemed to be significantly different from this selected group and therefore they are not being discussed because they did not reach the prescribed level of dissatisfaction established by the baseline or standard item 19.

Self-efficacy which relates to a persons ability internally to deal with or control their environment is seen to be a motivational obstacle. All four motivational items identified in Table three as obstacles to completing online learning in this study could appear to relate to self efficacy. Brown (1999) has highlighted the importance of self efficacy a precursor to choices the learner must make while doing training; specifically the strategy chosen by the student and the effort expended. Ball (2000) has also stressed within motivation, the importance of learner style in motivation to complete coursework. Other authors have noted how student hesitation in using software can affect motivation for course completion (Boehle, 2000; Vuepoint & Carlson, 2000). This could explain the presence and importance of motivational item 23 (Table 3) in the findings of this study.

One design factor in this study appeared comparable in dissatisfaction to the baseline item, Item 14 “The course failed to encourage my interest in the way it was designed.” Although many teachers today have access to help in designing their courses, several authors have found that many teachers are not equipped to integrate technology into their curriculum (Beckett, Chisholm, and Wetzal, 2003). Considering the multiple obstacles that exist in completing online classes, it is intuitive that maintaining student interest is critical in ensuring that students are encouraged to complete the courses they begin.

RECOMMENDATIONS

The two areas showing the highest levels of dissatisfaction in this study were motivation and design, with motivation having four significantly comparable items and design having one. Motivation is an area which the student controls; whereas, design is an area controlled by the teacher, the designer and the institution. We will focus on each area separately. Some research suggests that student-instructor personal interaction, student-student personal interaction, and

student-content interaction along with the students perception of the delivery features and gender are all predictors of course satisfaction (Chang and Smith, 2008).

As noted earlier, the four elements identified in motivation appear to involve self-efficacy; the ability one has to internally deal with his or her environment. In many cases the students who take online classes cannot control much of their environment. Families or bosses are often either supportive or do not support the student's efforts and often distractions can be rampant within the learning environment of the student. However, it has been found that as long as students have the skills to use the online tools, and if they perceive the education is useful and provides a flexible way of learning, they experience enjoyment from online instruction (Sahin & Shelley, 2008). Although these are environmental factors, how the students respond to them (self efficacy) is a motivational factor. Self-efficacy has been recognized as an integral part of a person's learning style and a way in which a student orients himself or herself to the material (Brown, 1999). Perhaps one way to increase the student completion rate of online classes would be to prescreen applicants to online programs to identify their levels of self efficacy. Self efficacy scales are commonly available and most involve less than a dozen items. If low self efficacy was evident, perhaps the student could be counseled ahead of time to prepare him or her for the rigors of online learning. Additionally, in line with such counseling, perhaps the student could be made aware of the importance of establishing and controlling the setting where the study takes place through proper selection of time and location to facilitate learning. Such testing would identify students who might potentially have problems and prepare them to take active charge of their learning experience. It is noted however that as distance learning has become more popular and common, increasingly students express high degrees of satisfaction in participating in such courses. Borstorff and Lowe (2007) found in a study of 113 business students that 88 % of them had reported a positive online learning experience while 79 % would recommend online learning to others. Eighty Eight percent said they would participate in online courses in the future.

As noted earlier, design is within control of the teacher, the designer and even the institution offering the coursework. That does not mean that there is a common solution for this difficulty. There are varying learning styles and what one student considers engaging may be boring to another student. Possibly, one solution might be in encouraging students and teachers to increase interactivity of the sessions and take into consideration multiple learning styles. One difficulty with this however is that researchers have reported that many teachers are not very well equipped in integrating technology into their curriculum (Beckett, Chrisholm, and Wetzel, 2003; Shieh, Gummer, & Niess, 2008). However, one way to deal with this would be to encourage teachers to take advantage of grants available to improve their abilities to design courses. Some governments are supplying grants for teacher training to improve the teachers' abilities to take advantage of technology in education (Burns, Martinez, and Abrego, 2003). Another way to compensate for this shortcoming would to involve professional

designers as part of the team to assist the teachers in preparing their course materials. This would have to involve the support of administration in recognizing the importance of this effort and in supporting it financially.

Although there was a general gender trend noted in this study with females more inclined to drop courses than males, the paucity of data within the cells leads one to exercise caution when making any predictions based on this study. However, it does raise an interesting question for further study. If there are gender differences in completion, this might be another area where counseling before and during the course may assist students in achieving higher completion rates.

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