

An Assessment of Technology Enhanced Learning Environments

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Abstract

Understanding technology – enhanced learning in a world that demands opportunities for continuous learning, flexibility, convenience, and accessibility (Pantazis, 2002) is growing increasingly important to universities of all types. It is necessary to evaluate and assess the effectiveness of technology delivered learning in order to identify how technology enhances or detracts from learning. This study compares two cohorts of students' learning outcomes from one class; a cohort that received its learning primarily through technological means only and a cohort that received its learning through technology while maintaining direct access to the classroom instructor. There was no significant difference in learning between the two cohorts, however there were distinct differences in comfort with the technology used in and outside the classroom.

An Assessment of Technology Enhanced Learning Environments

Technology – enhanced learning is a growing venue for providing education in a world that demands opportunities for continuous learning, flexibility, convenience, and accessibility (Pantazis, 2002). As institutions expand the e-learning opportunities for students, it is important to evaluate and assess the effectiveness of these venues in order to identify how technology enhances or detracts from learning. This study compares two cohorts of students' learning outcomes from one class, one a group of distance learners and the other not. Following, is a review of the literature on technology- enhanced learning specifically focused on distance learning opportunities, which include synchronous and asynchronous venues.

Distance learning has been defined as a “kind of teaching method in which the teacher and students (e.g., learners) are separated from each other by place and/or time” (Offir & Lev, 1999, p. 132). Methods used for technology – enhanced learning include both synchronous and asynchronous opportunities which may employ any one or more of the following: CD-ROMS, web-based courses, web-based discussions, one-way and two-way satellite videoconferencing, mail lists, email, or video recording of the class (Bloom & Hough, 2003; McNames, 1998; Offir & Lev, 1999).

Among the various research studies conducted on distance learning, several common themes appeared. These themes can be categorized as follows: effects on academic performance (North Carolina State University, 2004; Offir & Lev, 1999; Pitcher, Davidson, & Goldfinch, 2000), teacher-student and student-student interaction (Beattie, Spooner, Jordan, Algozzine, & Spooner, 2002; Lafuze, Osborne, & McDaniel, 1998; McCormick & Austin, 1998; McNames, 1998; Mottet, 2000; Offir & Lev, 1999; Pitcher, et al, 2000; Ranieri, 1998), faculty preparedness (Beattie et al., 2002; Bloom & Hough, 2003; Latchman, Salzman, Gillet, & Bouzekri, 1999; Offir & Lev, 1999), and technological issues (Bloom & Hough, 2003; Lafuze et al., 1998; Pitcher, et al, 2000).

Several studies indicate there is no difference in the academic performance or amount of learning that takes place between distance learning and the typical classroom setting (Moore & Thompson, 1997; North Carolina State University, 2004; Offir & Lev, 1999; Pitcher et al., 1995). For example, exam scores in one study (Pitcher et al., 2000) indicated “students had in no way suffered academically as a result of the videoconferencing” (p. 206). The Project 25 pilot study (North Carolina State University, 2004) also found that there was no statistically significant difference in academic performance between students in web-based learning environments and those in classroom-based settings. Storck and Sproull (1997) found in their study of what students learn in videoconferencing that there was no difference in learning as measured by course grades between those students who were remote and those students onsite. The review of literature on the effectiveness of distance learning by Moore and Thompson (1997)

indicated that in most cases there was no difference in academic performance and learning between remote and onsite students.

Another common theme that surfaced dealt with the interaction between all the constituents in a distance-learning environment. This includes teacher-student interaction, as well as, student-student interaction and how interaction, lack of interaction and perceptions affected participation. For example, Offir and Lev (1999) found that increased interaction between teacher and student increased the effectiveness of distance learning. LaRose and Whitten's (2000) study on teacher immediacy in distance learning also found that student learning is motivated when students and teachers respond to one another via email or in web-based group discussions because it provides an opportunity for interaction. Providing multiple venues for communication like email, web-based group discussions, giving prompt feedback, utilizing the beginning and end of class and breaks to meet and greet students, and creating an atmosphere of sharing can aid in helping students and teachers feel connected and result in enhanced learning (Beattie et al., 2002; LaRose & Whitten, 2000; McCormick & Austin, 1998; McNamers, 1998).

Interaction between the offsite and onsite students is another important factor in distance learning. A lack of immediacy between the students at both sites may result in less interaction between onsite and remote site students in synchronous (videoconference) settings (Pitcher et al., 2000). Typically, onsite students were more likely to ask questions during the videoconferencing sessions than those students offsite. Pitcher and colleagues (2000) noted that the offsite students never asked questions during the lecture, they waited until after class to ask questions of their on-site tutor. However, even onsite students may be hesitant to ask questions during the lecture because of the strangers (remote site students) that were present (Pitcher et al., 2000). The effects of student immediacy in asynchronous settings such as web-based discussions would be helpful for instructors as well.

Another aspect of interaction pertains to perceptions of students and teachers in distance learning settings, specifically as it relates to nonverbal communication (Lafuze et al., 1998; McCormick & Austin, 1998; Mottet, 2000; Pitcher et al., 2000). The inability of students to see the instructor and vice versa can be unsettling. Mottet (2000) conducted a study in which he explored "the relationship between interactive television instructors' perceptions of students' nonverbal responsiveness and the influence of those perceptions on distance teaching" (p. 146). He found that the ability to receive both visual and audible nonverbal cues increased not only the positive perceptions of students, but the distance teaching process as well. The more nonverbal responsiveness the instructor perceived while teaching resulted in positive impressions of the students, positive perceptions of his/her teaching effectiveness and satisfaction, positive perceptions of teacher-student interpersonal relationships, and preference for teaching in an interactive television setting versus a regular classroom setting. Understanding the relationship between nonverbal responsiveness and the resulting perceptions of students and distance learning can be helpful for instructors as they consider how to create interaction in this environment.

Since interaction between students at the two sites and between the instructor and students is important, intentional planning is required. The instructor has to consider how to facilitate communication and interaction not only between himself/herself and the students at both sites, but between the two sites as well. This is just one aspect of distance learning that relates to faculty development/preparedness for teaching with technology, another emergent theme in the research.

Without exception, the research shows teachers have found that distance learning requires more extensive preparation, planning, time and technological knowledge than teaching in a classroom-based setting (Bloom & Hough, 2003; McNames, 1998; North Carolina State University, 2004; Pitcher et al., 2000). Ranieri (1998) says that course development for distance learning “seemed to require each class session to be planned in advance, to the minute” (p. 2). In addition, technology continually changes; so needless to say, the task of teaching using technology can appear daunting.

Faculty knowledge about technology, and his/her comfort in using technology were two of several factors, which were found to affect student satisfaction in distance learning (Bloom & Hough, 2003). Although the construct for planning a class may not change (evaluate the needs of the learner, articulate objectives and goals for the class, and decide on method of delivery), the factors to be considered and personal learning required to achieve the desired end has changed. For instance, the instructor will need to consider his/her own technological experience as well as that of the students (onsite and offsite). The instructor will also need to be familiar with the technology that is available to him/her and make decisions about how the content will be delivered. The combination of learning how to use the technology and managing the student learning experience can be quite a challenge and require a great deal of effort and time. However, as Pitcher et al. (2000) note, the time spent on those activities should diminish with experience.

Technological issues were another common theme. Although technology is the means that enables distance learning to exist, when there are technological quirks the result is often frustrated students and faculty (Bloom & Hough, 2003; Lafuze et al., 1998). The technology challenges that were identified involved inclement weather, lack of experience and familiarity (faculty and student) with the available technology, lack of technical support, blocked access to available web resources, system outages, and faulty equipment (Bloom & Hough, 2003; Lafuze et al., 1998; Pitcher et al., 2000; Ranieri, 1998). Lafuze and colleagues (1998) suggested that having “technical difficulty” backup plans, an expanded syllabus, a detailed workbook, and videotaping the sessions could address many of the technological issues. Once again, time to prepare and plan becomes an issue.

Technical difficulties are inevitable. Although instructors can be proactive by coming up with alternate plans in case of technical trouble, as one instructor puts it, “patience and a sense of humor are vital to success in the virtual classroom” (McNames, 1998, p. 4).

Although there are many challenges to consider when implementing distance learning, they are not insurmountable. Further research in the field of technology-enhanced

learning will benefit institutions, faculty, and students as we continue to learn what enhances and hinders distance learning.

Because distance learning is here to stay, institutions are faced with utilizing technology in the education of adult learners. The Information and Technology Department at the study institution has been commissioned with the responsibility for the institution's overall technology-based development, implementation, and support. Their objectives include (North Carolina State University, 2003):

1. Developing exceptionally competent and efficient learners who adapt readily to changing learning and research environments.
2. Assuring quality-learning experiences at a distance and map strategies via which high quality education at a distance diffuses innovation into on-campus learning activities and vice-versa.
3. Providing enterprise level instructional systems and facilities that support teaching and learning.

In an effort to determine if the department is accomplishing their objectives, the following assessment outcomes (Bresciani, M.J., Shockley, D. R., Zelna, C.L., 2003) were articulated for the study cohort and thus serve as the study's overarching research questions.

1. The students' learning will be enhanced through participating in a synchronous videoconferencing environment. (Objective 2, 3)
2. The students' learning will be enhanced through the implementation of supplemental assignments and discussion that are delivered using web-based technologies. (Objective 2, 3)
3. The students are comfortable participating in a technology-enhanced learning environment. (Objective 1)
4. The transfer of learning will be comparable between the students receiving instruction at the host site and those receiving instruction at the remote site . (Objective 2, 3)

The purpose of this pilot study is to compare two cohorts of students' learning outcomes from one class; a cohort that received its learning primarily through technological means only (e.g., a distance learning cohort) and a cohort that received its learning through technology while maintaining direct access to the classroom instructor with the exception of two classes where the instructor delivered the lectures from the remote site so that students in the on-site cohort could experience what it was like to not have the instructor accessible before, during, and after class.

Method

Participants

Following university guidelines and obtaining informed consent, twenty graduate students (11 men and 9 women) were invited to participate in the study. Ten students were onsite and ten students were at a remote location. Students who chose not to participate in the study were not penalized. All but four students chose not to participate, one was from the onsite location and the other three were from the remote location.

Procedures

A constructivist-based qualitative assessment was developed to gather data from the viewpoint of students engaged in a technology-enhanced graduate course. The constructivist paradigm, a qualitative methodology that allows the inquirer to gain access to the contextualized experiences of another's life, was utilized in an effort to develop a more comprehensive understanding of the value, strengths, and weaknesses of the technology systems available at "study institution" (Stake, 1995; Caffarella, 2002). Constructivism is a philosophy of learning centered on the premise that we construct our own understanding of the world through life's experiences. The constructivist approach to assessment is goal-free, in that each individual constructs his or her own version of reality.

The constructivist paradigm perceives learners as interpreting what they learn individually and experiencing learning outcomes that differ for each individual. During the 1980's, Lincoln and Guba (1989) added a fourth phase to their evaluation model, a phase, which is best, characterized as a "responsive constructivist evaluation model" (p. 38). They state, "Fourth Generation evaluation is a form of evaluation in which the claims, concerns, and issues of stakeholders serve as [the] organizational focus, which is implemented within the methodological precepts of the constructivist inquiry paradigm" (Lincoln & Guba, 1989, p. 52).

To analyze the impact of technology-enhanced learning environments utilized at this institution, five constructivist-based assessment activities were administered.

Measures

Assessment Activity One

The students were asked to maintain journal responses to open-ended questions throughout the semester (Appendix A). The questions were designed to prompt the individuals to discuss their positive and negative experiences with the technologies utilized within the course. The responses to the journal questions were open-coded in order to examine the emerging themes relative to technologies available on campus. (Outcome 1, 2, and 3)

Assessment Activity Two

The students participated in focus groups to further explore the open-ended questions utilized within the journal assessment activity (Appendix B). The students located at the

host site participated in a focus group discussion facilitated by Dr. Carrie Zelna, Assistant Director of the office sponsoring the research, while the students located at the remote site participated in a focus group discussion facilitated by one of the graduate students, a participant-observer. To increase the reliability of the focus group discussions, a set of focus group facilitator guidelines (Appendix C) were developed and reviewed by each facilitator, and the sessions were videotaped in order to verify the notes taken from each session. The tapes were transcribed and data gained from the focus group discussions were open-coded in order to examine the emerging themes relative to technologies available on campus. (Outcome 1, 2 and 3)

Assessment Activity Three

The instructor kept a journal recording her comfort level about using technology in the course (Outcome 1, 2, 3, and 4). The instructor's journal was open-coded to determine technological comfort issues.

Assessment Activity Four

The students completed a self-assessment pre-test that was administered at the beginning of the semester and a self-assessment post-test that was administered at the completion of the semester. The data gathered from these tests were open-coded in order to holistically evaluate the possible differences between the students located at the videoconferencing host site and the students at the remote videoconferencing site. (Outcome 1, 2, and 4)

Assessment Activity Five

The students were required to complete two final course projects, 1) an oral presentation of their assessment project utilizing the enhanced learning technologies available in the videoconferencing centers at the host and remote sites and 2) a final written assessment plan. The data gathered from these assignments was open-coded in an effort to holistically evaluate the possible differences between the students located at the videoconferencing host site and the remote videoconferencing site. (Outcome 1, 3, and 4)

Findings and Discussion

(Can we incorporate more literature into this section?)

The following is a summary of the findings as they relate to the intended outcomes of this course. Each measure was compiled and analyzed in order to determine whether the intended outcomes were met. Thus, the findings and discussions are organized around each outcome.

1. The students' learning will be enhanced through participating in a synchronous videoconferencing environment. (Objective 2, 3)

Evidence compiled from three of the five aforementioned measures (e.g., assessment activities one and four had inconclusive evidence due to non-responses and minimal participation), supports that remote site students' learning was enhanced through participating in a synchronous videoconferencing environment, however on-site students believed their learning was not enhanced by the synchronous videoconferencing environment. Yet, the on-site students' final projects met the evaluation criteria for course learning outcomes to the same extent as the remote site students. Thus, while on-site students overall felt that the videoconferencing environment was a distraction to their learning, their documented artifacts of learning did not confirm this belief.

While the remote site cohort experienced similar concerns about quality of the synchronous videoconferencing environment, their expressed belief that just having the opportunity to participate in the class enhanced the remote cohort groups' learning. Without the opportunity for distance learning, the remote cohort group reported that they would not be able to participate in the doctoral program. The opportunity to participate in the learning environment exceeded the remote site's discomfort with the quality of their technological environment. In addition, the researchers noted that the remote site had been taking classes as a cohort in the same location for almost three years. The comfort level with technology delivered learning may have increased during this time, and may have resulted in their developing coping skills to address any disadvantages they may have felt with the technology earlier on.

Personal and professional growth also took place in this environment. One student mentioned that she has learned to adapt to the distance-learning environment and when she takes another one, she can do some things differently. Another student indicated that this experience enabled him to better identify with and relate to the students he encounters in his job in student affairs. Finally, one onsite student said:

...it gave me a greater appreciation for what they're [remote cohort] going through there because I would have had no idea what some of their concerns were, some of their problems and with how we dealt with them. They told us some of the same things: they couldn't hear us, and they couldn't see us. But until we experienced that, I had no idea. And so now I think there are little things that I think I'm doing differently now in order to help, or to realize, okay, they're still reading this or they're still trying to decide what's on the PowerPoint before they can respond, and things like that. That maybe I didn't appreciate before.

2. The students' learning will be enhanced through the implementation of supplemental assignments and discussion that are delivered using web-based technologies. (Objective 2, 3)

Both cohorts had their assignments delivered in the same manner, however, on-site students had access to the instructor before, during, and after classes, except for the two classes where the instructor traveled to the remote site to deliver the lectures. Thus, on-

site students tended to ask questions directly to the instructor rather than posting those questions on the on-line discussion board and in their journal assignments.

While student perception varied, there was less actual participation from the on-site cohort in the discussion postings and there was very little interaction between cohorts on on-line discussions topics. Where there was greater interaction between cohorts, it was between members who had met each other in a course the previous summer, when the remote site cohort had traveled to the on-site campus for in-person instruction. As one on-site student stated:

I haven't liked the WebCT for this class this semester. For me it's something else to do and I'm not getting anything out of it". In fact, most of the remote cohort did not post anything to the discussion board unless it was in response to the onsite student they did know because they "didn't know them [onsite students].

From the student's perspectives, the onsite cohort appeared to encounter more technological quirks than the remote site. However, the instructor journaled that the remote site cohort had less sophisticated technology, and thus in her opinion, had more technological challenges to overcome. Yet, seemingly, the remote site cohort found it difficult to print and download material from WebCT. For instance, printing the PowerPoint notes was a challenge to one student who found that they would only download in "Chinese". The overall complaint with WebCT from the onsite cohort was that it was not user friendly.

However, that same cohort mentioned the value of the resources made available via WebCT. One student stated:

I think having all the other resources available through WebCT, stuff to download, the different rubrics, all the different things beneath the content module that she has that's very nice. I really like the fact that she uses those rubrics so you really know what's expected of you. You can look at the rubrics and see how she's evaluating certain things, what she's looking for. It gives you a whole lot more guidance in terms of how you're to respond to different things.

Both cohorts agreed that the PowerPoint lecture notes seemed to enhance student learning. Many students articulated that having the PowerPoint notes helped with note taking. For example, one student articulated it this way: "It allows you to concentrate. ... you can engage in the conversation, you can participate, and you're just writing down highlights, or clarifying points". Others mentioned how the PowerPoint provided a framework for the class and focus, so the class could stay on task/topic.

3. The students are comfortable participating in a technology-enhanced learning environment. (Objective 1)

The results of the study indicate that there were varying levels of comfort with regards to participating in a technology-enhanced learning environment. Overall, as previously mentioned, the students at the remote site seemed far more comfortable with a distance-learning environment than those students onsite. The remote site had far fewer comments regarding technology than the onsite students; whereas the onsite students commented more frequently about the technological challenges and quirks they faced.

Again as mentioned earlier, one reason for the discrepancy between the two sites may be the fact that this was the remote site's third year of classes together in a distance-learning environment. As one remote site student articulated, "I think we've all learned to adapt well enough to be successful at this. I think that says something for the technology, the people operating that technology and whatever the problems are we've figured a way around them". The cohort's familiarity with distance technology in comparison to the onsite group's comfort was a source of frustration, as one student stated:

I get annoyed when we're the pros when something happens in Raleigh ... or they can't deal with it or they [say]... 'Yeah just deal with it and go on'. I think that's the frustration of being the pros and having done this so many times.

The lack of interaction, immediacy or affinity between the two sites and with the instructor influenced various aspects of the class. For example, the remote site students did not post responses to the WebCT discussion board because they "didn't know them [onsite students]".

The common frustration with technology that both sites indicated in the focus group discussion was how interaction between the sites was impeded by the delay in transmission. The delay can be frustrating because if you are at the remote site and want to respond there is a 10 second delay so by the time a student begins to answer, often he/she interrupts someone onsite who has already started answering the question. Often remote site students will give up after trying to ask a question because "it is too hard". This may be frustrating for all parties since the delay prevents people from following the "normal" turn taking patterns in conversation. This also may be one reason that a few of the remote site learners felt there was an "us vs. them" mentality.

Both sites indicated that when the instructor was not physically present, they found it more difficult to engage in discussion and ask questions than vice versa. For example, one student said, "... I felt ... when she was out there; the other class seems to be leading the direction of the discussion. And so you feel less able to ask questions or get really complete responses and so you just feel disassociated with what's going on".

Another interesting observation regarding comfort level with technology relates to the instructor's level of comfort with the technology. The instructor's journals illustrated her high level of discomfort with the technology and the further discomfort with the taping of the courses. Student's noted it as well as one student voiced, "It seems like Dr. *Name* even struggles with that, where to look and where to put the eye contact." If the instructor is not comfortable with the technology, then it may affect the students. One student

pointed out that if both the cohort and the instructor are inexperienced with the technology, it might be difficult for the cohort to adjust or adapt. As mentioned earlier the instructor's knowledge about technology, and his/her comfort level with the technology were factors found to affect student satisfaction in distance learning (Bloom & Hough, 2003).

While the department offering the course provided the instructor with a graduate student to assist her with her own training to use the technology, assistance with WebCT postings, and assistance with operating the classroom technology, the instructor reported to remain very conscientious of her technological limitations as well as the concern over the courses being taped. Interestingly, what the students both in their on-line journals and in the focus groups commented on was the instructor's concern about the classes being videotaped and archived. One student stated:

“It was actually kind of amusing, and I can understand why, several times Dr. Name restricted what she was going to say because she knew that she was being taped. She had done that quite a few times actually. And probably for good reason. But it probably restricts her maybe from being natural and how she might be without being taped. Actually, I did the same thing. We had a discussion, with Dr. Name and she knew the situation I was talking about but she was asking me about it and I didn't feel like I could...she could read my body language and say “okay, more later, I can't tell you everything right now; it's being taped and I don't feel comfortable.” That was just one incidence for me.”

Planned group projects for the course became more limited as the semester progressed as students had difficulty engaging across the cohorts in-group report-outs. The instructor noted that she became as tense as the students when she tried to assign cross-cohort group discussions. She further reported that the students were delighted to find out by the fourth class that the instructor had abandoned any attempt to continue such cross-cohort conversations in small groups.

4. The transfer of learning will be comparable between the students receiving instruction at the host site and those receiving instruction at the remote site. (Objective 2, 3)

There was no significant difference in the holistic evaluation of the scoring of the students' final projects and presentations. Each student struggled in their own way with their project presentation, yet the instructor did not notice any increased comfort holistically across cohorts. While the students did not discuss noticing discomfort in wither cohort of their peers in regards to the presentations of final projects, they did comment on the oral presentation evaluation rubrics (e.g., peer evaluations of oral presentation of final projects were provided to students but did not count on the final

grade) that it was difficult to evaluate the students on all aspects of the oral presentation rubric because in some instances, the technology would not accommodate seeing both the student and the visuals. Thus, it was sometimes difficult to evaluate eye contact and use of visual aids.

The instructor's journals revealed concern about grading oral presentations where the technology did not allow her to view the students' simultaneously with the visual aids. While student presenters provided their visual aids ahead of times, in the same manner that the instructor had, the instructor found herself trying to guess which PPT slide she should be referring to when the video was only on the student's face. The instructor's journal revealed that thought her discomfort level at grading the oral presentations was high, she felt confident enough that she had seen enough of all the aspect's in each student's presentation to evaluate the presentation ethically. While the peer evaluations were not used to grade the student, in the end, they served as a "check" of the instructor's own evaluation

Recommendations for Future Research and Practice

Professional Development of Faculty

The professional development of faculty who are teaching in a distance-learning environment is crucial. As one student so blatantly put it, "...half of the instructors we've had say I've never taught on this type of technology. ...and sometimes I look at them and think did you not take the course that told you you'd be doing this or that?" Moore and Thompson (1997) state that: "That there is some evidence that the success of distance education in the schools depends largely on the effectiveness of the teacher, and that this in turn depends on the teachers' knowledge, skill, enthusiasm and commitment to the innovation" (p. 32).

Based on the current and previous studies, professional development, which includes not only the "how-to's" of using the technology, but also the "how -to's" of humanizing or creating an environment in which the distance is minimized and rapport develops between the sites would be most helpful (Beattie et al., 2002; Moore & Thompson, 1997; Spooner, Spooner, Algozzine, & Jordan, 1998). Moore and Thompson (1997) found that most faculty desired training on how to use the technology effectively, but that there was a gap in providing that type of training and development. Educating the faculty about the current technology available, modeling how to use the technology, suggesting which technology would be best for various instructional purposes, providing opportunities to practice using the technology, and discussing possible problems are possible topics to include in a technology training workshop (Moore & Thompson, 1997).

Several studies have indicated the importance of humanizing the distance-learning classroom (Beattie et al., 2002; McCormick & Austin, 1998; Lafuze et al., 1998; Moore & Thompson, 1997; Spooner et al., 1998; Storck & Sproull, 1995). Potential workshops

could include: strategies for increasing interaction between onsite and remote site students, strategies for creating cohesion amongst the cohort groups and the instructor, tips on how to facilitate communication between the sites and with the instructor both synchronously and asynchronously, input on how to structure the class in order to maximize interaction, and the opportunity to hear how fellow faculty member's have handled this aspect of distance learning (Lafuze et al., 1998; Moore & Thompson, 1997; Storck & Sproull, 1995). Storck and Sproull (1995) suggest that simply letting students know that “voice levels, interruptions for floor taking, and need for repetitions” were potential challenges in the videoconference setting could help manage expectations and make the process less stressful. For instance, forewarning students of the above could prevent the “us vs. them” mentality that can develop between cohorts.

The researchers are left with questions regarding how much professional development is required for faculty to use technology in the classroom with confidence? What are the most cost-effective methods to deliver successful technology training? How do you motivate faculty to obtain such training? What kinds of follow-up training are required? Does every faculty member need a graduate assistant to ease him or her with the transition into technology-enhanced learning environment?

(Are citations of literature are needed here)

Quality of the Technology

(Citations of literature are needed here) While professional development of faculty appears to be imperative to delivering quality technology-enhanced learning, the technology itself must indeed be reliable and dependable. If the quality of the technology is poor, the instructor will not be able to communicate his/her content in an effective manner. In other words, if the instructor is properly trained on how to use the technology and can demonstrate mastery of it, it all seems inconsequential if the technology is not in proper working order.

While students expressed concerns about the technology quirks, the instructors journal revealed that the on-site technology was far superior to that of the remote site. It seemed to the instructor that the remote site team became more comfortable with their technology challenges because they had three years to adjust to it. Yet, she reported that given the choice, she would refuse to teach in the remote site classroom because it presented such challenges that would in her opinion, inhibit learning.

Thus, the researchers pose the following questions to consider. What kinds of technology provide the most dependable means of delivering learning? Are these modes of delivery cost-effective? How does one fund the improvement of out-dated learning technology?

Managing Student Expectations for Faculty Engagement

(Citations of literature are needed here) Finally, though faculty may be trained on 21st century designed means of delivering technology-enhanced learning, are students ready to become engaged learners in that type of environment. On-site students with the

superior technology, reported higher discomfort level with the technology and they had the instructor on-site for all but two classes. While they appeared to increase their comfort level over time and reported knowing how to better approach the course the next time they enrolled in one, is there some means to assist students with their own comfort level the first time they engage with technology-enhanced learning? Furthermore, how can we identify whether technology discomfort may be a contributing variable to individual difference in learning when technology is used? If we can identify technological discomfort as an adverse factor in learning, how do we provide an intervention that will bring that student to the same level of performance opportunity as another student?

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Appendix A

EAC 779 Technology Enhanced Learning

Journal Questions

Please keep a journal throughout the semester with your on-going reflections of these questions. At the end of each week, please submit your journal entries to (insert names and email addresses). Please make sure that your entries are dated and remove any identifying marks from the journal. The instructor will not review the journal entries until the final grades have been posted and you may elect to withdraw from this study at any time during the study.

If you could please respond to the following questions based on each weeks class session:

1. What were your biggest anxieties about technology enhanced learning this week?

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2. How did the technology used in class this week seem to enhance your learning? Please consider: Powerpoint, WebCT, Internet, and the video conferencing technology. Please provide an example.

3. How did the technology used in class this week seem to detract from your learning? Please consider: Powerpoint, WebCT, Internet, and the video conferencing technology. Please provide an example.

4. What are your thoughts about lack of face time with the instructor (if applicable)?

5. Please share any other thoughts that you may have on technology enhanced learning and the delivery of outcomes for this course.

Appendix B

EAC 779 Technology Enhanced Learning

Focus Group Discussion

Introduction

It is apparent that e-learning will become an integral part of our lives as we move towards a technology-based society where continuous learning is required for everyone. E-learning is not a panacea, but as the web-based training environment continues to evolve, its potential for broadening access to high quality educational programs is compelling (Pantazis, 2002). The purpose of this pilot study is to develop an assessment model for evaluating the effectiveness of technology enhanced learning delivery systems.

Student participation in the focus group discussion is voluntary and you may elect to withdraw from this study at anytime. Dr. Bresciani will not review the focus group discussion data until the final grades have been posted, therefore your elected

participation will not impact your course grade. The focus group discussion will begin during the last hour of the EAC 779 class held on October 15, 2003. The session will be video-taped for the purpose of verifying the notes from the focus group discussion session.

Questions

1. What have been your biggest anxieties while participating in a technology enhanced learning environment?
2. How has the technology used in EAC 779 enhanced your learning? Please consider: Powerpoint, WebCT, Internet, and the video conferencing technology.
3. How did the technology used in class this semester detract from your learning? Please consider: Powerpoint, WebCT, Internet, and the video conferencing technology.
4. What are your thoughts concerning the lack of face time with the instructor when you participate in class from the remote location?
5. Please share any other thoughts that you may have on technology enhanced learning and the delivery of outcomes for this course.

Appendix C

Focus Group Session Guidelines: Things leaders must prepare for, do, or cause to occur.

Establish the proper environment (mental set and physical setting) for the meeting

- Make sure participants come to the first meeting prepared and with a purpose in mind. (E-mails, letters, phone calls, etc.)
- Ensure the understanding of participants that the focus group purpose is not to analyze or solve problems/issues presented. Remind group we are “gathering” not solving at this point.
- Secure a quiet, comfortable room with chairs in a semi-circle (full vision of other participants). Have room prepared.
- Allow for introductions of self and participants.
- Set stage for the importance of activity. Pep talk.
- Give overview of what is going to happen.
- Allow for questions and answers/concerns.

Provide and/or establish helpful structure for the activity

- Establish role of leader: Lead and control process/communication and not content
- Role of participants: Be honest, participate, contribute, and follow directions, etc.
- Ground rules: Agreements (present or create) confidentiality issues, interruptions, time issues, professional courtesy, etc. Draft ground rules to be brought in by facilitator.
- Agree on order of topics to be addressed.
- Agree on time schedules/limits per topic.
- Allow for questions and answers/concerns about process.
- Allocate sufficient time for each question.

Lead the process of gathering information

- Establish a process to ensure full and fair participation—a process that addresses the introverts/extraverts of the group, e.g., allow each participant to present his/her ideas in casual/random order until all have had a chance, then do another round.
- Explain the positive nature of “piggy-backing” and group discussion. You want interaction but must control tendency for extraverts to dominate.
- Allow short time to think when starting each issue.
- Monitor time on each specific idea and each main topic.
- Provide feedback/clarification for each suggestion to ensure everyone understands what is being presented.
- Help group to avoid the tendency to analyze or solve problems/issues presented. Remind group we are “gathering” not solving at this point.
- Keep the group on task. Don’t let them wander off.
- If an idea is important to any member, it is important to be recognized. However, some group discussion/clarification might help “wild ideas” to be withdrawn.
- Be prepared to educate, give examples, etc. if group is at roadblock.

Provide Closure/Wrap-up and Follow-up

- Always end with opportunity for questions and concerns.
- Provide thanks and a “pat on back” for participating.
- Clarify “what’s next”, where we go from here.
- Provide opportunity to edit/clarify content of meeting (consensus).

Information gathered from: (Zelna, 2003) and (Krueger,1998).

Appendix D

General Overview of Findings: Enhanced Learning Delivery Technologies

Categories	Source	Data Location
Videoconferencing Strengths <i>Access</i>	Focus Group: Raleigh Focus Group: Asheville	58,17A,50A,51A,52A,53A,12A,75,49A,26A,54A,55A
Videoconferencing Weaknesses <i>Interaction</i> <i>Technology</i>	Focus Group: Raleigh Focus Group: Asheville	1,36,46,1A,57A,39,58A,59A,37,38,40,41,42,43,47,54,61A,62A,105A,106A,121A,122A,123A,135A,3, 4, 5,6
WebCT Strengths <i>Access</i>	Focus Group: Raleigh Focus Group: Asheville	1,3A,20A,67,68,33,13,2A
WebCT Weaknesses <i>Interaction</i> <i>Technology</i>	Focus Group: Raleigh Focus Group:	63A,11A,10A,30A,21A,22A,23A,24A,25A,29A,67A,

	Asheville	
PowerPoint Strengths <i>Notes</i>	Focus Group: Raleigh Focus Group: Asheville	16A, 31A, 64A,59,61,62,63,64,65,66
PowerPoint Weaknesses <i>Technology</i>	Focus Group: Raleigh Focus Group: Asheville	33A,9,10, 22,48,49
Internet Resources Strengths <i>Access</i>	Focus Group: Raleigh Focus Group: Asheville	14A,15A,125A,126A,50
Internet Resources Weaknesses <i>Interaction</i>	Focus Group: Raleigh Focus Group: Asheville	124A

General Overview of Findings: Instructor Location

Categories	Source	Data Location
Host Site Strengths <i>Interaction</i>	Focus Group: Raleigh Focus Group: Asheville	37A,63A,41A,39A,70,51,73
Host Site Weaknesses	Focus Group: Raleigh	15,7,16,17,18,52,127A

<i>Technology</i>	Focus Group: Asheville	
Remote Site Strengths	Focus Group: Raleigh Focus Group: Asheville	72A,129A
Remote Site Weaknesses	Focus Group: Raleigh <i>Interaction</i> Focus Group: Asheville	70,A7,1A,73A,75A,77A,78A,79A,80A,81A,82A,83A,84A,85A,86A,87A,88A,89
Cohort Factor	Focus Group: Raleigh Focus Group: Asheville	128A,110A, 111A,112A,114A,115A,116A, 113A