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ABSTRACT

The possibility of creating an appropriate online learning environment for distance adult students was examined in a study of 22 Pennsylvania State University (Penn State) students' attitudes regarding the online version of a course offered as part of Penn State's masters of education program. The students completed surveys before, during, and after the course. The survey questions focused on technology use, the learning process, the course's structure and content, and students' opinions regarding how well they had met the course objectives. In addition, 16 paired responses from the precourse and postcourse surveys were analyzed using the Wilcoxon matched-pairs signed ranks test. Most students rated their mastery of course objectives very highly. Eighty percent of the students interacted with other students between four and five times each week. Sixty percent stated that they interacted with the instructor "very often or always." As the course progressed, students reported significantly more expertise in computer use and less apprehension about using the Internet for the class. Students stated that the course's greatest strengths were the course instructors and the guidance and support provided. The surveys also established that the learning environment created made good matches to the learning principles that had guided the delivery design. (Contains 25 references and 5 figures.) (MN)

Researching distance education: Penn State's Online Adult Education MEd Degree on the world campus

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A dominant response by higher education institutions to their changing environment is the development of online distance education programs. This paper reports on a program-based initiative that introduced a group of adult students to masters-level study in a computer-mediated online environment. Their experience, monitored by means of surveys, evaluative comments and time tracking charts, is reported on. The results indicate that a collaborative learning environment was created. Small group and paired work was important in this development. In addition, students perceived an increase in their ability to use technology. Results also indicate students moved towards independence and interdependence within the course environment.

Many universities are wishing to respond to the changing characteristics of their students and the increasing access to technology for both faculty and students. University administrators and planners often see new technologies as opening up new markets of students who traditionally might not have had access to undergraduate and graduate education. Between 1995 and 1998 the number of courses offered at a distance doubled and the percentage of higher education institutions offering distance education courses in the USA increased by one third (National Center for Educational Statistics 1999).

Distance education 'is planned learning that normally occurs in a different place from teaching' (Moore and Kearsley 1996, p 2). The National Center for Educational Statistics (NCES), through its PEQIS (Post Secondary Quick Information System) surveys, provides a picture of trends in distance education in the USA, using a more constrained definition - one that focuses on electronic media. NCES defines distance education as education and training courses delivered to off-campus students via audio, video or computer technologies. The most recent report notes that several forces are at work - convergence of communication and computing technologies, changing demographics of students, and the need to reduce costs. Institutions, it is suggested, see distance education as attractive as they seek increased enrolments and decreased costs. Students, the survey says, benefit from increased access for those constrained by geography, time, job and family responsibilities and finances. Distance education offerings are increasing. More courses are being offered, particularly by institutions who already have a distance education tradition.

Several writers and researchers also suggest that computer-mediated communication (CMC) will enable teachers and institutions to extend educational and communication opportunities (eg Dede 1996; Spencer 1998). Hiltz (1994) and Kaye (1989) claim that CMC is able to support teaching and learning for distance and dispersed learners and build the type of community that strongly supports learning.

A new educational paradigm that is time independent, place independent and supports many-to-many interactions is heralded by some writers (Beller 1998; Harasim 1989; Kaye 1989; Turoff 1997). For faculties using these technologies for the first time, there are new issues related to teaching, learning, and learner characteristics to be considered as they come to meet the personal challenges of teaching in a new way. Windschitl (1998) has urged university researchers to become involved in researching instruction using the internet to explore emerging possibilities for improved instruction at all levels.

Research background

Two broad questions formed the foundation for a review of theory and research: What are the characteristics of adult learners that should be developed, encouraged, and taken advantage of in instruction offered through distance education? What are the elements of an effective online learning environment? These two questions were set within the context of a course on research methods that focused on developing an online learning community for graduate students enrolled in a web-based Masters degree program in Adult Education.

Graduate students as adult learners

In writing about part-time graduate school study, Pitman (1997, p 72) comments about adult students:

> Adult students generally want to be treated as adults, a preference that grows stronger over time. Adults tend to be more goal oriented than younger students, and they look for immediate opportunities to apply course content. Also, they bring valuable experience to the classroom; professors and other students learn from them. All of this is grossly oversimplified, of course, but it is generally helpful in designing educational programs for adults.

Other broadly useful design parameters as characteristics of adult learners are the notions of self-direction and a wish to be active participants in their learning. Brookfield (1986) and Knowles (1980) both support the ideas that adults wish to participate in their own learning and assume some responsibility for it. In a graduate-level course there can be some tension between the formal framework of a course and these characteristics. In addition, the course instructor has to recognise the points at which support or guidance is needed and provide it in a manner that does not undermine the learner.

Group work and collaboration have been widely used as a means of sharing experience, exploring ideas and building new learning (Tennant 1991). Activities in small groups and with learning partners can develop a sense of community that supports learning (Cook 1995). The development of self-direction and collaboration in distance education needs support and guidance, and providing this becomes an important role for the instructor (Eastmond 1997).

Distance study at a graduate level has strong links to adult learning. It is increasingly through distance education that an adult returns to school. The need for an advanced degree to further work aspirations or a return to study as a preparation for a re-

focused stage of life often lead adult students to graduate school (Pitman 1997). In a survey of graduate students, Hammon and Albiston (1998) found study is usually undertaken on a part-time basis. Family and work constraints were factors considered in the decision to return to study. The challenge is for higher education to adapt objectives, content and presentation to support learning for this group. Graduate-level study calls for attributes of independence and focused effort. Dialogue and debate are expected (Swenson 1995).

Learning environments

Traditionally most learners have assembled together in classrooms of some type. In these settings, professors aim to guide the learning activities that help students construct knowledge. Typically this guiding process involves three key steps:

- Understanding and knowing the prior knowledge of the students so links can be made between old learning and new;
- Responding to the students to promote feedback and gathering the responses to use in the construction of new or refined knowledge;
- Helping the students see how activities and ideas presented build or combine to increase understanding and knowledge. (Slavin 1997)

Such a constructivist approach emphasises the active role learners take in knowledge construction. Learning thus defined has strong social aspects, and interactions between learners and instructor, and learners and learners, are important. This type of learning environment has been valued in the adult education program that is the context for the research reported here. Maintaining such an approach in a distance education environment was considered important.

Online groups/learning communities

The social dimension of learning and social interactions can have a significant impact on learning outcomes (Burge 1994; Jonasson et al 1995). Learners need the chance to interact, discuss, refine and reflect. Collaboration allows them to do this. Computer-based collaboration adds flexibility with its any time, any place capability (Harasim et al 1995). It also makes collaborative discussions, peer activities and small group work possible. These activities encourage independence and self-direction and demonstrate the interactivity that is the major advantage of computer conferencing (Eastmond 1998; Mason 1994; Schrum 1998). A key role for the instructor is to act as a facilitator and to carefully monitor and support the interactions (Burge 1994; Wegerif 1998). A skilled instructor (or facilitator) seems to be required to ensure that groups work well together (Gunawardena and Zittle 1997; Wegerif 1998).

Study context

This study is based on the results of four surveys, time tracking charts and evaluations used to gain students' responses to the online teaching and learning environment that was developed for them. The theoretical perspective reflects the importance of developing an online learning community for graduate students, emphasising collaboration and self-direction in learning.

The graduate students in this study were a 'typical' adult group. Many were returning to study, most were women, and all had other responsibilities. Twenty-six students logged on at the beginning of the course. After the first week, when two students withdrew, the group settled to 24 students. Later in the course, two students decided to defer completion of the course due to family responsibilities. The students were advised in advance that they should allow 12 hours per week for their coursework and have access to the computer equipment required for the distance education course that had no face-to-face component.

The online Masters degree program is offered from a land grant university in the USA (Penn State) that has a history of outreach and distance education. Recently, in response to the changes in student demographics and needs, the university has developed a virtual campus (known as the World Campus) that is designed to continue the outreach mission and extend that commitment to distance students. Central to the virtual campus development has been a focus on using new technologies to provide an interactive environment for students.

Although the course was an existing one that had been previously taught by the researcher, careful planning and preparation occurred before it was placed online. A team approach was employed as for all courses on the World Campus, involving an instructional designer, programmers, program manager, marketing and research specialists. (Faculty members are released from one course for the two semesters prior to instruction for course development. Whenever they teach for the World Campus, they are also released from teaching a course on campus. Thus, all instruction through the World Campus is part of a faculty member's load.) An additional instructor was added to assist with grading some assignments as a way to prepare him for teaching upcoming courses through the World Campus.

The online version of the course was developed using WebCT to create a password-protected web site whose major features were multiple bulletin boards, an email system, automatic record-keeping available to faculty and individual students at any time, online text and images, and links to other web sites. Students were provided with a weekly schedule for course task completion. Assignments included an approximately even balance of those to be completed individually (and submitted to the instructor by email or done as a self-check) and those that required small group work that was posted to the appropriate bulletin board.

Methods

Data were gathered before, during and at the end of the course. There were four major survey points. A pre-course survey was administered online at the beginning of the course. The questions focused on technology use, the learning process, the course structure and content. The post-course survey repeated the same questions and also included two questions related to the time tracking exercise. A mid-course survey (referred to as 'mid- survey') focused on the course objectives, feedback, assignments, support material and faculty/student interactions. Students were: given the opportunity to add further comments; asked to indicate their willingness to take another course designed in a similar way; and asked whether they would recommend the course to others. The reflection survey (referred to as 'reflect survey') asked students how well they felt they had met course objectives. It also asked for comments about teamwork and the development of an online community. In

addition to the surveys, the students were asked to keep a weekly Time Tracking Chart and to post evaluative comments on group work to a discussion forum. A Suggestion Box was available throughout the course for student input and feedback.

The surveys used a Semantic Differential approach that asked for students to react on a seven-point scale to polar opposite adjectives about specific content (Osgood et al 1967). The pre and post surveys were used to determine changes in student response over the duration of the course. The two remaining surveys and the Time Tracking Chart provided additional data relevant to the pre-post survey themes. The evaluative comments were used to gain an overall understanding of the students' experiences. The qualitative data were then analysed to identify themes in the comments that develop a richer picture of the student experiences. According to Windschitl (1998), using mixed methods, as in this study, is superior in identifying and describing the impact of the internet on instruction.

From the pre and post survey, sixteen paired responses were analysed using the Wilcoxon matched-pairs signed ranks test to determine if there was a statistically significant change in responses to the pre and post items. For all items in the technology use theme, a directional change was hypothesised. It was considered that students would report: moving toward expertise in computer use (Q2); less apprehension about internet use for the course (Q6); and to increasingly like using the computer (Q14). One tail tests were used for these items, and also for two items in the course and content theme. It was hypothesised that students would report increasing expertise in their knowledge of adult education (Q4) and research (Q5). Tests for all other items were two tail tests, since no hypothesis for direction of change was made. All tests used a significance level of .05. Zero differences were not included in the analysis. Coding for Questions 3, 4 and 7 (negative items) was reversed before analysis.

Results

The pre- and post-semantic differential surveys provide information about changes in the students' perceptions of various aspects of the delivery and the course. The other surveys (mid - completed by 80% of the students; reflect - completed by 67%) and student evaluations provided comments and further responses that enriched the picture. This section reports the results of the pre and post surveys and includes supplementary information from the other surveys where relevant. Tables 1, 2 and 3 give z-scores arising from use of the Wilcoxon Signed Ranks test with the pre and post surveys.

Table 1: z-scores for technology use (pre- and post-survey items)

	Q2	Q6	Q14
z-score	-1.84*	-2.59*	-0.31

Table 2: z-scores for course and content (pre- and post-survey items)

	Q3	Q4	Q5	Q17	Q18
z-score	-2.19*	-1.82*	-2.59*	-0.34	-1.15

Table 3: z-scores for learning process (pre- and post-survey items)

	Q1	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q15	Q16
z-score	-1.18	-2.66*	-1.07	-0.05	-1.01	-1.78	0	-1.29	0	-2.25*

For all tables * = $p < .05$.

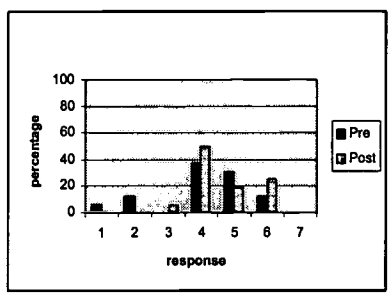
In the section that follows, items identified as showing significant change are presented in graphic form to indicate the direction of the change. Relevant information from other data sources is included. In all cases, four (4) is a neutral response.

Technology use

Some questions related to the use of technology are presented below:

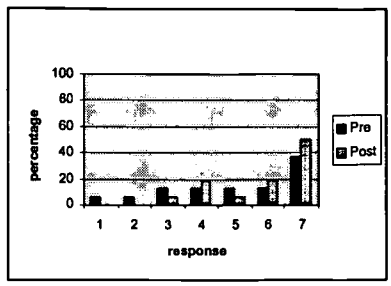
Q2: A range from a computer novice (1) to computer expert (7).

Figure 1: Pre/post pairs Q2



Q6: A range from apprehensive about internet use for the class (1) to confident about internet use for the class (7).

Figure 2: Pre/post pairs Q6

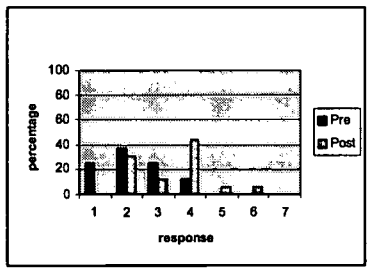


Course and content

Related to internet use was a question that asked about exploring resources found on the web. Students in this course need to develop skills in locating and using resources for research purposes as well as foundational research skills. These are skills that they will use later in their program as they write their Masters papers.

Q5: A range from research novice (1) to research expert (7).

Figure 3: Pre/post pairs Q5



Q1 in the reflect survey asked: How well do you feel you met the following course objective: 'Through this course, you will critically analyse research studies published in adult education journals for factors such as assumptions, biases, and contributions to the knowledge base and practice'. All students (100%) indicated they had either mostly or completely mastered the objective.

Q5 in the reflect survey asked: How well do you feel you met the following course objective: 'Through this course, you will gain a foundation for your course in Adult Education and for writing your Masters paper in ADTED 588, which you will take toward the end of your degree program'. Ninety-four (94%) indicated they had mostly or completely mastered the objective.

The other responses (Q 2, 3 and 4) from the reflection survey, which focused on course content mastery, indicate that most students rated their mastery of course objectives very highly.

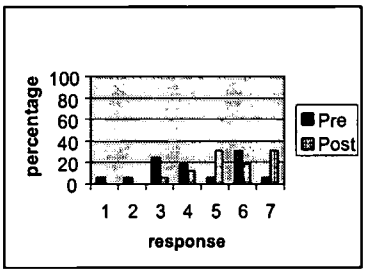
The mid survey provided some course- and content-related perspectives. At that point in the course, 80% of students were finding the course objectives easy to understand; 85% said the assignments and activities were clearly explained; and 95% said the assignments provided practice of the lesson objectives. The performance expectations and effort required were seen by 75% to be clear and feedback was timely (80%) and detailed (70%).

The learning process

The learning process, as already indicated, was a key consideration in the planning, delivery and teaching of this course. Two of the pre- and post-survey responses related to this concept.

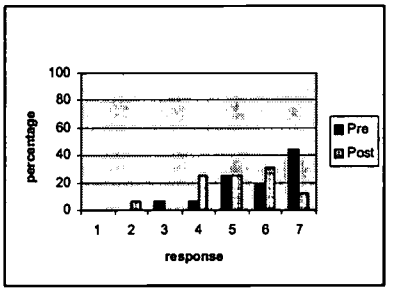
Q7: A range from prefer to be a self-directed learner (1) to prefer direction (7).

Figure 4: Pre/post pairs Q7



Q16: A range from dislike being helped in class by others (1) to like to be helped in class by others (7).

Figure 5: Pre/post pairs Q16



In support of this finding, Q17 of the mid survey showed that 80% of the students interacted with other students between four and five times a week. Also from the mid survey, students indicated that they 'almost always or better' applied concepts in actual or simulated situations; felt 'very often or always' active participants in the teaching and learning process (90% of respondents); and 'very often or always' felt encouraged to challenge the instructor's and other students' ideas (75% of respondents). Most (60%) also felt they interacted with the instructor 'very often or always'.

Data about time spent working on coursework and about working with others were gathered through the Time Tracking Chart and Q 18 in the mid-survey. At the mid-point of the course, 55% of the students indicated they spent 11-15 hours on the course and 20% indicated more than 15 hours. The Time Tracking Charts, when analysed at the end of the course, showed an average of 6.91 hours online and 6.26

hours offline per week over the whole course. The instructors also spent a total of approximately 12 hours per week on the course (both on and offline).

There were two final questions in the mid survey. When asked if they would be willing to take another course that was designed in a similar manner, 100% of the students responded positively. When also asked if they would recommend another student to take a course designed in a similar manner, 95% indicated they would.

The students were given the opportunity to comment on various aspects of the course, such as group work, strengths and weaknesses, teamwork and the online community. Comments from these evaluations illustrate some of the discussion points that follow.

Discussion

This section comments briefly, in turn, on each of the three areas that formed the basis of the pre and post surveys. In particular, however, it draws on students' comments about one aspect of the learning environment - working in groups.

Technology use

In two of the items related to this theme, significant change can be seen. As might be expected in a course that requires considerable interaction via computer, students reported more expertise in computer use and less apprehension about the use of the internet for the class.

Course and content

The responses to Q5 (pre/post survey) about research novice/research expert show that while most wouldn't call themselves experts, they did become more confident. The learning objective related to using research studies (Q1 reflect survey) and the one related to using their research skills (Q5 reflect survey) showed very high levels (100% and 94% respectively) of confidence appropriate to their level of study.

The greatest strength of the course for the students was the instructors and the guidance and support provided. Interaction was the second greatest strength.

> Strengths: Flexibility of timing, well thought out and planned, ease in use once you get started, availability of support, positive support from instructors, printed material and course is user friendly, non-intimidating (most of the time). (Comment from student 24).

The learning process

The results showed that the learning environment created made good matches to the learning principles that had guided the delivery design. Computer conferencing can allow the interactive and collaborative aspects of learning to flourish. As has been indicated, many student comments pointed to the importance of the instructor in the learning process.

> Strengths: positive support from instructors. (Comment from student 8).

Of the eleven items that contributed to the learning process theme, two were found to be significant. First though, note the change reported in the previous course and content section that students grew to feel more capable of using the internet to search for and find information useful in the course. While this item also reflects the confidence in technology use noted already, it must reflect more than that. Students reporting a shift to expertise must also be weighing their ability to make judgments about the nature of the material useful in their particular learning environment. This increasing expertise is matched by a significant shift in feelings towards self direction in learning (Q7). These changes point to the increasing independence of students. This conclusion is supported by the results of Q16 that students grew to dislike being helped. These points do not, however, indicate that students did not enjoy or appreciate working together.

The evaluative comments gathered about group work enriched the picture of student interaction and support that emerged. These supported the literature findings suggesting that, for distance students, the learning process can be enriched through small group work. Group work was important for the students and a valuable aspect of the course. Ninety-three percent (93%) of the students who responded mentioned that they had found the group work valuable. Those who elaborated on this mentioned the sense of community or classroom that was built and the value and support they had found in this. It was also evident that most groups and partnerships had worked well.

> It *[the group work]* gave me the feeling that I was actually in a classroom environment. (Comment from student 17.)
>
> I (we) thought the group work was the best part of the class. It really gave me that much needed human contact and sounding boards. (Comment from student 23)
>
> I think it [group work] did establish a learning community and for me, it added some discipline and structure to an assignment. Peer pressure is useful for procrastinators. (Comment from student 13).
>
> I found that we worked so well together that I would have preferred all assignments to be done that way. (Comment from student 9).

The students also commented on group size, indicating that a group of six was the maximum size they would want. They had found the amount and timing of group work to be about right but experienced some difficulties getting together - even online.

There was further support for the group work and the development of an online community in the comments associated with the reflect survey. Over ninety percent of the students indicated they felt part of an online community. Most also commented on the value of shared contributions that had helped them develop the course concepts. It had been, they indicated, a valuable and enjoyable experience. Clearly, the students grew to increasingly value independence and interdependence, but not dependence.

> I really felt like part of a class with this experience. With the exception of knowing what people looked like I feel I got to know personalities, interests and levels of experience in Adult Education. We interacted a lot which I found an interesting experience. I enjoyed the web pages that we had to do during that first week. Great idea. I really feel like part of a community. (Comment from student 6).

Conclusion

While the study demonstrated that an appropriate online learning environment could be developed for distance adult students, we should not consider that the move from traditional class teaching to online is without questions and mysteries of its own. There are areas to research that would further develop our understanding of online teaching and learning and benefit the new and returning students who are moving into higher education. We need to know more about how students interact with the material, how groups work to support learning, and the role the instructor plays in facilitating and developing learning in a collaborative distance environment.

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