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ABSTRACT

A study was conducted to determine predictors of student satisfaction in a graduate nursing program taught via fully interactive, multipoint real-time video teleconferencing and World Wide Web/Internet. A correlational research design was used to examine relationships among five learner attributes, three instructional variables, and student satisfaction. The five learner attribute predictors were: (1) previous experience with courses taught via technology; (2) self-ratings of competence with technology; (3) frequency of between-class usage of communications technology; (4) age; and (5) remote-site group size. Instructional variables included instructor/instruction, technology, and course management. Regression analyses identified learner attributes and instructional variables predictive of student satisfaction. Of the eight predictor variables regressed on the measure of student satisfaction, only instructor/instruction contributes to explanation of the variance in course satisfaction scores. Overall instructor rating strongly correlated with satisfaction. The most potent finding is that good pedagogy is important to students' perceived satisfaction with distance education. The focus of faculty training and development for those who instruct in distance education courses should be directed to development of effective instructional strategies. (Contains 1 figure and 19 references.) (Author/AEF)

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Technology Is The Tool, Teaching Is The Task: Student Satisfaction In Distance Learning

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Abstract: A study was conducted to determine predictors of student satisfaction in a graduate nursing program taught via fully interactive, multipoint real-time video teleconferencing and World Wide Web/Internet. A correlational research design was used to examine relationships among five learner attributes and three instructional variables and student satisfaction. Regression analyses identified learner attributes and instructional variables predictive of student satisfaction. Of the eight predictor variables regressed on the measure of student satisfaction, only instructor/instruction contributes to explanation of the variance in course satisfaction scores (R^2 = .21). Overall instructor rating strongly correlated with satisfaction. The most potent finding is that good pedagogy is important to students= perceived satisfaction with distance education. The focus of faculty training and development for those who instruct in distance-education courses should be directed to development of effective instructional strategies.

Introduction

The demand for flexible and convenient education programs to support life long learning and career development is increasing. Distance education, as an instructional format, offers flexibility and convenience--characteristics sought by a growing student body. With the increasing demand for distance education and growing consumer experience with distance-learning modalities, expectations for quality instruction, successful educational outcomes, and satisfying learning experiences will rise. The cost of the technology used to deliver instruction via distance learning is high. Favorable program outcomes must be demonstrated in order to justify the expense of developing and maintaining distance learning programs. One important measure of program outcomes is student satisfaction. In order to assess and maintain student satisfaction in distance learning programs, providers must first identify the factors that are associated with satisfaction.

Although the distance-education literature is replete with research conducted in video teleconference courses (Russell, 1997) there is a dearth of research examining student satisfaction in distance-education courses employing both interactive video teleconferencing and computer-mediated communications technologies (World Wide Web/Internet, bulletin board systems, e-mail). This study was conducted to: 1) determine relationships among selected learner attributes, instructional variables (instructor/instruction, technology, and course management) and student satisfaction in a first-semester course of a graduate nursing program taught via fully interactive, multipoint real-time video teleconferencing and World Wide Web/Internet; and 2) to identify those learner attributes and instructional variables that are predictive of student satisfaction.

Conceptual Framework

Educational systems theory (Banathy, 1992) and Moore=s theory of transactional distance (Moore & Kearsley, 1996) provide the conceptual framework and guide the selection of variables to predict student satisfaction in distance-education courses. The operational model of the Department of Nursing Education at the research site was modified by the researcher to graphically depict the theoretical framework of the study. Figure 1 displays a systems model representing the interaction of components of the instructional system in this study. The four elements of the learning process component of the system represent the predictor variables which are examined for associations with student satisfaction (output) at the conclusion of a course in the first semester of a graduate nursing program taught via interactive video teleconferencing (IVT) and World Wide Web/Internet (WWW/INT).

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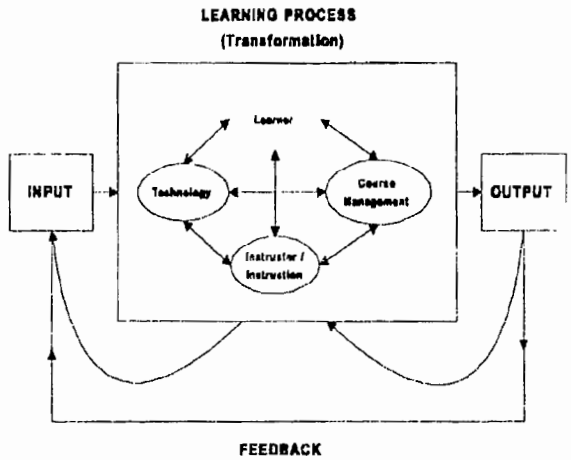

Figure 1: The instructional system in technology-mediated instruction.

Transactional distance is inherent in all educational systems. Transactional distance refers to the psychological distance created when an instructor and learner are separated by time and space (Moore & Kearsley, 1996. Transactional distance exists on a continuum and is a function of two variables: dialogue and structure. Dialogue refers to the extent to which an instructor and learner are able to respond to each other and includes all types of interactions between the instructor and students. Structure is defined as the measure of an educational program=s responsiveness to learners= individual needs. Using integrated telecommunications technology systems (technology that combines voice, sight, access to online databases, and shared communications applications) together with interactive video teleconferencing promotes both synchronous and asynchronous interaction. By increasing communication options and promoting opportunities for dialogue, structure is reduced and the transactional distance may be minimized. Adult learners who have opportunities for control over their learning and systems that support frequent and quality interactions are more likely to experience satisfaction with learning in distance education programs (Bayton, 1992).

Literature Review

The efficacy of distance learning has been widely studied. In one review of the literature (Russell, 1997), over 248 research reports, summaries, and papers exploring educational outcomes in distance education consistently demonstrated no significant differences in achievement outcomes between traditional face-to-face classroom instruction and distance learning. Yet despite a large body of research literature examining achievement outcomes in distance learning, researchers have not fully investigated the affective outcomes of distance learning (Allen, 1995; Biner, 1993). Student satisfaction is one such affective outcome requiring additional investigation.

Learner Attributes and Satisfaction in Distance Learning

Although age has not been demonstrated to predict student satisfaction in distance education (Biner et al., 1996), student attributes related to academic success and satisfaction correlate with maturity (Allen , 1995; Dille & Mezack, 1991). Older student age may be associated with expectations for higher levels of interaction and collegiality, both activities that may be limited in distance education and may therefore impact student satisfaction. The impact of previous experience with distance-education courses on perceptions of satisfaction in subsequent courses is not clearly established. Some researchers have found no differences among students with varying levels of previous experience toward IVT courses (Dille & Mezack, 1991; Sorenson, 1994/1995). Others report students with prior telecourse experience are less satisfied with the instructor and the instructional aspects of the course (Biner et al., 1996). Lack of technical competence can impact attitudes toward the technology itself, affect students= ratings

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of instructor effectiveness, and satisfaction with the course (Nally, 1995). The opportunity to interact and collaborate with peers during the instructional process is linked with students= perceptions of involvement and satisfaction with distance education (Fulford & Zhang, 1993). Students who use available communications technologies to interact with each other and with the instructor between class sessions may perceive less isolation, more interaction, and greater satisfaction. The small class size at remote-teleconference sites may contribute to students= feelings of isolation from other students, the instructor, and the support services of the sponsoring institution. The size of the remote-site group may effect students= motivation, persistence, and attitudes toward the course (Biner et al.. 1997).

Instructor/Instruction, Technology, and Course Management Variables

A review of distance-education literature suggests the following factors are related to students= satisfaction with elements of the quality and effectiveness of the instruction: 1) the clarity of communication and course expectations; 2) the selection, quality and instructional use of visuals; 3) the timeliness of feedback on course work; and 4) the use of instructional strategies that aid students in understanding the course content (Daines et al., 1994; Egan et al., 1992; Mood, 1995; Sorenson, 1994/1995). Factors specific to perceptions of instructor effectiveness include: 1) teacher behaviors that create a sense of belonging and inclusion in the class; 2) effective communication skills; 3) enthusiasm during instruction; 3) organization and preparation for each class; 4) access to the instructor and response for students= questions; and 5) perceptions of the instructor=s professional behaviors (Daines et al., 1994; Kooker et al., 1994; Moore & Kearsley, 1996).

Technical aspects are cited as the most frequent cause of course deficiencies, student anxieties and frustration, negative attitudes toward the course, and student dissatisfaction (Mood, 1995; Thomerson & Smith, 1996). The issues related to the deficiencies of technology use in distance education are characterized in two areas: issues related to the function and reliability of the technology itself, and issues related to the human interface with technology (levels of previous experience, operational familiarity and expertise, and techno-fear or intimidation).

Aspects of course management identified as important to students and related to their satisfaction in distance education include: 1) the clarity of class assignments and communication of course and assignment performance expectations, 2) access to campus-based resources (library, registration and records, bookstore, financial and administrative offices, advising and counseling), 3) promptness of course materials exchange between instructors and students, 4) the availability of technical support personnel during and between instructional sessions, and 5) the provision of orientation to the course, technology, and operation of the equipment (Biner, Dean, & Mellinger, 1994: Daines et al., 1994; Mood, 1995; Moore & Kearsley, 1996; Sorenson, 1994/1995; Thomerson & Smith, 1996).

Methods

Description of the Research Setting and Course Logistics

The distance-education program in this study represents an affiliation between a publicly-funded State university (SU) and a not-for-profit health maintenance organization (HMO) located in northern California. All academic aspects of the program are administered by the faculty of the university (curriculum, pedagogy, provision of faculty, admission of students). The HMO provides the video teleconference sites, teleconferencing equipment, broadcast technical support and operation of the teleconferencing network. Students receive IVT instruction at 10 locations throughout California, selected based on clustering of the students accepted into the program. The university faculty teach the IVT classes (approximately 60% of the total class sessions) one evening each week from the same remote-teleconference location throughout the semester. Internet-delivered class meetings (approximately 40% of the total class sessions) are conducted by the instructor and Areceived≅ by students from any location with an Internet-accessible computer.

Audio, video, and data interaction during the IVT classes are enabled through fully interactive, multipoint real-time video teleconferencing technology. The video teleconference bridge connection (via microwave and fiber optic network) allows the faculty to link all sites, or any two or more sites for multisite interactive group work, discussions, and for collaboration on course projects. Technical support for problem solving equipment malfunction is available by telephone from the teleconference technicians at the IVT network.

During the WWW/INT class sessions, the faculty and students interact electronically to receive assignments, conduct instructional sessions involving presentation of content, participate in online discussions, pose

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questions and receive answers, and communicate about the course between instructional sessions. Students are also assigned learning tasks involving the WWW/INT between the weekly instructional sessions Orientation to operation of the online aspects of the course is provided at the start of the semester. Technical assistance is provided by a Web specialist who developed tutorials to facilitate students= acquisition of WWW/INT skills and is available to students throughout the semester by e-mail. Communication between instructors and students, and among students, is facilitated by the use of bulletin board systems, e-mail, and telephone/voice mail. Students have access, via Internet, to the main campus library services and a reference librarian assigned as a designated resource for students enrolled in this program.

Subjects, Design, Variables, and Instrumentation

Participants of the study were a convenience sample of 44 registered nurses enrolled in a semester-long theory course in the first semester of the master=s degree program in nursing leadership and case management. Subjects were entered into the study through voluntary completion of the surveys (100% response rate). The final sample was reduced from 44 to 43 because of one unusable survey. The majority of participants are female (95%), Caucasian (65%), married or cohabitating (77%) adults who range in age from 30 to 59 years. More than half (56%) reported working more than 39 hours per week; 44% attended a college-credit course within the past year, 21% within one to three years, and over 18% have not been enrolled as a student for more than 11 years.

A correlational design was employed to examine the relationships among selected learner attributes, instructional variables, and the criterion of student satisfaction as measured by the Student Satisfaction Survey (SSS) instrument. The study examined eight predictors which included five learner attributes and three instructional variables (the facets of instructor/instruction, technology, course management). The five learner attribute predictors are: 1) previous experience with courses taught via technology; 2) self-ratings of competence with technology; 3) frequency of between-class usage of communications technology; 4) age; and 5) remote-site group size

The SSS, a 59-item, pencil and paper attitudinal assessment instrument, is comprised of an established questionnaire (Biner, 1993) plus survey questions appended by the researcher to collect data reflecting the unique technology combination of IVT and computer-mediated communications used for instruction in the course studied. Respondents indicate their perceived levels of satisfaction by marking a response on a five-point Likert-type rating scale (1 = very poor, 2 = poor, 3 = average, 4 = good, and 5 = very good). Multiple survey questions comprise each of the three instructional dimensions and generate a facet scale score. Four open-ended questions solicit students= narrative responses to aspects of the course. Other survey items generate general course and student information. The measure of student satisfaction is a composite of students= responses to two survey questions: overall satisfaction with the course, and comparison of the course with conventional classroom courses.

The survey was administered during a regularly scheduled video teleconference class at the conclusion of the course to all students enrolled who consented to participate (100%). Volunteers from each teleconference site distributed and returned the surveys to the researcher via postal mail. Two students absent on the evening of the data collection were sent surveys via postal mail and both returned surveys. Reliability coefficients were computed to identify questions for inclusion in the learner attribute and instruction predictor variables. Simple correlation coefficients (level of significance set at $p \leq .05$) were computed to discover the relationships (associations) between the eight predictor variables (five learner attributes and three instructional facet scores) and the measure of student satisfaction with the course (criterion variable). The results directed the computation of an intercorrelation matrix for the 17 survey questions within the facet of instructor/instruction to identify relationships among those items and course satisfaction. Linear regression analyses (forward stepwise) were used to determine the nature and closeness of the relationships among the predictors and the criterion variable, and among the 17 questions within instructor/instruction and student satisfaction. For the stepwise regressions, entry values were set at $p \leq .05$. Content analysis was performed on the students= responses to the open-ended questions to identify the frequency and commonalities of experiences with the course, students= likes and dislikes, and their suggestions for course improvements.

Results

The majority of students are satisfied or extremely satisfied with their experiences in the first semester of

a distance-education course (N=43, M=4.00, SD=.96). Of the eight predictor variables regressed on the measure of student satisfaction, only instructor/instruction contributes to explanation of the variance in course satisfaction scores (R^2 = .21). Within the facet of instructor/instruction, 8 of 17 questions are correlated positively with the criterion variable ($r > .40$, $p \leq .05$).

The data suggest the following pedagogical characteristics are associated with student satisfaction in a course taught by IVT and WWW/INT: 1) providing clear expectations about course assignments, 2) promptly recognizing and responding to students= questions, 3) encourag.ng student participation in class sessions, 4) using a variety of instructional techniques to help students gain a better understanding of course material, 5) establishing mechanisms for students to access the instructor outside of class sessions, and 6) providing timely feedback and return of students= written course work. The generalizability of the findings are limited to like populations due to small sample size and homogeneity. The high quality of the IVT technology used in the course may have minimized the impact of technology as a variable in students= satisfaction. Programs that use less sophisticated technology may find different results.

Discussion and Implications

Among the intercorrelations for the individual questions in the facet of instructor/instruction, 8 of 17 correlate with the criterion (satisfaction). Most important to students= favorable ratings of this facet are factors that support the critical need for interaction between and among students and the instructor. Four questions correlate positively and are statistically significant in support of this assertion: the promptness with which the instructor recognizes and responds to students= questions ($r = .50$, $p \leq .01$), the extent to which the instructor encourages class participation ($r = .39$, $p \leq .05$), the accessibility of the instructor outside of class ($r = .35$, $p \leq .05$), and the timeliness with which written work is graded and returned ($r = .33$, $p \leq .05$). These findings are no different that one would expect to find in a traditional classroom.

Students self-reported they had little or no previous experience with distance learning and rated their pre-course competence with technology as low, yet they were highly satisfied with the course. Their comments indicate they experienced frustrations over the unreliability of the Internet server (first six weeks) and with incompatibilities among individual computer software programs. The students overcame the technological barriers with the passage of time and through consultation with other students, the instructor, and the Web specialist. By the end of the semester-long course, 78% of students (n = 34) rated the course technology as good or very good. This is a remarkable finding in that students did not allow their initial difficult experiences related to the reliability of the technology to limit their use and acceptance of, and satisfaction with, course technology.

Students had choices about the type of communications technology they used, when they initiated communication, and with whom (instructor, adjunct faculty, other students). This choice is a key concept in the theory of transactional distance (Moore & Kearsley, 1996). The multiple modes of technology provide not only choice, but a variety of options for dialogue (interaction and communication) among participants in the course. Increased dialogue in an educational program reduces the perceived distance in the transactions of learning (Moore & Kearsley, 1996). The perception of reduced distance, increased dialogue, and student input to course structure may contribute to overall course satisfaction.

This study finds no association between course management and student satisfaction ($r = .08$, n.s.). Several course-design features may contribute to students= positive ratings of course management. The technology of the WWW/INT facilitates students= access to vast resources--both people and information--in a quick and convenient manner. This electronic access may explain why the majority of students rate access to library and resource materials as good to very good (67%, n = 29). The promptness of materials exchange among students and instructor is also rated as good to very good by 79% of students (n = 34). The multiple technologies (WWW/INT, BBS, e-mail) and the dedicated course Web page most likely contribute to this finding. Students can access the course syllabus, receive and submit all course assignments, and exchange written information electronically on-line at times and places that are convenient for them.

Technical support and training for participants in technology-mediated distance-education courses is critical to student satisfaction and program success (Boston, 1992). Students in this course received orientation and training in use of the various technologies (IVT, WWW/INT, BBS, e-mail) at the start of the semester. The availability of IVT technicians during class sessions and the Web specialist via e-mail contributed to high ratings for technology support in the course: 88% (n=38) rated the IVT support as good to very good; 72% (n = 31) rated support for the

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WWW/INT component as good to very good. Students= ratings indicate that the provision of these support services are valued and most likely contributed to their positive ratings of course management.

Conclusion

When teachers use effective pedagogy, technology can facilitate interactive instruction and communication without compromising satisfaction with the instructor, instruction, or with the course. Overall course satisfaction is related to overall ratings of the instructor and instruction, regardless of course format, the physical separation of course participants, or technology=s mediation of communication and interaction. Satisfaction in distance-education courses is related to the performance of the instructor--just as for traditional face-to-face classes. Students acclimate to the instructional reality--traditional, campus-based face-to-face instruction or technology-mediated distance education--and once accustomed to that reality, it is the quality and effectiveness of the instructor and the instruction, not the technology that is associated with satisfaction.

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