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ABSTRACT

This descriptive study examined the meaning of student responses to computer-mediated communication in a distance learning setting. The theoretical framework of the study was based on social and collaborative learning theories within a constructivist perspective. Participants were 13 studio and 24 off-site students enrolled in a distance learning graduate course taught at Ball State University (Indiana) and transmitted to five distant sites, using two-way audio and one-way video signals. Out-of-class interactive instructional opportunities were provided via a World Wide Web site, the Class Page, which included group discussion, project sharing, corresponding with instructors, peers, and experts, and Internet exploration. Participants were surveyed and interviewed in order to collect descriptions of learner experiences with the Class Page. Cognitive learning strategies employed by students included managing the computer environment (i.e., management of computer-based information and the computer's text-based environment) and management of personal resources (i.e., investment of effort and management of time). Interpersonal networking was an affective learning strategy described by participants as a way of coping with the Class Page environment. It was concluded that computer-mediated communication, distance course design, learner characteristics, and the design and interactive potential of the computer component influenced the cognitive and affective strategies developed by course participants. (DLS)

Learning Strategies for Coping with Computer Technology in a Distance Learning Environment

by

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"As the [computer] technology gains a stronger foothold on our educational institutions and becomes a standard educational tool in the classroom, as well as fundamental component of cultural literacy, it is critical that we understand students' responses to this medium" (Krendal and Broihier, 1992, p. 225). The purpose of this descriptive study was to describe and understand the meaning of student responses to computer-mediated communication in a distance learning setting. The theoretical framework for this study was based on social and collaborative learning theories within a constructivist perspective.

The study setting was a distance learning graduate course taught in a studio classroom on Ball State University campus and transmitted to five distant sites in Indiana via the IHETS Network, using two-way audio and one-way video signals. Out-of-class interactive instructional opportunities were provided students via an Internet-based web site, the Class Page. This Class Page included interactive opportunities such as discussing among peers, sharing creative projects, corresponding with instructors, peers, and experts in the field of education, and exploring the Internet.

Evidence in this study was collected from thirty seven study participants through a series of surveys and interviews administered over a sixteen week period. These thirteen studio and twenty four off site students responded to questions which were developed to encourage descriptions of learner experiences with the interactive computer component, the Class Page, in this distance learning setting.

Professionally and educationally, the study population was fairly homogeneous. Of the thirty seven participants, thirty were professional educators, six were graduate students in counseling psychology, and one was a factory worker. All participants were

graduate students enrolled in master or doctoral degree programs. This study population was predominantly women (thirty one women, six men) and fairly unskilled with computer and Internet use. Thus, the study population generally consisted of well educated, highly motivated professionals, over 80 percent of whom were women, and most of whom needed and wanted computer and Internet training.

In his Theory of Guided Didactic Conversation, Holmberg (1989) stated that academic work needed planning and guiding by either the student or the teacher for study goals to be attained. In addition to the planning and guiding of the instructor in this study, participants also developed strategies for planning and guiding their learning experience. Descriptions of these learning strategies for managing the computer-mediated communication in this distance learning setting threaded through survey responses and interview comments.

Students developed both cognitive and affective learning strategies. Strategies classified as cognitive were those learner responses that reported knowledge, judgment, reasoning, and skill. Cognitive strategies that enabled students to cope with the computer component of the course focused on managing the computer environment and personal resources.

Affective learning strategies were those learner responses that reported attitudes, values, and emotions. Affective learning strategies focused on interpersonal networking. These cognitive and affective learning strategies were developed and employed by students to accomplish their primary purpose of meeting the course requirements of this study setting.

Cognitive Learning Strategies

Managing the Computer Environment

Students' cognitive learning strategies for coping with the course requirement of Class Page participation included managing the computer environment. These learning strategies focused on management of computer-based information and the computer's text-based environment.

Information Management:

Information management was a cognitive learning strategy described by students as gaining skills such as navigating the World Wide Web and mastering the use of computer programs. Although Class Page activities were described as user-friendly by more than 75 percent of participants at week eight of the sixteen week course, at the end of week one only three students rated themselves as 'very skilled' at computer use. For the remaining 34 students, the skillful use of Class Page participation represented a major challenge. Sixty five percent of the students rated themselves as unskilled computer users, needing training in all aspects of the computer environment including the operation of a personal computer, a modem, communications software, a word processing program, and mainframe access. Students' lack of computer skills was a critical barrier to the successful completion of the course.

By week twelve of sixteen, 63 percent of study participants agreed that Class Page activities and resources were helping them understand class content, and 72 percent were enjoying Internet exploration. By the end of the course, 92 percent of studio students and 76 percent of off site students stated that Class Page expectations were

appropriate to their personal level of development. This response is a credit to the Class Page design and the students' information management when one remembers that, at week one, only 8 percent of the students considered themselves 'very skilled' computer and Internet users. As students developed learning strategies for managing computer-based information, their computer skills improved, comfort levels rose, and confidence in computer use increased.

Not all students successfully managed the information in the computer environment. At least four students reported avoiding Class Page involvement. For example, one student shared, "I did whatever it took to stay away from the computer. I got my friend to post my assignments. I dictated to her what I wanted to say on my survey. I mean, I really hated that computer."

When asked why they avoided the computer, the few resistant participants focused on their fears. For example, one student shared, "I'm really afraid of the computer. I know that's stupid. And everyone tells me so, too. I just couldn't force myself to use it." This condition, referred to in the literature as computerphobia, inhibited and, in two cases, prohibited Class Page involvement.

Information management was a cognitive learning strategy employed by students to cope with the Class Page environment. This environment required students to navigate the Class Page web site, as well as the Internet. Through the learning strategy of information management, students grew dramatically in their computer competency and comfort levels over the course of the sixteen week semester.

Text-based Environment:

A defining characteristic of the computer setting in the present study was the Class Page's dependency upon text-based communication. According to Nipper (1996), a hidden prerequisite of computer-mediated communication in distance education was that learners must cope with text-based communication processes. That is, learners must express themselves clearly and analytically in writing and track the written cognitive and affective messages of others. Learners must also communicate without the nonverbal cues so important to learning and information exchange. The cognitive learning strategy of managing the text-based environment of the Class Page was necessary for successful learning in this study context.

Interviews provided evidence of student responses to this text-only setting. For example, one student complained, "All that writing. Man - it's hard work. Thinking is hard enough, but on the Class Page you have to think and write!" Another student concurred, "I tire of writing all my comments and responses. I know I would do more on the Class Page if I didn't have to write. I need one of those speak-at computers. Then, no more writing!" The text-based computer environment was a limitation for these participants.

Other students found the written text a benefit. For instance, one student enthused, "I'm a better writer than speaker. In class, I normally keep quiet. I am just as happy to listen. When I write, I can reflect. I can say my thoughts in just the right way. I am definitely more articulate when I write than when I speak." Another student commented, "I like writing. It frees me to think quietly and slowly. To really ponder an

issue. I feel no pressure to respond immediately, so my responses are really the product of my reflections." For these participants, the text-only environment was liberating.

The theoretical perspective upon which this study was based is a constructivist perspective which claims that knowledge is socially constructed. Moore (1991) stated:

> The areas of student interaction and creating knowledge promise to be [computer-mediated communication's] main contribution to distance education .... It is the written dialogue ... between students that is making possible the creation of knowledge by students and [a] high level analysis, synthesis and critique of knowledge (Moore, 1991, p. 6).

The challenge for educators is to engage distance learners in this computer-based written dialogue. In the present study, written dialogue was primarily situated in the discussion area of the Class Page. Although students who chose to participate in the discussion area enthused about its benefits, at week twelve of sixteen only 14 percent of respondents reported having held a meaningful conversation and shared ideas and problems with fellow classmates on the Class Page. If knowledge is socially constructed and if the majority of students were not involved in the most socially interactive aspect of the Class Page, how effective was this learning environment? A more practical question might be, how could distance educators have motivated learners to become more involved? Setting involvement expectations, helping learners master computer competencies, and educating participants about the value of interaction may have contributed to higher participation in this interactive medium.

.A number of researchers studying university student responses to online courses found participants reporting advantages of text-based computer interactions. For

example, Harasim (1987) reported that students found that the textual nature of computer-mediated communication facilitated student-student interaction and provided ready access to the learning group. Maxcy (1989) found that students responded to text-based learning by developing closer personal relationships and more focused views of the text. Most student responses in the present study clearly contradicted these interpersonal findings. The more typical student response in this study was, "Writing everything out is a lot of work. It's easier to talk in class." This comment illustrated a critical difference between the contexts of the prevalent computer-mediated communication research and the present study. Most research settings were of online-delivered courses only. The online component in the current setting was supplemented by audio and video course delivery to sites at which there were at least two learners. In this setting, the social needs of the participants differed considerably from those in online-only courses. Participation in the current context was not dependent upon the effective management of the text-based environment. Learners could always go to class and dialogue face-to-face.

Wizer and Lynch (1995) surveyed 117 graduate students and reported that 54 percent of the respondents found the online course helpful for improving writing skills. Eastmond (1995), in his study of adult online learners, reported that written communications enhanced thinking, enabled creativity, and improved outlining and thought-generation skills. None of these findings were confirmed in the present research context. Most students reported their writing skills had not improved and no students reported enhanced thinking or creativity as a result of their written communications.

Student responses in the current study described the development of learning strategies in order to productively manage the text-based computer environment. Graddol

(1989) has stated that "computer-mediated communication represents a new cultural context for which [students] need to develop a new communication competence" (p. 241). Dean, Biner and Coenen (1996) discussed the need for research on the meta-disciplinary skills that work best in distance learning. Future research must focus on this new cultural context for which meta-disciplinary skills are required.

Personal Resource Management

A cognitive learning strategy employed by students to learn in the Class Page context was the management of personal resources. Personal resources included the investment of effort and management of time. This investment and management of personal resources paid dividends to students as they met course requirements through Class Page-based Internet exploration, assignment postings, and peer and instructor interactions.

Investment of Effort:

At week two of the sixteen week course, anxiety over Class Page participation was reported by 72 percent of study participants. For 79 percent of the respondents, Internet exploration was a new experience, and 84 four percent of respondents expected to learn new computer skills. Within this study population, a considerable investment of effort was required for learners to become comfortable and competent in the computer context of the Class Page environment.

Most study participants focused their Class Page efforts on meeting course expectations. For example, at week four, 60 to 70 percent of respondents reported

regularly reading the class questions, motivational and project ideas, class handouts, and the notice board on the Class Page. At week six, 63 percent of respondents reported exploring the Internet for class articles, and 45 percent reported that Class Page activities helped them understand class content. Effort was not being invested in peer interaction on the Class Page, as only 22 percent of respondents reported using the discussion area for sharing and discussing with classmates.

Investment of effort paid off, as 72 percent of respondents reported an improvement of computer skills by week eight. Major Class Page concerns at week ten were reported as computer access (60 percent), a supportive class setting (54 percent), and student/teacher interaction (47 percent). Access issues consumed student effort, as 47 percent reported they had no ready access to an Internet-linked computer.

By the end of the course, 76 percent of respondent reported feeling the effort invested in the Class Page had enabled them to achieve the course's purpose, had stimulated critical thinking, and had encouraged them to apply course concepts beyond the classroom. Ninety one percent of respondents felt free to express themselves on the Class Page and 82 percent felt Class Page expectations had been appropriate for their level of personal development.

Social learning theories contend that meaningful learning is a social endeavor. Within the social learning environment, learners were expected to develop peer and instructor relationships that maximized learning opportunities. When learners' efforts were focused on coping with the mechanics of the environment, little time or energy was left for reflective and dialogical learning activities. Although theoretically most effective, social learning was not viewed as most efficient by study participants. With limited

resources of time and energy, the value of meeting basic course requirements often overshadowed the value of social learning. In the current setting, effort required for mastering the Class Page environment absorbed effort that could have otherwise been spent in the social learning activities of the Class Page. One student shared, "The effort was worth it. I wanted to learn the computer. So I put in the time I needed to learn to travel around the Page and the Internet. But, because I'm still learning, all I had time and energy to do was the basics. No time for discussing, sharing with classmates, putting out my opinions." A purpose of the Class Page was to provide for social learning. Social learning was inhibited by lack of learners' computer experience that directed effort to learning activities perceived as more productive.

Management of Time:

The time management required for locating an Internet-linked computer, accessing and exploring the Class Page, and fulfilling the Class Page participation requirements was a constant stress for most study participants. At week ten of sixteen, 63 percent of respondents reported continuing difficulties coping with lack of time for computer interaction. The time strain was most often expressed when discussing Class Page discussion area interaction. One student shared, "The reason I'm not on the discussion area is because I don't have the time. I only have the time to do the Class Page parts I'm graded on. Of course, I always read the discussion area. But I never share."

This tendency to read, but not interact, in the discussion area of the Class Page was echoed by many respondents. For example, "I love the discussion area. It's the first place I go when I get on the Page. I read it word for word. But, no, I never say anything.

I mean, I don't really have the time to say anything." In discussing this tendency, Mason (1989) commented, "... all students blamed lack of time as the reason for reading rather than contributing. Some admitted that they felt guilty about reading without writing messages and others referred to a sense of disappointment at finding no new messages in the conference. This constant refrain began to sound like noise..." (p. 137). Lack of time or time management skills contributed to participants' reluctance to interact on the Class Page.

In coping with the Class Page environment, effective time management was required for the continuation of learner engagement and motivation. Although it was unclear to what extent time limitations influenced computer interactivity, management of available time contributed to participants' successful completion of course requirements.

Affective Learning Strategies

Interpersonal Networking

Interpersonal networking was an affective learning strategy described by study participants as a way of coping with the Class Page environment. This networking was described as organizing personal relationships with study participants in order to productively fulfill course requirements.

The primary purpose for including computer-mediated communication in this distance learning environment was to bridge the social distance between participants. The Class Page was designed to bridge this social distance by facilitating interactive learning opportunities among students. Posting assignments, communicating via email, linking to Internet sources, and participating in the discussion area were examples of student-student

interaction. Moore (1989) divided interactive learning into three types: learner-content, learner-instructor, and learner-learner. In this study, all three types of interaction were observed.

The affective learning strategy of interpersonal networking primarily focused on learner-instructor and learner-learner interactions. Interpersonal networking was defined as using fellow students and instructors as information sources and for course-related support. As a learning strategy, interpersonal networking was used by students to manage interpersonal relationships on the Class Page, and among classmates in person.

The Class Page environment was intentionally designed to support interpersonal networking. It was intended that students consider each other valuable sources of information. For example, in the discussion area, students were expected to learn from each other's experience, collectively solve problems, challenge each other in supportive ways, and explore new concepts. This discussion area required student engagement in active and constructive thinking. It was intended to move students away from viewing the instructor as the sole source of knowledge and authority. Although students reported using interpersonal networking to fulfill course requirements, the discussion area was generally not used to accomplish it. It seems the discussion area was avoided in favor of other interpersonal opportunities.

Although the Class Page was conceived and developed as a means for providing interpersonal interaction in a distance learning setting, the majority of study participants did not view the Class Page as a vehicle for developing relationships among class members. At week four, when asked if they agreed the Class Page was useful for interpersonal interaction, 53 percent of the respondents said they did not agree and 47

percent were undecided. Only 12 percent reported having shared and discussed with classmates on the discussion area of the Class Page. At week eight, 50 percent of respondents had not become acquainted with classmates on the Class Page and ratings of Class Page interactions were evenly distributed over response categories from 'poor' to 'good.' Overall, interpersonal interaction on the Class Page was not valued by study participants.

Discussion area participation fluctuated over the semester. For example, 12 percent of students at week four, 22 percent at week six and 32 percent at week eight reported discussing issues and expressing opinions on the Class Page. But at week twelve, discussion activity was reported by only 6 percent of the students, even though, by week sixteen, 91 percent felt free to express themselves and 50 percent found Class Page interaction helpful for mastering course concepts. The discussion area was considered by participants valuable in theory, but not in practice. Few students used it for networking with fellow classmates.

Some students' interpersonal networking focused on learner-instructor interactivity. At week eight, 90 percent of students rated the instructor's availability on the Class Page as 'good' to 'excellent.' Clearly, more students were actively communicating on the Class Page with the instructor than with fellow students.

Another source for interpersonal networking was fellow students at the studio and off site locations. For many, the Class Page indirectly stimulated interpersonal networking. Because of challenging access issues and lack of computer and Internet skills, many students reported networking with classmates more skilled in computer use and who had Internet access. For instance, one student enthused, "This Class Page has

really inspired me. I didn't know a thing about computers and I couldn't find one with the Internet. So, a classmate at my site invited me over to her house. She and I spend a couple of hours a week together doing Class Page stuff."

In a dozen interviews, participants described how both studio and off site students networked with one another to accomplish Class Page course requirements. Remembering that, at week one, only three students of 37 reported being 'very skilled' at computer use and only two of 37 students reported skill at Internet use, this out-of-class interpersonal networking was a valuable learning strategy employed by study participants.

The theoretical assumptions of this study maintained meaningful learning requires interpersonal interaction. Vygotsky (1978) stated that social interaction and collaboration with fellow learners were indispensable for cognitive growth. Self reports in this study stated that cognitive growth occurred. By the end of the semester, 63 percent of the respondents agreed the Class Page had stimulated critical thinking, 56 percent agreed Class Page interactions were helpful for mastering course concepts, and 70 percent agreed Class Page participation encouraged application of course concepts and competencies beyond the classroom. If Vygotsky's assumption was correct and the respondents' self reports accurately described student learning, this cognitive growth occurred though interpersonal networking developed to meet technical needs ("How do I get onto the Internet?"), support needs ("Can we do this together? I don't know how!"), and security needs (I'll read the discussion, but I'm not saying anything to total strangers! I'll talk to my friends in class."). Networking met learners' immediate needs to fulfill Class Page participation requirements.

Conclusions

Authorities in the field of distance education have advocated for research focusing on the learning and teaching experience within technological environments (e.g. Twigg, 1996; Bates, 1995). Through this study, the researcher attempted to describe and understand learner responses to computer-mediated communication in a multimedia distance learning context. It is intended that a deeper understanding of this learning and teaching experience will provide foundational information on which to base further studies of technology in distance education, and the future development of distance learning course offerings.

This study offers two primary contributions to the field of distance education. First, the educational environment of computer-mediated communication within this multimedia distance learning setting played an important role in determining learning strategies developed and employed by students in this context. The cognitive and affective learning strategies applied by learners in this study were developed by students in response to the medium of computer-mediated communication. This finding implies that media within a learning environment play an important role in determining how students will respond to, and learn from, their educational experience. For example, had the online component been absent in the present study, responses to a text-based environment would have been unnecessary. Without the Class Page, student responses to information management would have focused on more traditional management issues. Without computer skills to learn, students would have redirected their time and effort toward mastering class content. Computer-mediated communication within this distance learning

setting determined, to an important extent, the learning strategies developed and employed by learners in this context. Implications of this finding should be applied to the instructional and technological design decisions relating to future distance education development.

Second, distance course design, learner characteristics, and the design and interactive potential of the computer component importantly influenced the cognitive and affective strategies developed by course participants. Learners' responses to this multimedia distance setting were shaped by specific characteristics of the learning environment.

Nalley (1995) has stated that failure in distance education is a matter of not learning from experience. It is intended that instructors in, and designers of, multimedia distance learning environments may learn from the findings, analysis, and conclusions of this study.

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