DOCUMENT RESUME

ED 427 612 HE 031 862

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TITLE Fostering Collaborative Learning among Students Taking Higher Education Administrative Courses Using Computer-Mediated Communication. ASHE Annual Meeting Paper.
PUB DATE 1998-11-00
NOTE 25p.; Paper presented at the Annual Meeting of the Association for the Study of Higher Education (23rd, Miami, FL, November 5-8, 1998).
PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *College Administration; College Students; *Computer Mediated Communication; *Computer Uses in Education; *Cooperative Learning; *Distance Education; Higher Education; Interaction Process Analysis; Postsecondary Education as a Field of Study; Teaching Methods
IDENTIFIERS *ASHE Annual Meeting

ABSTRACT

This paper presents findings from two studies on the use of computer mediated communication (CMC) in distance learning courses in higher education administration. The first study compared differences between students (n=17) in a face-to-face (F2F) classroom and students (n=7) taking the same course using CMC. It analyzed differences in interaction within learning groups, achievement of course learning objectives, and satisfaction with the course. CMC course students reviewed the instructor's lecture notes on the course's Web page, and discussed issues from readings and lecture notes with group members and the instructor via e-mail. Students also completed a survey following the class and met with researchers as a focus group. Among findings were: interactions between CMC group members were not as satisfactory as in the F2F group; participation was more uniform in CMC group discussions than in the F2F setting; and CMC students achieved course objectives as well as F2F students. The second study specifically explored learning group interactions in a course requiring a group project. Two F2F groups and three CMC groups used different interactive approaches. Although the CMC groups used e-mail for regular communication, they also chose to meet face-to-face, either to discuss issues or to organize the final project. Recommendations for Practice and a third study are discussed. (Contains 45 references.) (DB)

Fostering Collaborative Learning Among Students Taking Higher Education Administrative Courses Using Computer-Mediated Communication

Paper Presented

at the

Association for the Study of Higher Education

Annual Meeting

November 7, 1998

Miami, Florida

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This paper was presented at the annual meeting of the Association for the Study of Higher Education held in Miami, Florida, November 5-8, 1998. This paper was reviewed by ASHE and was judged to be of high quality and of interest to others concerned with higher education. It has therefore been selected to be included in the ERIC collection of ASHE conference papers.

Introduction

Many state legislatures have been pushing for higher education to become more efficient and productive, as well as improving access (Gilbert, 1996). The utilization of technology, particularly computer-mediated communication (CMC), has implications for dealing with issues of access. Educational institutions need to assure that students learning at a distance using CMC, will have access to the same quality of education as students in traditional classroom settings.

Review of the Literature

Much of the literature cited regarding the use of technology in the teaching and learning process has focused more on the technology used rather than on the pedagogical issues. Gilbert (1996) suggests that instructors who would like to consider optional teaching methods utilizing various delivery systems lack information on what constitutes "good practice" (p. 11).

Interaction and Learning

Chickering and Gamson (1994) reviewed fifty years of research on teaching and learning in higher education. Their research resulted in the "Seven Principles of Good Practice for Undergraduate Education." In order to foster good learning they believe that good teaching should include: (1) interaction between faculty and students, (2) opportunities to develop collaboration and cooperation among students, (3) active learning, (4) timely feedback, (5) an emphasis on time management, (6) high expectations, and (7) different ways of learning.

Chickering and Ehrmann (1996) reviewed these seven principles and addressed the implementation of these principles using technology. First, technology has increased the opportunities for students and faculty to communicate via e-mail and electronic conferencing. Second, students can participate in on-line study groups or participate in collaborative projects utilizing communication technology. Third, students can interact with the World Wide Web conducting research or utilize computer programs that offer simulations in order to gain a better understanding of concepts. Fourth, technology enhances feedback to students. Communication technologies allow immediate feedback to students regarding questions, assignments or revisions on papers. Fifth, technology can make studying more efficient. Students can work at home at times convenient for them. Sixth, different types of learning challenges can be simulated using computer technology. Lastly, various types of technologies provide multiple delivery systems allowing instructors to offer students different methods more suited to their learning styles.

Others have followed Chickering and Gamson's (1994) lead regarding good practices. Tulloch (1996) developed the "Seven Principles of Good Practice in Distance Education." She claimed that individuals developing or teaching courses using distance education need to ask questions such as, how will we encourage student-faculty contact and collaboration among students?

Johnstone and Krauth (1996), in their article, "Some Principles of Good Practice for the Virtual University" have also endorsed some of the principles suggested by Chickering and Gamson (1994) and Tulloch (1996). They said electronically offered programs should provide, "appropriate real-time or delayed interaction between faculty and students and among students" (p. 40).

Several authors have written about the pedagogical rationale for using group discussion to foster student-to-student interaction in the classroom (Bonwell & Eison, 1991; Bruffee, 1994; Millis, 1995; Smith, Johnson, & Johnson, 1992). These interactive classroom activities in education have been called different things throughout history. Concepts such as active learning (Bonwell & Eison, 1991), cooperative learning (Johnson, Johnson, & Smith, 1994), and collaborative learning (Gamson, 1994; Millis, 1995) have all been used to describe interactive groupwork.

Whether discussing cooperative learning or collaborative learning, researchers have alluded to the characteristics of cooperative learning as developed by Johnson, Johnson, and Smith (1994). Johnson, Johnson, and Smith (1994) have developed five elements that they believe are necessary for certain kinds of effective group-work and interactions. These elements are positive interdependence, face-to-face promotive interaction, individual accountability and responsibility, social skills, and group processing.

Johnson, Johnson, and Smith (1998) reported the results of 305 studies conducted on cooperative learning with college students. Their meta-analysis suggested that cooperative learning promotes greater academic achievement, higher self-esteem, and greater perception of social support when compared to individualistic and competitive learning.

Barr and Tagg (1995) have examined the teaching and learning paradigms. The emerging paradigm is one in which the focus is learning and is centered on the learner as opposed to an instructor-centered approach emphasizing teaching. This shift in paradigms needs to be considered when delivering distance education as well as courses in the traditional face-to-face setting. Distance learning cannot be based solely on delivering factual information to students. These learners must be engaged in active, collaborative, and cooperative interactions. Educators need to find ways to accomplish this learning task utilizing new technologies (Maxwell, 1995).

Computer-Mediated Communication (CMC)

Academic leaders, politicians and consumers of higher education all have interests in the new technologies. Colleges and universities are being pushed to change the way they teach (Daniel, 1996; DeLoughry, 1992; Gilbert, 1996; Johnstone & Krauth, 1996). The delay in technology transfer to education is often compared to the technology used in bowling alleys. It took years for overhead projectors to make it from the bowling alley to the classroom. There is hope for educational uses of computer technology, bowling alleys are now using computers for scorekeeping (Brown & Duguid, 1996; Green, 1996).

Although there is the belief that these new technologies can improve the quality of learning, offer greater access, and be cost-effective, "commitment to change. . . is outpacing the availability of conclusive research results" (Gilbert, 1996, p. 10). Wells (1990) reviewed over a hundred articles and said that many of the studies were lacking "empirical evidence" (p. 3). Many of the papers and articles that exist are case studies offering recommendations for implementing computer technologies or reviews of the various types of technology available (Barnes & Greller, 1994; Berge, 1994; Eisley, 1991; Lundin, 1994; Smith, Kim, & Bernstein, 1993). Although technology is being implemented in the educational setting, there is a need for more research, particularly on the pedagogical uses of technology (Bailey & Cotlar, 1994; Geissinger, 1993; Kuehn, 1994; Mizell, 1994; Ruberg & Sherman, 1992).

Fredrickson (1992) used electronic mail to teach university courses to remote learners in Alaska. He reported that he had much more interaction with his remote students than on-campus face-to-face learners. Likewise, D'Souza (1991) found that e-mail led to greater student-to-student and instructor-to-student communication. Students have reported that there is more opportunity to communicate when there is access twenty-four hours a day, seven days a week (Harasim, 1991).

Schrum (1992) used a case study research design and discovered that students liked the immediate feedback provided through e-mail and that the greater access to the instructor provided confidence to students, which allowed them to do more problem solving on their own. She found that there was a higher completion rate with her course offered electronically when compared to other correspondence courses. Additionally, students reported that they were not bothered by the lack of face-to-face contact. However, they would have liked to meet their other classmates face-to-face.

A few studies have examined participation rates using computer-mediated communication (CMC). Data suggested that participation rates were much more uniform among group members when they communicated electronically. Individuals who tended to be inhibited by face-to-face dialogues were less inhibited when communicating via computer (D'Souza, 1991; Doucette, 1993; McComb, 1994; Scott, 1993; Sydow, 1994). In her review of literature, Wells (1992) also found that CMC fostered discussion and increased participation rates, however, instruction must be student-centered.

Sydow (1994) compared changes in face-to-face and CMC conversations as students switched modes of interaction in an English composition course. Her results showed that the quantity of interactions was much greater in the face-to-face conversations. However, conversation via CMC was much more on-task.

A long-term research project has examined various uses of CMC (Hiltz, 1986; Hiltz, 1988; Hiltz, 1993). Hiltz (1986) collected data from courses that used CMC to supplement traditional face-to-face courses. She found that for the most part, students agreed that CMC allowed for more student interaction, better access to the professor, greater learning, feelings of being more involved

in the course, and a better learning experience overall. Additional results suggested that student interaction and a greater sense of involvement in the course were highly correlated with higher perceptions of learning more.

Hiltz (1988) looked at CMC effectiveness based on collaborative learning activities. Comparisons were made among a face-to-face classroom, a class taught on-line, and one using a mixed mode. Results suggested that students taking the course on-line or using the mixed mode had better access to the professor and increased participation rates when compared to the face-to-face students. Almost half of the on-line and mixed mode subjects reported they had communicated with other students more than in other traditional courses they had taken. However, rates were higher for the mixed mode than those taking the course completely on-line. There was no significant difference in grades among the three modes.

Hiltz (1993) continued her studies by examining five courses offered by both on-line and face-to-face modes. She found that there were no significant differences between the two methods of delivery with regard to grades. Those students taking the courses via CMC were much more likely to report a better learning experience via CMC than other traditional courses, if the CMC allowed for "group learning" (Hiltz, 1993, p. 95).

Smith (1994) conducted an experimental study looking at the effects of supplemental CMC work on course satisfaction and final exam scores. He taught three of his courses in the usual manner (face-to-face), but augmented the third course with on-line communication. There were no significant differences found for the final exam scores between the course sections. Students taking the experimental course reported more dissatisfaction with the class.

McCollum (1997) reported on a study conducted in California. A professor randomly divided his course into two sections. One section attended class as usual and listened to lectures while the other section participated in collaborative learning activities via CMC. The CMC group outscored the face-to-face class by approximately 20 percent on exams. It was suggested that future studies require the same activities for both sections.

Summary

Distance learning cannot be based solely on delivering factual information to students. Educators need to find ways to engage students, studying at a distance, in interaction (Maxwell, 1995). New technologies lend themselves to providing interaction with distant learners (Fredrickson, 1992; Harasim, 1991; Johnstone & Krauth, 1996). However, there is a need for more research on the pedagogical uses of technology (Bailey & Cotlar, 1994; Geissinger, 1993; Mizell, 1994; Ruberg & Sherman, 1992).

Purpose of the Study

In order to meet the need for greater access to the only educational administration doctoral program in the state and provide flexibility for students,

the researchers redesigned literature-based courses so they could be offered using computer-mediated communication. An on-going research project is being conducted in order to evaluate the effectiveness of offering courses via computer-mediated communication in comparison to a face-to-face classroom.

The purpose of this paper is to report the findings from two classroom studies that have been completed and changes in course design that are now being examined in a third study. The first study explored the differences in learning between students taking a course in a face-to-face classroom (F2F) and students taking the same course using computer-mediated communication (CMC). Differences between the two groups were explored regarding interaction in learning groups, achievement of course learning objectives, and satisfaction with the course. The second study explored further the differences in learning group interactions.

First Course Design

Two sections of a graduate course, "The Principles of Higher Education," were offered by one of the authors of this paper. The purpose of this literature-based course was to provide students with a comprehensive overview of the principles and practices of American higher education. Students self-selected to take the course in a F2F classroom (n=17) or at a distance using CMC (n=7).

Students in the F2F classroom met once a week for three hours. During the first hour of the class the instructor gave a focused lecture. Following the lecture, students met for forty minutes in assigned collaborative learning groups to discuss issues from the readings and the focused lecture. The remaining time in the class was spent discussing the main points from the collaborative learning groups. This was done in a large group format with the other groups and the instructor. The collaborative learning group discussions were tape recorded each week and then transcribed.

Students taking the course using CMC reviewed the instructor's focused lecture notes that were posted weekly on the course web page. The CMC students were also assigned to learning groups for the semester. The CMC students were expected to discuss the issues from the readings and focused lecture with their group members via e-mail. Copies of the e-mails were forwarded to the instructor. The instructor then reviewed the weekly e-mail messages and provided feedback to each group via e-mail. Copies of the CMC e-mail discussions were collected by the researchers.

[Insert Table 1 About Here]

Classroom assessment techniques, as suggested by Angelo and Cross (1993), were utilized in this study. Both the F2F and CMC students were asked to complete a pre-assessment assignment during the first week of class in order to determine prior knowledge. In addition, learners completed a midterm and final exam. At the end of the semester, all learners met together in the face-to-face classroom and completed a course survey.

The survey was designed to measure students' perceptions of their achievement of the course objectives, interactions in learning groups and satisfaction with the course. The first part of the survey had responses based on a four-point Likert-type scale which formed on the following continuum: strongly disagree, disagree, agree, and strongly agree. The second part of the survey contained open-ended questions.

Upon completion of the survey, the researchers conducted a focus group with the CMC students to learn more about their learning experience. The focus group was tape recorded and transcribed.

Assessment of the First Course

Differences in Group Interaction

Three methods were used to determine differences in the interactions that took place in the learning groups. First, the collaborative learning group discussions were coded using Johnson, Johnson and Smith's (1994) five elements of cooperative learning. These elements consisted of positive interdependence, promotive interaction, accountability and responsibility, group processing, and social skills. The group discussions were analyzed to determine if there were differences regarding the group interactions based on the five cooperative elements. For the second method, responses were collected from the course survey regarding students' perceptions of the use of these five elements in their interactions. These responses were analyzed using quantitative methods. Lastly, the focus group interview with the CMC groups was analyzed to better understand how they perceived the interactions via e-mail.

The results of the qualitative analysis suggested that there was some positive interdependence in both the F2F and CMC groups. However, when explaining concepts, F2F groups were much more likely to rely on their own experiences and opinions while the CMC groups were more likely to cite the literature and incorporate the author's beliefs with their own experiences.

Students in the F2F groups promoted more interaction by questioning, responding, challenging each other and giving opinions, unlike the CMC groups where communication was only one way. Students would e-mail their initial responses to the discussion topic, but students would not comment or give feedback on each others' responses.

The F2F groups were found to be less responsible and accountable than the CMC groups. The CMC students said they felt more accountable and responsible because they were expected to not only share their opinions by weekly e-mails to their group members, but also with the instructor. Participation was much more uniform in the CMC groups with every group member contributing at least one response. Participation in the F2F groups was not as uniform. Some students dominated the F2F group discussion while other students would contribute some weeks and were silent other weeks.

Students in the F2F groups demonstrated more social skills and group processing skills by seeking out other group members' opinions and occasionally discussing how the group was functioning. One additional finding regarding interaction concerned the sharing of personal information. The CMC students shared more personal information on their weekly e-mails than the F2F students. They would mention things like the weather or what they had done the past weekend. The F2F groups shared some personal information but only when it related to discussion topics.

The results of the qualitative analysis of the group interactions were then compared to the students' perceptions of the interactions collected as part of the course survey. Due to the small sample sizes, Wilcoxon's rank-sum tests, a nonparametric test, was used on the data obtained from the survey items. Students' perceptions of the collaborative group interactions supported the findings from the qualitative analysis of the group interactions. Students in the F2F groups ($\underline{M}$ = 3.62) tended to agree that the groups helped promote interaction while the CMC groups ($\underline{M}$ = 2.85) tended to disagree. The Wilcoxon rank-sum test indicated there was a significant difference between the two groups ($\underline{p} < .05$).

The analysis of the CMC focus group reinforced this difference in the interactions. Students openly expressed their disappointment with the lack of two-way communication with their group members via e-mail. The CMC students made comments like:

> *Get everyone together on campus before it (the class) starts so that we can place a name with a face. It makes the contact a little more personal. Similar to what we have in the class when we have the face-to-face contact.*

> *Getting to know each other that first week (in a face-to-face setting) would break down some of the barriers. We could then chat more informally.*

[Insert Table 2 About Here]

Achievement of Course Learning Objectives

Two methods were used to assess the differences in course learning objective achievement between the F2F and CMC students. First, midterm and final exams were qualitatively analyzed according to the course objectives. The pre-assessment exercise served as a baseline for prior knowledge which indicated that the both the F2F and CMC students had very limited knowledge about the principles and practices of higher education.

Based on the students' performance on the exams, students in both groups learned the course objectives. When reviewing the exams, it was surprising to find that the CMC students referenced their group members when citing examples. This indicated that students must have read and reflected on

other students' responses and utilized the comments to learn the material even though weekly interactions were one-way.

The course survey was the second method used to assess differences in course learning objectives. The CMC and F2F students indicated that they felt they had achieved the course objectives. There were no significant differences between the two groups. Based on these assessments, it was determined that there were no differences in achievement of course learning objectives between the two delivery methods.

[Insert Table 3 About Here]

Course Satisfaction

The course survey was used to determine the students' self-reported level of satisfaction with the course. Students in both the CMC and F2F groups indicated on the course survey that they were satisfied with the course learning methods and materials. Quantitatively there were no significant differences between the two groups. The qualitative analysis of open-ended questions on the survey suggested that CMC students enjoyed the convenience of taking the course via the internet, although, they missed the face-to-face contact they would typically have in a F2F course. However, the convenience of not having to drive long distances was more important than the face-to-face contact.

One CMC student responded:
Taking the course via the internet eliminated a commute and allowed freedom to complete course work within my time constraints. Working full-time affects my ability to take courses with the long commute.

The CMC students also indicated that they would recommend the internet course to other students. They were not frustrated by the technology and would consider taking another course via CMC. One CMC student made the following comment:

Overall this was a really positive learning experience. I enjoyed the opportunity and would take another course via the "net." It is an experience that adds to a student's personal and professional growth.

Furthermore, some of the CMC students felt that the format of the course allowed for more reflection with regard to the discussion questions. One CMC participant said:

The weekly assignments forced me to think through the information presented and articulate an educated response (to the learning group). If I had been in the face-to-face class, I would not have necessarily taken the same amount of time to formulate my responses.

[Insert Table 4 About Here]
[Insert Table 5 About Here]

The instructor was surprised to learn from the open-ended questions on the course survey that F2F students were accessing the focused lecture notes on the internet that were intended for the CMC students. The F2F students indicated their appreciation for the availability of the internet notes. They found that if they printed the notes off the course web page and brought them to class they could participate more in the class discussion instead of focusing on taking notes. Both F2F and CMC students rated the content portion of the course (focused lecture notes) as being very important to their learning.

Several conclusions emerged from the assessment of the first course. First, interactions are different between students taking a course in a F2F classroom and those taking a course via CMC. The one-way interactions between the CMC group members indicated that the use of computer technologies does not always foster two-way interaction. Second, participation continues to be more uniform in CMC group discussions when compared to groups that interact face-to-face. Public display of student comments over the internet may account for CMC students' greater sense of responsibility to contribute to the group's discussion. Third, students taking a literature-based course via CMC can achieve course objectives as well as students taking the course in a F2F classroom. The lack of two-way interaction between CMC students does not hinder their achievement of course objectives. Fourth, students taking the course via CMC can be as satisfied with the experience as students taking the same course in the F2F classroom. Taking a course on the internet allows students greater flexibility and access to coursework. Lastly, although the literature suggests we need to include interactive activities in courses (Chickering & Gamson, 1994; Chickering & Ehrmann, 1996; Johnstone & Krauth, 1996; Tulloch, 1996), students still value traditional course methods such as course readings and the instructor's lecture (internet notes for the CMC class).

Second Course Design

Based on the assessment of the first course, a second course, "College and University Administration," was taught in the same manner as the first course with the addition of a required group project. Students were expected to develop a policy perspective for ten major policy issues discussed in the course. The purpose of the second study was to determine if the use of a required group project would promote collaborative learning and increase group interactions. Both F2F and CMC students were asked to meet in the face-to-face classroom on the first day of class, at midterm, and the last day of the course as suggested by CMC students in the first study. It was anticipated that the face-to-face meetings would increase the comfort level of those CMC

students that would be interacting via e-mail. Students self-selected to take the course in the F2F classroom (n=8) or at a distance using CMC (n=11).

Assessment of the Second Course

The same qualitative and quantitative methods used to assess group interactions in the first course were used to determine if a required group project promoted greater collaboration and group interaction. In addition, the final projects were evaluated to determine if there were any differences in the quality.

Differences in Group Interaction

Results of the qualitative analysis suggested that the CMC group interactions were more informal and more two-way interactions took place in CMC groups when compared to the first course. However, the interactions in the F2F groups were still greater than those in the CMC groups. Quantitative analysis of students' perceptions of the group interactions revealed that there was still a significant difference ($p < .05$) in how the students perceived the group interactions. The F2F group members strongly agreed ($M=4.00$) and CMC group members agreed ($M=3.36$) that the collaborative groups helped them exchange, process, and provide feedback to other group members. This indicates a change from the first course where the CMC group disagreed ($M=2.85$) that the collaborative groups helped them exchange, process, and provide feedback to other group members.

[Insert Table 6 About Here]

The Group Project

Qualitative analysis of the group project indicated that students in both groups had achieved the course learning objectives, but not the objective of the group project. The purpose of the group project was to "require" that students discuss the policy issues and come to consensus as to what the group wanted as a policy statement regarding the issue. In evaluating the final projects and analyzing the group discussions, it was interesting to discover a relationship between the group interactions and how the projects were completed.

There were two groups of F2F students. One of the F2F groups spent a great deal of time in their small groups discussing which individual was going to write which policy statement. Each group member then wrote their section, soliciting other group member feedback when the draft was completed. In reviewing their final project, it was obvious that each policy was written by a different group member. The wording was different and there was no consistency from one policy statement to the next and each statement was typed in a different font. The second F2F group spent their weekly group time discussing the policy in detail soliciting everyone's input. At the end of the group discussion one of the group members took the responsibility of writing up what the group had decided. Their final project read much more like a group

report. They used the term "we" and described how the group had come to consensus on the individual policy statements.

The CMC students were assigned to one of three groups. One CMC group divided up the sections similar to the first F2F group and solicited each other's feedback on drafts via e-mail. At the end of the semester, this group met face-to-face on campus to write the final draft of the policy statements. The second CMC group decided to rent a hotel room near the campus for two weekends to write their policy statements. The final project for both of these CMC groups was similar to the first F2F group. The members of the third CMC group lived in the same metropolitan district sixty miles north of the campus. This group decided to meet weekly at a coffee shop to discuss the policy issues and come to consensus on their policy statement. Their group interaction was similar to the second F2F group where they discussed the policy issues and one person assumed the responsibility to write the group's conclusion. Their final report read as a group report. Although all three CMC groups used e-mail to communicate weekly, all three groups chose to meet face-to-face to either discuss the policy issues or organize the final project.

Some of the written comments received from the CMC group at the end of the course included:

> *Preparing my section of the policy perspective really helped me understand the issues-the actual accumulation of the policy perspectives and trying to work together was difficult.*
>
> *The delay in exchange of drafts by e-mail resulted in less synergy than I expected would have been true in a face-to-face class.*
>
> *Coordination of responsibilities became clouded and we were forced to "physically" meet--it kind of defeats the purpose of taking a course via the internet.*

The results of the second study suggested that the required group project did foster greater collaborative learning based upon Johnson, Johnson and Smith's (1994) five elements. In particular, the interaction between the CMC students did increase and was more informal. This could have been fostered by the fact that the CMC students were required to meet face-to-face at the beginning of the course and that they chose to meet face-to-face to complete the group project. The interesting finding was that only two groups, one F2F and one CMC, used a group consensus process to write their policy statements. So, the structuring of the group process may be a critical element in fostering greater collaborative learning.

Limitations of the Study

This study may have been limited by the following factors. First, the samples in this study were limited to graduate students enrolled in a particular

course that self-selected the learning method. Also, the sample sizes were small and some of the results may not be generalizeable beyond the population from which the samples were drawn. Lastly, one of the researchers was also the course instructor.

In order to learn more about our teaching and our students' learning, classroom assessment techniques must be utilized. Angelo and Cross (1993) suggest that classroom research will help faculty know how their students learn and what methods work best. In reviewing assumptions for classroom assessment, Angelo and Cross state, "The type of assessment most likely to improve teaching and learning is that conducted by faculty to answer questions they themselves have formulated in response to issues or problems in their own teaching" (p. 9).

Recommendations for Practice

Based on the findings and conclusions of these studies, the following recommendations for practice are made.

1. Educators providing learning opportunities to distance learners should consider ways to foster faculty-to-student and student-to-student interactions.
2. An initial face-to-face meeting with CMC learners may break barriers and allow for more interaction via CMC.
3. Educators providing learning opportunities to CMC learners may need to provide some structure by requiring response deadlines for interactions.
4. If an educator desires certain outcomes for a course, group activities may need to be more structurally defined in order to foster greater interdependence in both F2F and CMC groups, more interaction among CMC groups, and greater responsibility and accountability in F2F groups.
5. Educators teaching F2F learners may want to augment the class by putting course notes on the internet.

Future Study on Structuring Collaborative Learning

A third study is in progress to further examine the structuring of the group process. The researchers hope to determine if academic controversy, as outlined by Johnson, Johnson, and Smith (1996), will provide the necessary structure to foster even greater collaborative learning among students taking a course using CMC.

Johnson, Johnson, and Smith (1996) applied the concept of cooperative learning to intellectual conflict in a small group process which they call academic controversy. "Academic controversy exists when one student's ideas, information, conclusions, theories, and opinions, are incompatible with those of another student, and the two seek to reach an agreement" (Johnson, Johnson, and Smith, 1996, p. 4).

Johnson, Johnson, and Smith (1996) cited the research that has resulted in three broad categories of controversy outcomes: achievement, positive

interpersonal relationships, and psychological health. Research suggests that academic controversy results in "greater mastery and retention of the material and skills being learned than concurrence seeking, debate or individual learning" (Johnson, Johnson, and Smith, 1996, p. 4). In addition, individuals who experience controversy are better able to apply the principles they learn to a variety of settings when compared to those who don't experience controversy. It is also suggested that group controversy results in higher-quality solutions, creative insights, positive relationships among students, and more social competence. The value of controversy doesn't lie so much in finding a correct position for a controversial issue, but rather in the critical thinking that is invoked.

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Table 1

A Comparison of F2F and CMC Methodology

Activity	F2F (n=17)	CMC (n=7)
Focused lecture	F2F with instructor	Focused lecture notes on the web
Collaborative learning groups	F2F discussion with group members	E-mail between group members
Processing with instructor and other groups	F2F with instructor	Instructor feedback to groups via e-mail

Table 2

Student Perceptions of Group Interactions

Question	F2F (n=17) M	F2F (n=17) SD	CMC (n=7) M	CMC (n=7) SD	Z Score	p
The collaborative learning group helped me:						
Learn the material	3.37	.80	3.42	.53	-.11	.90
Help others in my group	3.43	.81	3.16	.40	-1.33	.18
Exchange, process, and provide feedback to other group members	3.62	.61	2.85	.69	-2.36	.01*
Be accountable and responsible for reading the material in order to communicate with group members	3.43	.62	3.85	.37	1.56	.11
Seek to understand the other students' opinions	3.75	.44	3.57	.53	-.79	.42
Give feedback to the group on how our group was functioning	3.18	.83	2.85	.69	-1.13	.25

*p<.05

Note: 1=Strongly Disagree, 2=Disagree, 3=Agree, 4=Strongly Agree

Table 3

Student Perceptions of Achievement of Course Learning Objectives

Question	F2F (n=17) M	F2F (n=17) SD	CMC (n=7) M	CMC (n=7) SD	Z Score	p
As a result of this class I:						
Understand the principles and practices in American higher education	3.47	.51	3.57	.53	.40	.68
Understand the historical developments in American higher education	3.88	.33	3.71	.48	-.93	.35
Can describe the organizational structures in different types of institutions in American higher education	3.52	.51	3.42	.53	-.40	.68
Understand the needs and interests of students in different types of institutions	3.70	.58	3.71	.48	-.12	.89
Can reflect on the major issues in American higher education	3.70	.46	3.71	.48	.00	1.00
Can demonstrate an understanding of higher education issues by being able to trace their development and current status	3.29	.46	3.28	.48	.00	1.00

Note: 1=Strongly Disagree, 2=Disagree, 3=Agree, 4=Strongly Agree

Table 4

Satisfaction With Course Method and Materials

Question	F2F (n=17) M	F2F (n=17) SD	CMC (n=7) M	CMC (n=7) SD	Z Score	p
The following enhanced my understanding of the course:						
Course readings	3.52	.51	3.57	.53	.14	.88
Instructor's lecture[a]	3.88	.33	3.85	.37	-.11	.91
Learning groups	3.47	.79	3.14	.69	-1.16	.24
Class discussions[b]	3.52	.62	3.42	.53	-.50	.61
Midterm & final exams	3.58	.61	3.32	.48	-1.33	.18
Instructor's internet notes[c]	3.60	.55	NA	NA	NA	NA

Note: 1=Strongly Disagree, 2=Disagree, 3=Agree, 4=Strongly Agree

[a]Worded as teaching notes (from internet) for CMC class

[b]Worded as instructor's comments for CMC class

[c]Not included on CMC survey

Table 5

Overall Course Satisfaction

Question	F2F (n=17) M	F2F (n=17) SD	CMC (n=7) M	CMC (n=7) SD	Z Score	p
My expectations for this course were met	3.58	.50	3.42	.53	-.66	.50
I enjoyed the collaborative learning groups	3.70	.68	3.42	.53	-1.51	.13
I enjoyed coming to class	3.82	.39	NA	NA	NA	NA
I enjoyed the freedom that taking this course via the internet allowed me	NA	NA	3.85	.37	NA	NA
I would recommend this course as an elective to a non-major	3.82	.39	NA	NA	NA	NA
I would recommend taking this course via the internet to other students	NA	NA	3.42	.53	NA	NA
The technology involved with the internet frustrated me	NA	NA	2.14	.89	NA	NA
I really missed the face-to-face contact in this course	NA	NA	2.57	.79	NA	NA
I would NOT choose to take another course on the internet	NA	NA	1.14	.47	NA	NA

Note: 1=Strongly Disagree, 2=Disagree, 3=Agree, 4=Strongly Agree

Table 6

A Comparison of Student Perceptions of Promotive Interaction Between the Two Courses

Course	F2F M	F2F SD	CMC M	CMC SD	Z Score	p
Question: The collaborative learning group helped me exchange, process, and provide feedback to other group members:						
First Course	3.62	.61	2.85	.69	-2.36	.01*
Second Course	4.00	.00	3.36	.67	2.09	.03*

*p<.05
Note: 1=Strongly Disagree, 2=Disagree, 3=Agree, 4=Strongly Agree

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