THE ON-LINE CLASSROOM FOR ADULT LEARNERS
AN EXAMINATION OF TEACHING STYLE AND GENDER EQUITY
by
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(ABSTRACT)

Two major questions guide this study: How are different on-line teaching styles related to classroom participation; does the on-line classroom generate a more gender-neutral environment? The data source for this study was a classroom instruction and performance program at a mid-size university in the Northwest. Included in this study were 59 students (38 males and 21 females) with 75 separate course records from six classes. Each academic discussion conference transcript was coded by message to record message traffic flow for each instructor and student.

There were four actions that instructors used that influenced the participation performances of their class. The organization of the conferences influenced participation performance. The two discussion conference model out performed the single conference model in message traffic. Instructor guidance, which was issued by message, had a profound affect on student performance. Although each instructor assigned a percent of the final grade based on
participation, this guidance appears to have been relegated low on the students' priority. Guidance given in a prepared syllabus which the students received both in paper and electronic form did not have the same impact as a personal instructor message. At the start of the study, it was assumed the instructors would provide most of the on-line encouragement to students to participate. During the coding process it became obvious that fellow students provided most of the positive social encouragement to participate. Not only did these students conduct student-centered discussions but they also self-motivated the group to participate more.

Does the on-line classroom foster a more gender-neutral environment? The results of this study are mixed, but very encouraging. There was no flaming or questionable innuendoes detected in any of the messages. The t-tests did not show a significant difference between male and female participation performance except for length of message. Females were encouraged by their peers to participate and their messages were valued. Since one did not have to wait a turn to speak in these on-line classrooms, there was more air time for all. In these on-line courses the verbose did not silence the rest.
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At the end of a doctoral program and dissertation, one is like a turtle on a stump. Everybody can see you but they know you did not get there by yourself. I certainly did not. Many men were very instrumental in this effort. Harold Stubblefield Advisor/Chair coached an old soldier in the ways of academia. Ron McKeen accepted my argumentative style in class and gave me very good advise on finishing the effort. Bruce Allen, who took the time to help me over the Internet and gave me leads that enhanced this project were very key to this effort. My Dad's rule that said you must finish what you start helped me carry on when I was frustrated and down. While the study examined teaching styles, the soul of it for me was the gender issues. It seemed to me to be an odd motivator for a career Army officer. But when one considers the women role models in my life perhaps it is not. Women played the key roles in this effort.

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CHAPTER I

INTRODUCTION

Background of the Problem

As the world faces the year 2000, change is occurring at an ever increasing rate. The Executive Branch of the U.S. Government published a report (1993) that established national goals and specific new initiatives supportive of the need for the nation to respond to the challenges of the information age. In no area is this more pronounced than with the current information explosion (Branscomb, 1979; Toffler, 1970, 1980). In many technical fields, the half-life of information is less than five years (Darkenwald & Merriam, 1982). As the volume of information increases and the nature of knowledge changes, a transformation from a capital-oriented industrial society to an information based economy is occurring (Boshier, 1985; Boulding, 1964). This shift in the economy has forced many people to undertake further education and retraining (Bell, 1980; Lindsay, Morrison & Kelly, 1974). A Department of Labor study estimates that a 20 year-old man will make six to seven job changes in the course of his working life (Wirtz, 1975). The half-life of an engineer’s knowledge in 1988 was
estimated at five years (Cetron, Rocha, & Luckins, 1988). By 1995, it had been projected 80% of all managers will be information workers. The need and desire for additional education and retraining are making lifelong learning an absolute must to survive (Naisbitt, 1982).

This expanded need for lifelong learning is placing more demand for non-traditional educational delivery systems (Johnson, 1987). Vice President Gore in a speech at the National Press Club (1993) warned that we can not allow major segments of our population to be excluded from access to distance learning technologies. Also, many potential students desiring additional education are located in remote areas where traditional educational opportunities are not available.

Educators have used distance education in all of its forms to foster access for a greater audience than traditional time and place bound institutional learning systems could possibly reach. Correspondence courses, which used the first distance education delivery system, the mail, have enjoyed wide spread popularity for many years. They have been available from many institutions and organizations. Information Technology has afforded the distance educator the opportunity to choose from a number of
other promising alternatives: Television in all its forms and audiographics are two of the more popular. Television delivery options range from video tape to full interactive teleconferencing. Because of its lower cost and near equal learning achievement the most popular form of TV delivery is one way video and two way audio. Audiographic teletraining is simple and easy to operate. It is based upon the telephone conference call, a graphics capable computer, and a graphics board that allows for the display of both graphics and still video on the same monitor. Not as popular as TV, audiographics is a very good training device for a narrow range of subjects such as computer programming and other skills that can be trained.

Another alternative is the on-line classroom. This is a technological advancement in distance learning delivery systems which uses a computer and a wide-area network to link students and faculty. Access to these systems is either synchronous or asynchronous. As students see the discussion positions from their peers, they can make side comments or add their own thoughts on the subject. Thus begins a seminar between participants that are separated by geography but connected by technology.
The On-Line Classroom

The on-line classroom offers students a number of advantages over the traditional classroom. The first obvious advantage is the freedom of the student to take his/her class at the time and place of his/her choosing. Students can participate at any time of the day or night which suits their work schedule and preferred study habits. If travel is necessary as a part of his/her job, the on-line classroom can follow the student if s/he has a notebook computer with him/her (Krumenaker, 1994). Many students have observed they like the ability to take their time in formulating their discussion comments. This is especially so for students who are reticent about speaking up in class. Students may have more contact with their teachers in the on-line classroom since the teachers are as near as the electronic mail for private or public discussions. Since the students can be anywhere geographically, many classes have a rich diversity that includes an occasional foreign student. Although many of these advantages are similar to those cited for the traditional correspondence course, there appears to be a stronger feeling of connection with other students that is lacking in the correspondence course student.
Providers

Creative writing courses are one of the most widespread and popular uses of the on-line classroom today. Used in the synchronous mode on its local area network, the University of Texas has found the collaboration generated among students working on the composition of papers is very powerful in the learning process (Bump, 1990). This power is derived from students and teachers being able to actually observe the writing process as it appears on the screen. That is to say that the student writing is appearing on others' screens simultaneously. This was not possible in the past. They have also used this model to teach senior humanities courses. Many other major universities offer creative writing courses using this model.

The National Distance Learning Center in Owensboro, Kentucky in partnership with the U.S. Federal Government has recently created an automated data base available through the Internet that lists five providers and over 150 courses using the on-line classroom. The two largest providers are the University of Phoenix On-Line Programs which offers four degrees entirely on-line and the New York Institute of Technology which offers three. The degrees are in such areas as Management, Behavioral Sciences, Business
Administration, and Interdisciplinary Study.

This new database is by no means exhaustive. One of the largest institutions to offer courses which is not in the data base is NOVA based in Florida. A large organization that offers its courses through a variety of different delivery modes, NOVA offers MS and doctorate degrees in computer science, information systems, and computer technology in education to mention but a few. These programs which are described in their catalogue use the on-line classroom to supplement other delivery systems. Another is the International School of Information Management (ISIM) based in Denver. ISIM offers an MS in Information Resources Management, an MBA, and other individual courses. The New Jersey Institute of Technology (NJIT) has also been a pioneer in this delivery system and the research connected with it. The popularity of the delivery system is growing and new programs can be found on many campuses across the nation.

Research

classes at NJIT to determine if learning achievement was different between traditional and on-line classrooms. Most of her findings were favorable to this distance learning mode. Although there were no significant differences in scores which measured the mastery of material taught, students found it superior to the traditional classroom in the following areas: convenient access, access to the professor, increased level of interest, equal or less inhibition to participate, and group collaboration skills. However, it is not, as Hiltz conceded, for all students. Students with low ability in reading, writing, and computer skills, who may be able to use their verbal skills to their advantage in the traditional classroom, are hurt more by the on-line classroom delivery system.

Eurich (1990) also discussed this question of effectiveness. Eurich observed that students created distinct informal writing styles as they developed into small groups. She concluded these writing styles allowed for freer communication within the group and is one of the reasons for the intense learning that takes place in this delivery mode. Another key to this learning process is the student's acute concentration on the issues discussed. Because students can read and reread the questions and
answers, they can take time to reflect, review their answers, and modify them before submission. Prior to sharing their answers or position on issues, they can consult others as part of their learning process. Students with less command of the language have the time to compose their positions to better reflect that which they wish to communicate. Students like the conference delivery method and spend an average of three times longer on the system than required. Although both these studies established the on-line classroom as an effective teaching alternative to the traditional classroom within their individual programs, much is still to be done.

Beaudoin (1991) presented a paper at the Second American Symposium on Research in Distance Education that outlined the research weaknesses in the distance education field. The picture is not good. Most so-called research is descriptive in nature and only reports on one program which make the studies of little value to scholars outside the given program. Coldeway (1990) agreed that the evaluative case studies of one program can not be generalized to other programs as theory-based research can be.

In her research review, Wells (1990, 1993) asked, what instructor's teaching style is most effective for fostering
participation in the on-line classroom. She discusses the role of instructor as a facilitator. In this role the instructor should not merely answer questions but should deflect some of them. At times it might be appropriate to delay answering questions to allow other students to share their views first. She warns that too frequent input from the instructor might reduce the responsibility students take for developing and preserving a true conference. She believes that teaching styles of instructors and their effect on student participation to be a rich topic for further study.

**Statement of the Problem**

**The Traditional Classroom Environment**

Knowles's (1990) Andragogical Model is based on a number of assumptions about adult learning including the role of the learners' experience. If one accepts the assumption that a learner's experience is a critical ingredient in the adult classroom, it becomes a rich resource in the pursuit of learning. If that classroom resource is to be fully realized, then all members of the class must feel free to participate in discussions as equal
partners. Participation in classroom discussions refers to active verbal contributions a student makes during the conduct of the class. Research has shown that not all members of the traditional face-to-face classroom feel like full and equal partners (Hali, 1982; Rich, 1979; Spender, 1980; Selfe, n.d.).

The dominant members of a class are often male. A small group of talkative males may quickly stifle the discussion of the rest of a class. This assertion is substantiated by a number of these sources who give a variety of reasons (Hall, 1982). It is a combination of both male and female actions that cause this silencing.

Researchers in gender differences concerning speech patterns have isolated certain features of speech that foster the silencing that happens in the classroom. These patterns, which occur in everyday speech, are not unique to women but are shared by individuals and groups that are afforded low status and little power (Hall, 1982). These features include: hesitation and false starts; high pitch; "tag" questions (the argument is strong, don't you think); a questioning intonation in making a statement; and excessive use of qualifiers. These features are culturally constructed in response to the realities in our society where women and
other groups are taught to express themselves politely and cautiously.

To make this worse, the normal classroom setting is masculine in tone. The valued speech patterns include: highly assertive language, impersonal and abstract styles, and competitive bantering. Some theorize that much of the higher education teaching is accomplished based on an argumentative dueling model (Ebben & Kramarae, 1993). Kramarae and Triechler (1990) report that white males in particular talk about education in metaphors pertaining to war, such as the pleasure of "battling over ideas". This combative style of education appears to be at odds with women's preferred ways of learning. A number of researchers conclude that women's preferred style of learning is collaborative, cooperative, and interactive (Maher, 1985). One manifestation of this can be observed when a group of female students who have not contributed to a heated classroom discussion strike up a calm conversation on the topic at the break. Lewis and Simon (1986) wrote a particularly insightful article that describes the power of gender-silencing that goes on in the traditional classroom. Lewis posed as a student in the class while Simon was the instructor. The article underscores the other research
cited above as Lewis tracks the gradual withdrawal of the females from the conversations in class.

Women tend to be interrupted more and their comments valued less. In mixed gender conversations, 98% of the interruptions are made by men (Zimmerman & West, 1975). They note that women accept these interruptions but that if a woman interrupts a man, he believes that his right to be heard is being violated. Spender (1980) explains that interruption is an effective male mechanism to stop women from talking and to gain the floor themselves. This is not normally a conscious action but rather one that is culturally learned and employed unconsciously. Under these circumstances women tend to withdraw.

While white female students talk about the lack of collaborative work, many Hispanics and Native American students, male and female, feel that openly disagreeing with a teacher is a sign of disrespect. These tendencies lend themselves to effectively silencing these groups in the classroom (Melendez, & Petrovich, 1989). Minorities, especially those whose first language is not English, often lack the confidence in their command of the English language to contribute and will remain silent.
Attenuating Social Cues on the Computer

There is wide-spread acceptance that computers can greatly increase the flow of information because of their ability to down load files so that the information can then be reviewed at one's own pace (Hiltz, 1986). Additionally, the lack of nonverbal and visual cues can diminish social presence (Short, Williams & Christie, 1976). Nonverbal and visual cues refer to such things as the gender, race, clothing, noticeable accent, and height of the individual. They can also refer to the trappings of power, such as the size or location of the desk or chair, insignia on uniforms, and age. McGuire, Kiesler, and Siegel (1987) showed that the use of computer conferencing in the workplace, has reduced social cues that inhibit communications. In fact, in decision groups using computer conferencing, they found nearly equal participation among all members regardless of gender or race. Since the on-line classroom, like computer conferencing uses computer mediated communication, it may be that more equal participation is achieved in the on-line classroom (Peterson, 1989).

Teaching Style

Instructors have found that they need to modify their teaching style to accommodate the on-line classroom
environment (Kaye, 1989; Nipper, 1989; Turoff, 1990; Konttinen and Marttunen, 1991). It is normally more appropriate for the instructor to pose questions rather than just supplying answers or to deflect student questions to the whole class for consideration. This shift to a more facilitative style normally means that instructors monopolize less class time. For example, in a face to face class, the instructor might contribute 60-80% of verbal interaction (Dunkin & Biddle, 1974; McDonald & Elias, 1976), while an on-line classroom instructor might only contribute 10-15% (Harasim, 1987). Because the instructor is not seen, his/her stage becomes the active conferences of the on-line classroom. The organization of these conferences is one expression of the instructor's style.

Active equal classroom participation, recognized as an essential ingredient in adult learning experiences, is not achieved by women and minorities in traditional classrooms (Hall, 1982; Rich, 1979; Spender, 1980; Slefe, n.d.). Although studies have been done using student characteristics and teaching styles to examine other types of distance learning delivery systems, little has been found that examines the on-line classroom specifically in the area of active classroom participation. In order to better
understand the dynamics at work, it is necessary to examine the relationships between students' characteristics, instructor teaching style and active participation in the asynchronous on-line classroom.

**Research Questions**

Two major questions guide this study:

1. How are different on-line teaching styles related to on-line participation?

2. Does the on-line classroom generate a more gender-neutral environment? Specifically, what differences are there in the following measures:
   a. number of messages sent
   b. length of messages
   c. student/instructor reaction to messages
   d. amount of personal encouragement to participate by other students or instructors

**Significance of the Study**

Because little research exists in this area, this study was exploratory in nature. The study shows that the on-line classroom fosters a more gender-neutral environment. Since this is true, the on-line classroom should be a more
attractive alternative for those students that feel stifled in the traditional setting. It lends insight into which teaching styles or techniques are more prone to produce active student learning as measured by participation.

Limitations of the Study

The institution under study has placed certain restrictions on the data available which are discussed in more detail in Chapter III. As a result, the study is restricted to examining gender issues and a very limited number of student characteristics. It has several other limitations that must be recognized when interpreting the results.

1. Since all the students were already enrolled in the program and therefore self-selected, the sample is restrictive and not random.

2. The study includes several uncontrolled variables. Assertiveness is one such variable that is not controlled for in the study. Because the researcher is using an existing data base with strict privacy rules only minimal student characteristics were used.

3. Only public messages within the class are available. Thus private encouragement and other private
communications are not captured.

4. Instructor teaching style is not examined on a common course. Rather each instructor is teaching a different course to which he was assigned.
CHAPTER II

REVIEW OF RELEVANT LITERATURE

Introduction

This chapter reviews the literature related to the asynchronous on-line classroom, the gender and racial bias in the traditional classroom and computer-mediated communications. Since this study is interested in the on-line classroom, this review is limited to asynchronous computer conferencing rather than the use of computers in the traditional classroom to enhance interaction or computer assisted learning. It does examine computer conferencing in the work place since much relevant research has been conducted there.

This review is organized into three parts. The first part examines the pertinent studies of the on-line classroom which concentrated on delivery system effectiveness, student acceptance and cost effectiveness. The second part examines the difficulties experienced by selected students in the traditional classroom environment. The final section examines the studies done in computer-mediated communications in the work-place that reinforces advantages
to the on-line classroom not initially realized in the early studies.

**On-Line Classroom Research**

Because the use of on-line classrooms is so new, this literature revealed a basic commonality of purpose throughout. Each study wanted to establish the effectiveness of the delivery system and demonstrate strong student acceptance of the system. This is not surprising since any new program which consumes scarce resources must first justify itself as effective before other research can be possible.

In the earliest efforts to examine the on-line classroom, Hiltz (1991) evaluated the on-line classroom extensively in a project that she conducted from 1985 to 1987 with major funding from the Annenberg/CPB project. This study compared the performance of traditional classrooms with on-line classrooms. Since this was the first extensive study of the new learning environment, Hiltz was concerned with two questions. Is the on-line classroom a viable educational delivery system? What are the key variables associated with various outcomes of this new educational environment? She wanted to establish the value of and some insight into the advantages of this new system.
The main research design was based on matched but nonequivalent classes of the same course delivered using the traditional classroom or the on-line classroom. The traditional classroom is understood to be the normal on-campus face-to-face classroom, generally delivered in the lecture mode. After the study began, a mixed delivery mode was also used for some classes. The mixed mode included both the traditional classroom and on-line classroom. As the on-line classroom was being used for the first time on both campuses in the study (New Jersey Institute of Technology and Upsala College), some variations in improvements of teaching techniques occurred as the instructors became more familiar with the system. In order to increase the number of subjects in the study, classes using a mixed mode of the traditional classroom and on-line classroom were adopted for some analysis. Five courses and 315 students were studied. The same professors were used for all three classroom environments. Pre- and post-surveys and a limited number of interviews, were conducted to augment actual demographic and performance data to conduct the analysis.

Some methodological problems that Hiltz experienced are important to note at this time. The study was unable to
attract the large number of students for the on-line classroom classes as planned. Use of content analysis of class transcripts to compare the different modes was abandoned because it was extremely time-consuming, expensive and did not yield very insightful data. The effort to compare ratings of the on-line courses which were "student centered" with those that were "teacher dominated" yielded no useful correlations. Although attrition analysis of the various classes was planned, two problems plagued the effort. Timely notification and interview of drop-outs was not possible because students circumvented the established administrative system. They did not attend the required instructor counseling nor gain prior approval to drop a given course. Students that did drop courses were not cooperative in course-end interviews nor did they submit surveys as planned. These problems can be expected in any effort to study attrition. Finally, a locus of control measure yielded no useful results.

In spite of these challenges, the main thrust of this pioneering effort was fulfilled. Hiltz was able to show that the effectiveness of the on-line classroom, as measured by student achievement and satisfaction, was as good as or better than the traditional classroom. This conclusion was
based on student performance data in the form of standard graded exercises for each group and self-reported measures of effectiveness. The other main answers to the questions of student satisfaction with various aspects of the on-line classroom were very favorable.

Although the issue of the positive effect of attenuation of social cues was not a prime objective of the study, the post-surveys did reveal that forty-four percent of the students felt communication was less inhibited compared to 23% which felt more inhibited (Hiltz, 1990). Additionally, students found that the time they could take to hone their answers off-line was helpful. This was the most extensive early study done to validate the effectiveness of the delivery system and provide some insight into the student's perceptions of the advantages of the on-line classroom. It encouraged others to adopt this new educational delivery system and fostered other research.

During the same time that Hiltz was conducting her study Haile (1986) was trying to determine if the new delivery system was supporting the distance learner in the way that it had originally been envisioned. She wanted to learn why so many did not complete their programs and what teaching techniques could be supported by the on-line
classroom. Transcripts of six undergraduate courses were analyzed with respect to high versus low teacher-provided structure and high versus low student participation. In addition, the courses were content analyzed to determine the frequency of four categories of messages: class management, technical assistance, motivational, and content-specific.

All but one of the courses studied had one student each while the sixth course had three students. The eight students were adults ranging in age from 20 to 45 years of age. The gender was split evenly, four females and four males. The courses ran for six months and had a completion rate of 50%. In all but one of the courses the mentors sent more messages; this is probably due to lack of students in the course. The student average message length was longer than that of the mentors. Although not noted this is probably due to the fact that the students were answering questions which would normally be longer than the questions themselves. The results of the message content analysis showed that the students sent mostly motivational/social climate and course content messages while the mentors generated many more class management messages with the technical assistance messages the least found for both mentors and students.
There were two major conclusions from the study. The mentors were using the class differently than the students. The mentors spent a great deal of their time clarifying key concepts while the students spent most of their time answering questions posed by the mentors. Secondly, because the numbers were so low the investigator concluded that more work needed to be done to further study the attrition causes and the relationship between mentor behaviors and participation and completion.

This was like reading a study at the beginning of the Industrial Revolution. Haile predicted that the message traffic between mentor and student would change when there were more students taking classes on-line. She lamented the number of confounding variables that she could not control, but confidently predicted this mode of distance learning was here to stay.

Harasim (1989), influenced by the NJIT work, conducted her own study at the Ontario Institute for Studies in Education. She had a slightly different focus for her work. First, she wanted to verify that the on-line classroom supported the adult education teaching technique of group work and shared learning experiences. Second, she wanted to confirm that course design needed to be done carefully to
take advantage of the perceived strengths of the system. As with Hiltz, she was also trying to justify this new learning environment and thus was also interested in establishing its credibility. She defined learning effectiveness as the measures of active user participation and user satisfaction perception measures.

Two graduate level courses of a duration of twelve weeks were the focus for what she called a case study. Twenty nine students of which only six were males took part in the classes. Two instructors shared the responsibility of the classes with one as the lead instructor for the first session and the other was the lead in the second.

The course design built upon the distinct character of computer conferencing to develop a student-centered group learning approach. Data was gathered from analysis of participation rates, semi-structured interviews, participant observation and in-depth study of the class transcripts.

The results confirmed much of Hiltz’s work. Students liked the system, and generally believed that the learning environment was at least as effective as the traditional classroom. Harasim raised the issue of equal participation. She reported that students in these courses commented on their willingness to participate in this on-line classroom.
environment when they did not in the traditional classroom. Additionally, she offered an insightful observation that the on-line classroom produced a more democratic environment than the traditional classroom.

Harasim acknowledges that this effort is a case study rather than a careful experiment. There are too few subjects with no control group and the qualitative nature of the evaluation could have been augmented with some quantitative work. The study does add to the support of the on-line classroom as an effective learning environment. It adds to the knowledge in course design, but, without other types of design being tested, it is weak at best. She acknowledges that more work in all areas needs to be done to include a study of successful on-line classroom student characteristics.

Another study that investigated student performance in the on-line classroom environment was one part of the Electronic School District project, a joint effort of IBM, the School of Education of Purdue University, the University Computing Services of Indiana University, and the Indiana Department of Education (Cheng, H., Lehman, J., & Armstrong, P., 1991). In Spring 1989, 28 teachers participated in the project by enrolling in a graduate-level computer course.
The course provided an overview of computer applications, and an introduction to the common programming languages in education. It utilized print-based materials, computer-based modules, and a computer-mediated communication system. An on-campus course using traditional instruction was available for comparison evaluation. Because of technical difficulties in establishing the communication link to some areas, a third group was formed that used the traditional paper-based correspondence mode of instructional delivery. This Unfortunately reduced the number of students in the on-line environment.

The study tested the learning achievements of the three groups. Important outcome factors suggested in work by Hudson and Boyd (1984) were considered. The authors adopted three variables: achievement test scores, time-on-task, and students' attitudes. These are quite similar to the previous studies. The expected outcomes were anticipated to be similar--The learning outcomes of the on-line classroom students would compare favorably with those of the traditional campus-based students.

Fifty-three students participated in the study--25 on-campus students, 19 on-line classroom students, 9 Correspondence students. A pre-course survey confirmed that
the groups were similar in knowledge of content, attitudes and educational background. This survey consisted of three parts--a demographic information questionnaire, a survey of subjects' attitudes and expectations of the computer and the course, and a pre-test of knowledge related to course content. The only significant difference found between the groups was age, where the off-campus groups were significantly older on average. Two course content achievement tests were administered during the semester and then a post-course instrument was conducted. The post-course instrument included an additional demographic questionnaire, a survey of attitudes toward the computer, course content, course outcomes, and the overall impression. Additionally, weekly surveys on participation activities were given to determine time spent that week on class activities, social interaction, and class preparation.

Analysis of variance (ANOVA) was used to analyze achievement, mean time-on-task per week, and attitudes in a one way non-equivalent pre- and post-test quasi-experimental design. Because of the age difference in the groups, the dependent variables were further analyzed using analysis of covariance (ANCOVA) controlling for age. In all of the six measures that showed significant differences (.05 alpha
level) using ANOVA, all continued to show significant effect but to a lesser degree (p values were larger) using ANCOVA.

Although the individual results were not as strong in favor of the on-line classroom as they had been in previous studies, none-the-less, overall achievement showed no significant difference between the traditional classroom and on-line classroom students. Although more time-on-task was reported by the on-line classroom students, the analysis revealed no significant difference between the two groups. Different from prior studies, on-line classroom students were not as positive in their attitude toward the course. This result was primarily attributed to one instructor who did not actively participate in the classroom discussions. Finally, incompletion and dropout rates were compared. The on-line group had the highest incompletion rate (32%) and dropout rate (11%) compared to the on-campus group which experienced 4% incompletion and 4% dropout rate. Time factors and job-related workload were the most often cited reasons for the on-line student attrition. They steadfastly did not blame the course itself but rather the outside pressures that the on-campus students did not experience.

Despite some discouraging outcomes within the details of the study, in the main, it reinforced the previous
results. The authors concluded that the on-line classroom was a viable alternative for this educational activity and recommended further study in the area.

Kaye (1990) did an extensive case study of the Open University's (Milton Keynes, England) initial experience using the on-line classroom. It was used in an adjunct mode on a multi-media distance education course. This undergraduate course, which covered the social and technological impacts of the use of new information technologies, had an annual enrollment of some 1500 students and used 70 part-time tutors to support the effort.

The first part of the report explained the rationale for using the on-line classroom, a discussion of the implementation of the system and features of the system adopted for use. Kaye discusses the expense of multi-media class production and the practical need for it to have a "shelf-life" of some eight years. This "shelf-life" is nearly impossible to accomplish in an area as dynamic as information technologies. The on-line classroom proved to be a very valuable tool to update portions of the course. Better access to students, mentors and instructors was postulated based on the system and its strength to exchange information.
The second part of the report discussed usage rates for both tutors and students. Keeping in mind that computer conferencing was an adjunct to the normal presentation of the class, students were asked to be on-line a minimum of 10 hours. The break-down of student participation was in thirds--one-third less than 3 hours, another 3 to 10 hours and one-third over 10 hours. The tutors also experienced a wide variation in usage of on-line time. Thirty percent used less than 10 hours while another 30% used over 30 hours.

Student impressions were also captured using a course end critique. As with the previous studies, students reacted positively to the new system. Of most interest for further research is the finding that 56% of the students responded "agree" to the question that individuals can participate more equally electronically than in face-to-face communications.

Kaye concluded that the use of the on-line classroom was a success and admitted that its full potential had not been tapped in this offering. However, it did demonstrate the acceptance of the on-line classroom by the students and the fact that the Open University was encouraged to use it more in the future. Overall, the study reinforced the
findings of student satisfaction with computer-mediated communications as an educational delivery vehicle. It also demonstrated that the on-line classroom could be used at least as an adjunct for a very large distance education endeavor.

The United States Army, faced with a declining budget and a Reserve Component scattered throughout the U.S., directed the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) to conduct a study on the on-line classroom (Hahn, Ashworth, Phelps, Wells, Richards, Daveline, 1991). The Army wanted to better understand the effectiveness, cost advantage and through-put performance of the on-line classroom using a pilot test. Thus they were interested in the same question as the previous studies: Is the on-line classroom an effective learning delivery system? Effective learning was measured by achievement tests and retention follow-up tests. Throughput of students and cost data was compared against the traditional classroom students and traditional paper-based correspondence courses.

Fourteen students, who were taking Phase III of the U.S. Army Reserve Forces School version of the Engineer Officer Advance Course, participated. This is a second level professional development management course for young
officers (25 to 30 years of age). Data gathered from them was compared to like information kept on resident and correspondence students. Improved on-line classroom throughput -- 64% -- compared to 54% of the correspondence course students; better performance and retention scores; and costs that fell between those for correspondence and resident programs lead ARI to recommend further study.

Although this was a very small pilot study of a professional development program rather than a standard graduate school course, its results continued to support the previous efforts.

During the spring of 1992 (Baker, 1992), Cincinnati Bell Directory, Inc. developed the software Ole' and worked with Northern Kentucky University and Apple Computer, Inc. to conduct a pilot study of the effectiveness of the on-line classroom using their product. Six courses, involving 224 students in education, sociology, geology and business law were examined. The students were randomly assigned to the test or control group within each class. The test group was provided a Macintosh SE personal computer to use at home or work to complete their assignments. The results of this test are consistent with the others. Students in the test group earned significantly more grades of A than those in
the control group (48% vs 30%). Two out of three test group students rated their overall experience as better. Fifty-five percent of the Ole' students rated their instructors attitude toward them as excellent as compared to forty percent in the control group.

Eastmond (1992) conducted a qualitative research effort to discover how adult students make their on-line classroom experience a success. He attempted to answer the following questions:

- How do students define effective learning experiences?
- What strategies did they develop to make on-line learning a success?
- How do these strategies differ from their traditional classroom approach?
- How do the strategies differ between those who succeed and those that don't?

Eastmond's research approach entailed the writing and analysis of detailed field notes which were developed from reflective memoranda, participant observations and unstructured interviews with the students and faculty. The primary subjects were nine adults with additional information obtained from nine other distance students and instructors, mentors, and technical support personnel. The unstructured interviews were conducted both in person and on
the phone.

The strategies observed were, for the most part, borrowed from their traditional classroom experiences. The students went through a period of trying and discarding various methods until the one that worked for her/him emerged. All expressed that they wanted to study things that were of interest to them and that they wanted to study less topics but in greater depth. They were frustrated when they did not cover a given subject adequately. They tended to use humor in class and would use work from other classes if it fit in the current class. Most desired feedback on their work. He believed those that succeeded had good self-discipline and desired structure. Those that failed tended to like to cram at the end of semesters and were uncomfortable with the computer.

The study ended with a list of recommendations for future on-line students. They advised students to stay current, come on-line 3 times a week, add a comment at least once a week, comment on others' work, keep a sense of humor and find a way that works to process the information that one receives in class.

Another qualitative work, done in 1992 by Schrum, studied a professional development course for teachers on
the use of technology in the classroom. This course design was informed by adult learning theory and was sensitive to the myriad needs of a busy professional student body. Questions that guided the study included types of educators taking the course, the impact of a lack of face-to-face relationships, effect of better student to instructor interface on attrition compared to traditional correspondence courses and, finally, the influence this exposure to technology made on the teachers' comfort level with this deliver mode of education.

The research was done on 40+ group of educators, both teachers and administrators, from around the world representing elementary, secondary, and university institutions. Unstructured interviews and measurement instruments were used throughout the course.

Their reasons for taking the course were as varied as their backgrounds. Most wanted more experience with telecommunications and some found this the most convenient option for a variety of reasons. Nearly all 40 stated that they were not effected by the lack of face-to-face contact and some even expressed a feeling of freedom to be "more frank" in this mode of instruction. Schrum's course did not move along at the same pace. Thus only one or two students
might be studying the same material at a given time. To overcome the lack of interaction with peers, she established a "coffee corner" for informal discussions. In spite of this, few took the time to chat. Student support was reported as very effective through the use of graduate students manning a hot line for technology problems with the system.

All agreed that the immediate feedback from the instructor was outstanding. In fact, the investigator believed, based on some comments, that this feedback was key to not losing some students from the program. Finally, many reported that they had become the local experts in telecommunications within their schools where they could find few if any peers that had the experience that they had.

In conclusion, the author challenged the community to continue with more research and to support both financially and mentally those teachers who were trying to improve themselves in the area of instructional technology.

In the Fall of 1991 (Lewis) five classes at universities across the U. S. with a common interest in leadership, motivation, and communication participated in the on-line COMCONF sponsored by Comserve. There were 119
students and faculty involved, most for the first time on-line. Each class was administered a follow-up questionnaire at the end of the term. Generally, these questionnaires included scales previously used by Hiltz in her work and additional scales to evaluate learning styles. These 15 scales which ranged from computer attitudes to tolerance of ambiguity were examined using cluster analysis. Although there were no discernible characteristics which clearly distinguished the different classes, students fell into two categories—work mechanics and organizational strap-hangers. The author concluded the on-line experience allowed those more mature adult learners, the work mechanics, to express themselves and to participate with other more serious students and instructors in a higher quality learning experience. He also found the degree of integration of on-line work into the class requirements and the degree of freedom the students had to choose classes, were both positively correlated with the emergence of work mechanics in a class. This was a relatively short paper which concentrated on the factor analysis which did support the contention that there were two groups. This was, of course, supportive of others' work that discussed lurkers versus participators in class. However to state that some
were experiencing a higher level of learning appeared to be a leap of faith without much substantiation.

Of late a few articles are appearing that attempt to bridge the gap between the "justification" studies and the current thinking within the Adult Learning community concerning the theories of adult education. Seaton (1993) wrote an article that cited many of the studies above as the basis for his discussion of the on-line classroom and the self-directed learner. Seaton contends that the new media allows for more self-direction for those students with enough educational development to be critical thinkers as envisioned by Brookfield. He sees the main contribution of this mode of education to be the ability of the system to support group work. He points out that group work can be supported but it is still the instructor who facilitates this action through her/his organization of the instruction. In other words the instructor must change from viewing education as a delivering of information to an experience that allows students to investigate their own interests within the broad umbrella of the course itself.

Another recent article chronicles the experience of Shedletsky (1993) when he introduced the on-line classroom to his students for the first time. He confided he was
surprised by the change of attitude that many of his students experienced after they had used the on-line classroom for a while. In his first class he learned they were happier and more involved learners than they were without it. He concentrated on the cognitive experience of the individual rather than focusing on either the efficiency model or the social dynamics model. He contends that the on-line learning is an example of Laurillard's (1987) communication model of learning rather than the didactic model. In the communication model the learning process is a negotiation between teacher and student where knowledge can not be given from the teacher to the student. He analyzed this negotiation activity with Cell's (1984) four types of experiential learning: response, situational, transitiuational, and transcendal. He contends that the on-line classroom supports all these modes of experiential learning. Examples of messages that support his contention were offered as indicators of support for his opinion. He ends by claiming that all educators would be well served to experience the on-line classroom first hand and then incorporate these experiences in their traditional classes either in a stand-alone or as a vehicle for additional classroom discussions.
In summary, many of these studies confirmed the effectiveness of the delivery system for both college students and those in other professional development programs. All demonstrated that the on-line classroom produces students that could demonstrate mastery of the fundamentals of material covered as measured by the test scores and other student projects. Additionally, student satisfaction with on-line classrooms was high among students that completed the various classes. Other advantages that normally were revealed in post-course interviews included increased access to the instructor, freedom to schedule course work to adjust to the student’s schedule and a more comfortable environment in which to participate in the classroom discussions.

**Traditional Classroom Bias**

The Andragogical model is based on a number of assumptions about adult learning which include the role of the learners' experience (Knowles, 1990). If one accepts the assumption that a learner's experience is a critical ingredient in the adult classroom, it becomes a rich resource in the pursuit of learning. If that classroom resource is to be fully realized, then all members of the class must feel free to participate as equal partners.
However, research has shown that not all members of the traditional face-to-face classroom are full and equal partners. The purpose of this section is to explore the work done and establish that recent research supports this contention.

The dominant members of a class are often male. A small group of talkative males may quickly stifle the discussion of the rest of a class. This assertion is substantiated by a number of sources which give a variety of reasons. The study most cited that substantiated this contention was done by Hall in 1982. Hall's work done for the Association of American Colleges was based on a collection of works, including empirical studies of college campuses, reports of individual researchers and surveys of campus groups. The work is qualitative in nature and bases its conclusions on the impressions of women from campuses throughout the nation. It uses selected quotations to substantiate the claims in the study. Although there was a lack of quantitative data, the work did encourage others to study the problem in a quantitative manner.

The major conclusions of the study focus on the question of classroom discussion participation. Women are discouraged from participating in classrooms for a variety
of reasons. First, many male instructors cling to unconscious sexist behaviors that marginalize women. Dirty jokes, off hand remarks to lessen the impact of female contributions and direct insults were all cited as real examples that had occurred in classrooms around the country. Hall pointed out gender differences in speech patterns that foster the silencing that happens in the classroom. These patterns, which occur in everyday speech, are not unique to women but are shared by individuals and groups that are afforded low status and little power. These features include: hesitation and false starts; high pitch; "tag" questions (the argument is strong, don't you think); a questioning intonation in making a statement; and excessive use of qualifiers. These features are culturally constructed in response to the realities in the larger society where women are taught to express themselves politely and cautiously. To make this worse, the normal classroom setting is masculine in tone. The valued speech patterns include: highly assertive language; impersonal and abstract styles, and competitive bantering.

Hall concluded her work with a number of recommendations that included actions to enhance awareness of the issue and training for the faculty to correct some of
the inadvertent sexist behavior. Student evaluations should include questions on the climate of the classroom. Hall really discusses all the female allegations of a stifling classroom climate in a very persuasive manner. Her work is must reading in this field and clearly motivated many others to look at the issue.

Sadker and Sadker (1986) conducted a base-line work that was highly popular and widely cited in the press and the public in general. Although best known and quoted are those portions dealing with the K-12 classroom, they also looked at the situation in institutions of higher education. They concluded that the chilly climate in our colleges is a direct result of the socialization that is conducted in our K-12 classrooms. Both female and male teachers call on and in general pay more attention to the males in the class. Although they felt comfortable that they could show that this was true, they were honest in observing that the reasons for these actions are less clear. They believed that sex segregation was the main cause. Teachers gravitated to the males section more often than they did to the female section. Boys also demand more attention. They are eight times as likely to call out answers and when they do they are called on for the answer while girls are more often
admonished to raise their hand. These researchers contend that this behavior is well ingrained before the students get to our colleges and universities where further silencing goes on.

Some theorize that much of the higher education teaching is accomplished based on an argumentative dueling model (Ebben & Kramarae, 1993). Kramarae and Triechler (1990) report that white males in particular talk about education in metaphors pertaining to war, such as the pleasure of "battling over ideas". This combative style of education appears to be at odds with women's preferred way of learning. A number of researchers conclude that women's preferred style of learning is collaborative, cooperative, and interactive (Maher, 1985).

One work that did not support the findings of the others was conducted at both a large university and small college (Crawford & MacLeod, 1990). After concluding that previous research suggested that female students participate less frequently than male students and that instructors' classroom behavior was partially responsible, they conducted surveys of some 1375 students to assess their perceptions of student-instructor climate. They criticized previous work because so much of it was based on observation in the
classroom and that instructors knowing that they were being observed would alter their behavior. When surveys had been done they covered an entire school year and not a specific short period of time that was fresh in the students' minds. Their survey was done randomly with instructor consent but not with his/her knowledge of which specific class period would be the focus of the survey. The results did not follow the pattern. Factor analysis detected a number of analytically distinct dimensions of classroom climate:

1. what the class was like in general
2. what the class was like for the student
3. what specific positive and negative instructor behaviors affect interaction.

Class size effected each of these dimensions while gender was only significant in the college. Additionally this gender difference was not due to the actions of the instructors. The investigators suggested that this finding in the college may be due to the fact that it had been an all male institution. Female teachers, it was shown, did create a more participatory climate for all students. They concluded classroom climate variables for both males and females were very similar with size of class the most important influence.
Ebben and Kramarae, (1993) conducted a very representative study that was motivated, in part, by the earlier work just discussed. They wanted to examine in a more vigorous manner the reflections of female and male students on recent classroom discussions. They selected a graduate class in the humanities, co-taught by three white instructors, with a student population of 11 males, 8 females, aged 22-35.

Data was collected in three ways. First each of the students was asked to comment on a five minute segment of actual classroom discussions that involved both students (males and females) and the instructors. Next each student was asked to complete a written questionnaire that covered both specific discussions in the class and class participation in general. Finally, short (5 min.) interviews were planned to allow students to comment further on their experiences. These proved to last far longer and provided more valuable insight than was originally envisioned.

The results were very supportive of the earlier work. Males talked more, were supported by the instructors more, and were very comfortable with the combative nature of the discussions. The instructors tended to attack all students'
positions and did so in such a manner that the females were reluctant to speak while the males accepted this as a challenge to be overcome. The females tended to speak out in order to defend another female in the class but otherwise were quiet. One manifestation of this silencing could be observed when a group of female students who had not contributed to a heated classroom discussion struck up a calm learned conversation on the topic at the break. This work is typical of the other work found which is summarized below.

Women and minorities are often marginalized in the traditional classroom (Rich, 1979; Spender, 1980; Selfe, n.d.). Women tend to be interrupted more and their comments valued less. In mixed gender conversations, 98% of the interruptions are made by men (Zimmerman & West, 1975). They note that women accept these interruptions but that if a woman interrupts a man, he believes that his right to be heard is being violated. Spender (1980) explains that interruption is an effective male mechanism to stop women from talking and to gain the floor themselves. This is not normally a conscious action but rather one that is culturally learned and employed unconsciously. Under these circumstances women tend to withdraw. Lewis and Simon
(1986) wrote a particularly insightful article that describes the power of gender-silencing that goes on in the traditional classroom. Lewis posed as a graduate student in Simon's discourse class that investigates language and power. Written in parts much like a play, they chronicle the evolution of the silencing of the women in the class, point out Simon's dilemma in breaking the silence and finally describing the event that it took for the women in the class to grab back at least some of the "air time". It is a insightful descriptive text that reinforces many of the observations of the past studies.

While white female students talk about the lack of collaborative work, many Hispanics and Native American students, male and female, feel that openly disagreeing with a teacher is a sign of disrespect. These tendencies lend themselves to effectively silencing these groups in the classroom (Melendez, & Petrovich, 1989). Minorities, especially those whose first language is not English, have a very similar problem. Often they lack the confidence in their command of the English language to contribute and will retreat into a shell.

Additionally, the facilitator is given enhanced status in the traditional classroom. Communications in this
environment are normally conducted one at a time with each person waiting till the last person is finished. In the face-to-face classroom the professor is likely to contribute 60% to 80% of the verbal exchanges (Dunkin and Biddle, 1974). In another study the time hovered at 75% (Kramarae and Triechler, 1990). The vast majority of the questions and comments offered by the students were directed to the professors in this setting. Thus control of the class and the allotted air time was dominated by the instructors. If males tend to dominate live communication exchanges and the professor is dominating all the "air time," clearly, the traditional classroom does not afford full participation.

Social Aspects of Computer Conferencing

Controversy does abound on the essential nature of human communication via computer (Hiltz, 1986). There is wide-spread acceptance that computers can greatly increase the flow of information because of their ability to download files to one's personal computer so that the information can then be reviewed at one's own pace. Additionally, there is some agreement that the lack of nonverbal and visual context cues can diminish social presence (Short & Christie, 1976). Nonverbal and visual social context cues refer to such
things as the gender, race, clothing, noticeable accent, and height of the individual. They can also refer to the trappings of power, such as the size or location of the desk or chair, insignia on uniforms, and age. Although there has been extensive research in the business setting that suggests the attenuation of these cues, there is disagreement on whether this diminished social presence will enhance or detract from open discussions.

The proponents assert that computer-mediated communications provides a context for the kind of non-coercive and anti-hierarchical dialogue that Habermas (1987) claimed constitutes an "ideal speech situation", free of internal or external coercion. This assertion is based on a number of studies.

Before concentrating on the social aspects of computer conferencing, a quick review of the type of research that preceded the studies to be discussed below provides a needed background. Until the early 1980s, studies focused around the technology of the delivery system of computer conferencing. The existing research prior to 1983 was focused on the efficiency of the technology and its cost and technical capabilities (Bikson, Gutek, & Mankin, 1981). Case studies of how corporations adopted networks into their
organizations (Rice & Case, 1982) or experiential studies comparing the effects of various communication channels were the norm. This approach to researching a new technology is a common and simple way to do early analysis in new technologies. However, with the advent of these new technologies, experience has shown that many psychological issues arise (Kiesler, Siegel, & McGuire 1984).

Siegel, Dubrovsky, Kiesler, and McGuire (1986) conducted the first of a series of experiments in 1983 in which one or more of these researchers were involved. Each of these experiments looked at a small set of these psychological issues. The delivery systems, though related, are different and an understanding of them is critical to the discussion. Each will be explained as part of the detailed discussions of the experiments. In the first experiment the researchers were looking at communication efficiency, interpersonal behavior, participation, and group choice. They were trying to establish if computer-mediated communication was depersonalizing and lacking social structure. Additionally, they felt that social influence among communicators might become more equal because so much hierarchical dominance and power information is hidden on the computer.
The first experiment was divided into three separate parts. Part one was typical of the rest. Three-person groups of college students were asked to reach a consensus on a choice-dilemma problem in three different environments: face to face, once using the computer anonymously and once non-anonymously. In the computer-mediated discussions each subject was physically separated from the others and the computer was used to communicate on a split screen where all members of a group could see real time what each was writing. In other words it was a rolling screen with three texts appearing if all three members were writing at the same time. Thus all could be communicating at once or separately. The results of the first part showed that computer-mediated groups took longer to reach consensus for reasons other than solely the use of the key board to communicate which had been controlled for by the researchers.

In the second part, Dubrovsky designed a software program that established order to the computer discussions. It was a sequential order that forced group members to take turns speaking as they might in a face-to-face situation. Thus only one person could talk at a time.

For the last part electronic mail was used instead of
the other computer methods. In using electronic mail, each person is separated and can send, on the computer, individual messages to one or more members of the group. The group can not see the message being composed as they could in the first two experiments and the receiver of the message could be designated.

The study showed that computer use did generate more equal participation among group members. Although one person did tend to dominate in both the face to face and the computer delivery mode, the dominance was less strong using the latter mode. When using the computer to communicate, swearing, insults, name calling, and hostile remarks were also more prevalent. This behavior, which is called flaming, has become common on computer networks. The researchers offered three possible explanations for the behavior they observed.

Possibly the additional length to come to decisions and the more even participation were caused by the absence of informational feedback in the computer-mediated mode. Thus people did not know when their arguments had been understood or agreed to and thus continued to contribute more discussion until they were sure. A second explanation points to the attenuation of a leader's influence using this
communication mode. Without leadership, a group could feel freer to ignore social norms, standards and precedents. Finally, perhaps the computer mediated communications do involve a process of depersonalization. The researchers realized that their data could not tell us which of these alternatives might be the correct one. For whatever reason, this pioneering research did show that participation among groups using computer-mediated communications was more equal.

The second field study was conducted in two departments of a Fortune 500 company to evaluate the impact of E-mail on information transfer patterns (Sproull & Kiesler, 1986). At that time most people believed that the new E-mail systems accelerated the speed of transmission of mail. Sproull and Kiesler sensed that more might be happening. In fact they used research on how social context cues moderate communication to predict how information exchange will differ when E-mail is used.

Data was collected from 96 randomly selected subjects from two different divisions of the company. The selection was done after all users (n=513) had been stratified, resulting in six strata, on employment level, and gender. The E-mail system had been on-line for some time. Data was
collected using interviews, questionnaires, and content coding of actual mail. Actual message attributes were examined for internal characteristics of E-mail, while questionnaire data was examined to find perceived differences in behavior across different communications media (e.g., E-mail vs. face-to-face).

Some of the pertinent results follow. The researchers found no gender or hierarchy differences in accessibility or number of messages sent. When evaluated by the researchers' "uninhibition message index", messages from subordinates looked the same as those from superiors. Overall E-mail did attenuate social context cues and produced more uninhibited behavior.

The third study (McGuire, Kiesler, & Siegel, 1987), similar to the first, looked at the normal face-to-face decision-making of small groups and compared it to decisions made using computer-mediated communications. Managers individually and in 3-person groups were asked to make risk choices. Two were made in face-to-face discussions and two were made using computer mediated communications. Again the purpose of the study was to look at the action of loss of social context cues on the dynamics of group decision making.
The subjects of this study were senior and mid-level managers (n=48) broken into 16 groups of three each. They attempted whenever possible to form groups from the same company. Groups were randomly assigned to experimental conditions so that half made decisions using computer-mediated communications first and the other half made face-to-face decisions first. Each group made gain and loss decisions under the two conditions (face-to-face and computer mediated).

The order of the discussions did not affect the outcomes. Manager's individual characteristics such as gender, age, and prior acquaintance of others also had no effect. Results similar to the earlier studies were found. Social context cues were attenuated. Groups who used the computer to reach decisions might be less influenced by standard norms. Kiesler, in discussing this study in an interview, told him that in face-to-face meetings the female of the group was only likely to advance the first solution 20% of the time while in computer-mediated meetings they would advance the first solution 50% of the time. Gender issues were not carefully developed in this study because there were not enough female managers.

The latest in this series of efforts to examine
computer mediated communications assumed the results of the previous efforts in social context cue attenuation and looked rather at the equalization of status.

The researchers had noticed that high status individuals in the three person groups were much more often the first advocate of a position in the face-to-face meetings than they were in the computer-mediated meetings. This observation resulted in a new effort to test this idea (Dubroovsky, Kiesler, & Sethna, 1991). This study looked at the influence of social and subject expertise status. The researchers believed that group members in a computer-mediated meeting were less aware of and less concerned with social and subject expertise status then when they met face to face.

Clarkson University students (60 men, 36 women), where 24 were in the MBA program and 72 were college freshmen, were randomly assigned to 24 groups of 4 each. One high status person defined as a graduate student was assigned with 3 low status freshmen. These groups were required to make decisions using both communication modes. The outcomes clearly demonstrated that the influence of the high-status person was significantly attenuated in the computer-mediated mode. In a latter article, Kiesler (1991), talking to the
possible theory for the results of all these studies, believes, when social context cues are absent or attenuated, people notice their surrounding less and care less what others think and thus operate in a more open and honest way.

Boshier (1990, 1993) adds some additional anecdotal support. He agrees that E-mail's inability to deliver a wide variety of visual cues may hold great potential for adult education, since those cues that denote status and power are irrelevant. He reports that a certain deaf student in New York found the on-line classroom very beneficial. The student would tape record the class sessions and have them transcribed to read later. Unfortunately the student was not able to take part in the classroom discussions. With the on-line classroom he was able to do everything that the other students were doing since all the discussions were text-based. Thus he felt more at ease in the on-line classroom since it put him on an equal footing with the other students.

Bump (1990) examined the effects of conducting class discussion on a local area network. Although this study used mostly real time synchronous networking, it lends more support that the on-line classroom helps class discussion. The study was done on 63 college students both undergraduate
and graduate students. Bump relied on satisfaction surveys and interviews. Most of the comments were gathered to determine the advantages of small group (n=5) discussions of literature and student writings. Nine of the eleven graduate students, 84% of the seniors and 50% of the freshman, reported the computer-mediated communication allowed all members of the class to contribute more fully to the class. Shy students were liberated and minority students felt they had a fair opportunity to participate in class discussion. He concluded that real time on-line classrooms restored voices to all students whatever their gender, race or age. Many comments echoed support that the dominant males in the face-to-face discussions were not able to totally command the floor in the on-line classroom environment.

In spite of all these results, toward the late 1980s some researchers were concerned that the theory that social context cues were nearly completely stifled in computer conferencing was overstated. They began to criticize the earlier studies for simplifying the real situations. Most of this group criticized earlier studies because those studies had not allowed sufficient time for the groups to form. Thus the conclusion that the medium is very limited
in its ability to perform a social function is more the result of the time lag to form groups when using the computer than it is a function of the computer attenuating social cues.

Weedman (1991), who was one of those researchers, analyzed a large computer conference to determine the amount of social context present in the conference. Social context, as she defined it, referred to the social amenities that we all use in our speech such as greetings, and social banter. She was trying to determine if there was enough to allow computer conferencing to be an effective group tool. She criticized the earlier efforts in two areas. First, she stated that the results may have been misread in that the lack of constraint in communications and informality may really be a manifestation of a more honest mode of communication. Secondly, the time constraints that were imposed within the studies may have prevented social context from developing.

Weedman examined a well established computer conference started by graduate students attending a large profession college within a university. Students, both undergraduate and graduate, faculty, and staff were active members of this conference. Two time periods representing a portion of the
first year of the conference and the same span of time some
two years later were analyzed. Content analysis of the
transcripts and survey data from the participants were both
collected. Thus it was possible to examine actual use of
the conference and the perceptions of those that used it.

For her purposes, her analysis of task versus non-task
conversations led to a conclusion that computer-mediated
conferencing was an effective group tool which had enough
social interaction to make it effective in group forming and
norming. For extended cooperation the establishment and
maintenance of a group identity must be sustained. Both
content analysis and the perceptions of the members of the
conference supported group identity. As a side observation,
there was no indication of antisocial behavior during the
conference, which will be cited later as a major drawback to
all uses of computer-mediated conferencing; in fact
uninhibited conversation did occur but took the form of
playfulness and was positive rather than negative.

Another recent effort concerned with the outcomes of
the Kiesler et. al. work, replicated the earlier work
looking for more social context within computer-mediated
communications. Walther and Burgoon (1992) studied the
effects of time on the three-person decision groups that were the center piece of much of the earlier work. They also stated that the great confound of the early study was time. Both the testing periods were too short and the need to type responses leads one to suspect that with more time different outcomes may occur. In other words, computer-mediated communications may have different communication rates. They cited later studies (Rice & Love, 1987; Steinfeld, 1986) when time was not constrained as examples when higher levels in socio-emotional content was detected in the computer-mediated communication's delivery mode.

Their sample (n=96) of undergraduates at a large university was randomly assigned into groups of three and those groups were further randomly assigned to use either the computer-mediated or face-to-face communication modes. The computer-mediated groups were given five weeks to discuss and decide on three separate decision packages. The other groups met three times over the course of the five weeks and were given two hours to complete one packet at each meeting. The face-to-face groups all completed their tasks in an average of 70 minutes which indicated they had ample time to complete their tasks. At the completion of each task a 64 item relational communications questionnaire
was administered.

The results of this study were also mixed. Most supported the researchers contention that computer-mediated communications were not static and that they did support group growth and cohesion. The main effect of time was stronger than the effect of the communication mode, although that effect was less than expected. It was, however, stronger than would have been expected by the "cue-filtered out" theory. Thus it was asserted that the mode did support social context development only over a slower period of time.

A most recent study (Olaniran, 1994) has returned to look at the three person decision group in yet another way. The groups were set up as in the earlier experiments except that some groups used a combination of computer mediated communications and face-to-face meetings. The process was broken into two phases--brain storming or idea generating and then decision making. It was found that the mixed groups that used one mode for the idea generating and the other for decision making were the most successful overall with the whole process. The findings did tend to reinforce the theory that the computer mode enhanced the idea generation by fostering the free flow of new ideas during
this phase. The investigator also concluded that while it took longer to make decisions using the computer, this extra time might be accounted for in the pace of down-loading, interpreting the messages and composing new messages rather than any inherent slowness in the decision process itself.

While nothing in these studies detracts from the contention that on-line classrooms might foster a more gender-neutral environment, lately there have been others that raise some concern. The voices of dissension are relatively new. They are mostly from women with experience on the Internet and are some of the same people mentioned earlier. Sproull (1992) quantifies male domination of computer networks at 95%. Ebben and Kramarae’s (1993) report, based on their observations of two network news group forums geared toward women, corroborates these findings. They found men claimed inordinate time and space and criticized the comments that women did make. In another report (Herring, Johnson, & DiBenedetto, 1992), female linguists on the LINGUIST electronic discussion list contributed significantly less than did male linguists—20% and 80% respectively. Additionally, women were most noticeably silent in discussions of an abstract nature.
Finally, in a different conference that they observed of a "friendly composition and rhetoric discussion group in which feminism enjoyed considerable influence" women contributed only 30% of the messages, and that their messages were shorter than the men's. Men got more responses to their messages than did the women. The most frequent direction of response was from men to men (33.4%), then women to men (21.3%), men to women (15.8%), and finally women to women (11.2%).

While the early studies indicated that computer-mediated communications have moved some business interactions toward a more gender-free environment, recent experience has shown that male dominance of conversations has carried over in some instances. In all of these instances, the conferences were devoid of a clearly delineated leader as one has in an on-line classroom environment where the instructor fills that role. There appears to be no work done to see if male dominance seeps, over time, into an on-line classroom. The status-free environment has been a hope of many in this computer-mediated communication's field of study. If this delivery system does promote a reduced social cues context in which status-based dominance of discussion and decision-making are
reduced in the work place, an analogous adult distance learning system, the on-line classroom, employed in the academic setting, should promote a similar reduced social cues environment.

In fact, as late as 1994 an article by Tuckey briefly discussed this very issue and essentially declared it to be true but did not cite any studies that had quantitatively examined the issue. She asserted that the uniqueness of the delivery platform results from the interactive mix of the asynchronicity and the text-based mode. Students have an opportunity to offer their own solutions and to reflect carefully before committing themselves to positions. She also claims that the social cues are reduced and that this quality flattens the hierarchical nature of the traditional classroom. The class is not monopolized by a few at least not in terms of "talk-time."

Summary

This literature review has shown that research of the on-line classroom is maturing. Early efforts were concerned with teaching effectiveness and student acceptance. Small group interaction supported by the medium has became of interest. More recently other work focusing on delivery improvement and student support has been done. It is a
relatively new technology implement and thus there is still much to do.

Clearly a case has been made that the face-to face classroom is not a gender-neutral environment conducive to interaction between all members of the class. Most of the evidence was qualitative in nature but has compelling in its diversity and quantity. It should be disturbing to all of the academic community that it is still so wide-spread and pervasive.

Computer-mediated communication (CMC) which is at the heart of the on-line classroom has been the object of intense research for at least the last 15 years. While the experts disagree in the details, all agree that CMC does lessen social cues and promotes freer expression of opinion by more people than the face-to-face meetings.
CHAPTER III

METHOD

This chapter presents the method of study. The population and sample, and data collection methods are described; instrumentation and data analysis are discussed. Throughout this study, the following research questions were addressed: How are different on-line teaching styles related to student classroom participation? Does the on-line classroom generate a more gender-neutral environment?

Sample

The data source for this study is a classroom instruction and performance program at a mid-size university in the Northwest. The Master of Science degree program, which has been in existence for five years, prepares students for careers in the areas of instructional design, job performance improvement, human resources, training, and training management. The MS program stresses scholarly understanding of research and theory as they apply to instructional technology and performance. The program is not primarily designed to produce a better trainer or presenter, but rather stresses the design of more effective
programs that can be exportable for use by others.

The program was first offered on-campus in the fall of 1987 and then, with a grant from a government agency, was redesigned for asynchronous computer conferencing in the fall of 1989. Since that time, the program has grown to offer some five courses each semester. There are currently six core courses and a number of electives in the program.

The program normally has a diverse adult enrollment consisting of about 75 on-line classroom students and 35 on-campus students enrolled with both genders well represented. Known attrition within previous on-line classes was 20%. Active on-line discussions within the classes are the norm. Each on-line class has between 5 and 20 students. These students are scattered throughout the United States and Canada.

For the purpose of this project, six courses, taught by six different male instructors, were studied. These courses, three core courses and three advanced electives, were selected based on the instructors involved. They represented a wide spectrum of on-line teaching styles. All possessed terminal degrees and had experience teaching in this mode.
Collection of Data

All data for this research had already been gathered in various forms and locations by the faculty. While the description that follows will lead one to understand the restrictions placed on this effort, this institution was the only one that would allow access for research. Twelve of the most prominent on-line institutions refused research for a variety of reasons. Although a small data base existed at the University, access to it was restricted to basic demographic information because of policies protecting the privacy of students. No contact with current or previous students was allowed. Informal meetings with two of the faculty were conducted but no formal surveys or interviews with them were permitted.

Personal Demographic Information

Personal demographic information was gathered from the University's application form for each student in the study. This information included age, gender, and ethnic background.

Personal Resume'

Each student was required to provide a written resume' prior to entry into the program. These resumes' were not standardized but rather were very personalized accounts of job history. Each was evaluated for length and level of
applicable work experience in instructional technology and performance. Additional credit for other work experience was considered. Each student was awarded a score on a Likert scale of 1 to 5 where 1 is no work experience and 5 was very experienced. This measure was added to each student's record as another characteristic. Military service data was drawn from this source and from an examination of individual messages which normally revealed such information. This was especially true when examples were given in which the student would often discuss a military work-place event.

**Classroom Participation Measures**

Because the on-line classroom is computer driven, a complete verbatim record of each class existed. Six full semester courses, each taught by a different male instructor were analyzed.

These courses were all organized around electronic conferences analogous to different class sessions. These conferences had assigned purposes that were easily identified based on the types of messages in them or from the directions given by the instructor. All classes had both academic and non-academic conferences. The non-academic conferences were set up for administrative and social interaction. For example there was a "Roll Call"
conference where the instructor and students could post messages concerning absences from the system. A student might report that he/she would be off the network for two weeks because of a business trip. The academic conferences were also constructed for different purposes. There were discussion conferences where the whole class would be involved in exploring a particular topic. These will be described in greater detail in Chapter IV under the examination of each class. Other conferences were set up for tests, projects and small group work. These conferences were not the focus of this study and thus no coding or analysis of them was done.

Each message of the academic discussion conferences was coded onto worksheets and transcribed onto electronic spreadsheets for analysis. The basic ideas for this coding came from the work of Harasim (1989) and Henri (1991). This coding was done by conference for each person (both student and faculty) to establish a record of the key events that took place in the conference. Each of the coded items for a given message is discussed. Most of these items were recorded by the software mail package. Those that were not are noted.

a. From: The sender of the message was recorded using a secret numbering code to preserve the privacy of the
students so that groupings of students could be performed (e.g. female or military).

b. **To:** Messages were either sent to All or to a particular person. Messages answering instructor questions were normally sent to All while those sent to individual addressees, to Individual, more often contain questions, encouragement to participate or reactions to previous posted messages. Regardless of which address was used, all students could see these messages even those addressed to another individual. Private messages could be sent that only the addressee could see. These messages were not provided by the University.

c. **Date and message number:** These pieces of information were available from the software. Both were needed because message numbering was normally restarted monthly. Therefore, sequences of messages could not be established by the message number alone. To sequentially order the messages properly, the date became a key item.

d. **Length:** Length was recorded in number of lines sent. This was done manually for most short messages and the software would give line numbers along the side of the messages that helped with the longer ones. Paragraph breaks, different margin widths, and lists of items within a message made consistency of this measure difficult. The
coder compensated for these differences as well as possible. Because messages were normally 1-5 lines or 10-20 lines or over 30 line, the difference of a line or two in the count on the longer messages was not considered significant for this study. Length of messages was measured as a surrogate for a level of effort by a student.

e. **Number of questions asked**: Messages were recorded to indicate that they contained one or more questions. If somebody replied to a message that contained questions, an assumption was made, that the reply addressed the question/questions within the original message. Additionally, questions asked in a conference were assumed to be answered in that conference or were not answered at all. During the coding process when each message was scanned there was no indication that any question asked outside a given conference was being answered inside that conference. Because of the dearth of questions posed, this effort yielded only minimal results. This measurement was used to partially determine if any student or group was being ignored.

f. **Positive encouragement to participate**: Each message was scanned for positive encouragement to participate. If upon reading a student's message the instructor complemented the input or recommended to others to read a message sent by a
particular student, this message was coded as having such an action and the person being referred to was also captured in the coding. After the first class had been coded, it became clear that fellow students did far more of the encouraging of individual students than did the instructor. Thus all classes were reviewed and student-initiated encouragement was also included. This measure was captured to be used to partially determine if some students or groups were being encouraged to participate more than others.

g. Referenced people and messages: The software gives references if the sender is quoting other messages. This was normally the case for messages that were in reply to previous messages. Additionally, the coder scanned each message to determine if the sender referenced anybody in the content of that message. This coding revealed how much attention others were paying to a given student's or group of students' messages. It was used to determine if anybody was being ignored.

h. Message on subject: This category was initially used to count the number of social or administrative messages that had nothing to do with the academic subject under discussion. Essentially there were none. After one class, this coding was dropped because the students were nearly always on subject. One or two during an entire class might
slip in, but they were not coded or counted. It was clear that the students used the administrative conferences and did not clutter up the academic conferences with administrative or social items.

The coding produced a record in a series of spread sheets (Appendix A for example) of each student's participation and the instructor's active role in the class. Student and Instructor program participation history was consolidated for further analysis. This consolidation was first done by conference until it became clear that conference by conference analysis would not yield any fruitful results due to the disparity in the intent and use of conferences. This will become clear during the course descriptions in Chapter 4.

Reliability of data gathering was evaluated. The original intent was to randomly select one conference from each course and re-code it from the original transcript and then compare the new coding with the original coding sheet to determine errors in the coding process. The original was then compared entry-by-entry to the spreadsheet to check the accuracy of information transfer to the spreadsheet. The reliability check was halted after two conferences, a Course 1 and a Course 2 conference, because the reliability of the coding was over 97% and transfer 98% for 1018 entries.
Course 1 was coded and transferred to spreadsheets first while Course 2 was coded and transferred fifth. No sloppiness appeared to have crept into the process over time. Based on the consistently accurate results of these two conferences, no more were checked.

**Analysis of Data**

**General**

The general analysis started with a presentation of the descriptive statistics for the entire data base. After the initial screening of data it was apparent that the major measurements that yielded the most interesting data were the number of messages sent, the total number of lines sent, and the number of referrals a student received. The rest of the analysis was organized into two separate sections that corresponded to the two research questions. The first section contains discussions about the teaching styles of the instructors and the resulting participation performances of their students. The second section examines gender performances. Each of these will be described in the following sections.

**Course Analysis**

The teaching style analysis starts with a descriptive comparison of course organization. In the initial
examination of the class transcripts, the teaching style differences occurred in the following areas:

1. course organization
2. conference organization
3. guidance to students
4. grading criteria

After these initial descriptions, the various student participation performances were gathered from spreadsheets for that course. Since all the messages were coded on spreadsheets, descriptive statistics of the variables were generated using Microsoft Excel for Windows.

All the comparison numbers were generated by manipulating the data except for tracing the performance on questions asked. To accomplish this each individual conference spreadsheet was manually examined to see how many, if any, referrals to a specific message containing the question were made. If a message had a question in it the assumption was made that any referral to that message must contain some element of an answer to the question.

Analysis was done to determine the effect of different teaching styles on student participation. The course data was averaged by the number of students in each class in order to make valid comparisons. Because Course 6 stopped open classroom discussions before the end of the semester,
adjustments to data generated from that course were made. Results of these comparisons were linked to the instructor's actions or guidance to the class for possible explanation.

Fifteen students took more than 1 of the 6 courses. Their performances are highlighted in order to further examine the effects of different teaching styles on student participation.

Examination of the timing of messages throughout each course was done for two reasons: To gain some insight into message traffic tempo for possible course design recommendations; and to adjust the sixth course data based on the five other courses' timing performance. This process is discussed in detail in Chapter 4 under the section entitled Participation Timing.

**Group Analysis**

Group comparison analysis consists of examining the performance of the gender groups and then the military group. A comparison of the gender groups' participation rates was done using t-tests. Other investigations were conducted to further demonstrate a possible gender-neutral environment. The answers to the following questions were determined using t-tests.

1. Did males send significantly more messages than
females?

2. Did males produce significantly more message lines?

3. To what extent do female students receive positive reinforcement compared to their male counterparts? Top and bottom performers in areas of interest were also examined for noticeable trends.

The military group analysis consisted of an examination of the group's demographic composition against the non-military group. Their performances were compared to determine if military experience had any apparent association with participation performance.
CHAPTER IV
RESULTS

Introduction

The results of the study are presented with a discussion of the sample and course size first. The rest of the chapter is divided into two major sections that correspond to the two research questions. The first section shows results of the different instructors' teaching styles on participation and other program-wide observations. The second section presents the effects of gender and military experience on the student sample. The first section starts with a course by course description where the organization and execution of each course is described. Participation results of the students and the instructors are shown next. Then a variety of comparisons are made. Core course results are contrasted with the advanced elective courses. After trends between the courses were established, students' performances for those students that were in both a core and advanced course are considered. Open conference versus guided conference participation is examined. Then common factors in the courses are compared for similarities and differences. Finally the timing of the message traffic within the courses and "lurking" results are presented.

The second section reports gender outcomes and other
gender related topics. Discussions of selected individual class gender performance is included. Finally the military experienced group results are shown.

**Sample Results**

The data source for this study was a classroom instructional and performance program at a mid-size university in the Northwest. The Master of Science degree program, which has been in existence for five years, prepares students for careers in the areas of instructional design, job performance improvement, human resources, training, and training management. Included in this study were 59 students (38 males and 21 females) with 75 separate course records from six different courses. Their descriptive statistics are shown in Table 1. This was a very adult group with the youngest being 28 and the oldest 60 years old. The work experience was high with only 4 people inexperienced (a score of 1) in the training and educational development field. Because the program was established to meet the needs of the military (n = 21), they represented 36% of the class. Results from the message coding show a large range for all the variables. In sum this was a mature experienced group with above average military experience whose performance was quite varied.
Table 1

Selected Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>42.1</td>
<td>6.4</td>
<td>28.0</td>
<td>61.0</td>
</tr>
<tr>
<td>Milexp</td>
<td>0.4</td>
<td>0.5</td>
<td>0.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Workexp</td>
<td>3.0</td>
<td>1.1</td>
<td>1.0</td>
<td>5.0</td>
</tr>
<tr>
<td>Msg #</td>
<td>30.9</td>
<td>24.3</td>
<td>6.0</td>
<td>138.0</td>
</tr>
<tr>
<td>Length</td>
<td>416.9</td>
<td>215.7</td>
<td>95.0</td>
<td>1154.0</td>
</tr>
<tr>
<td>Avln</td>
<td>17.3</td>
<td>9.6</td>
<td>3.5</td>
<td>42.9</td>
</tr>
<tr>
<td>Enc-g</td>
<td>4.8</td>
<td>5.3</td>
<td>0.0</td>
<td>27.0</td>
</tr>
<tr>
<td>Enc-r</td>
<td>4.0</td>
<td>3.5</td>
<td>0.0</td>
<td>15.0</td>
</tr>
<tr>
<td>Referrals</td>
<td>16.3</td>
<td>16.0</td>
<td>0.0</td>
<td>78.0</td>
</tr>
<tr>
<td>Questions</td>
<td>2.6</td>
<td>3.6</td>
<td>0.0</td>
<td>17.0</td>
</tr>
<tr>
<td>Q-replies</td>
<td>3.0</td>
<td>6.7</td>
<td>0.0</td>
<td>49.0</td>
</tr>
<tr>
<td>Q-ignored</td>
<td>1.2</td>
<td>1.9</td>
<td>0.0</td>
<td>9.0</td>
</tr>
</tbody>
</table>

Note. Milexp = military experience: 0 = none, 1 = some; Workexp = work experience: 1 = lowest; 5 = highest; Msg # = number of messages sent; Length = total number of lines sent; Avln = average number of lines sent; Enc-g = encouragement given; Enc-r = encouragement received; Referrals = number of messages a given student was mentioned in; Questions = number of questions asked; Q-replies = number of messages received in answer to a question asked; Q-ignored = number of messages that contained a question that received no answers.
Course Composition

Within the classroom instructional and performance program, there were six courses studied—three core courses and three advanced electives. Each was led by a different male instructor. Course one is the first basic course required to be taken in the program. Its students were usually inexperienced with on-line classes. Course 2 and 3 were the same course taught at different times by different instructors. The advanced elective courses, as the name implies, were only for experienced students who were close to completing their program of study. The number of students in the courses, as shown in table 2, vary from a low of 6 to a high of 18. The females were outnumbered in four of the courses and outnumbered the males in the two smallest courses. Because the organization of the on-line classroom is a very important facet of an instructor’s teaching style, descriptions of the course organizations are presented first.

Teaching Style Affects on Participation

Teaching style in the on-line classroom is expressed by the organization of the course, the written instructions contained in the syllabus, and the more personal guidance sent by message to the students. This section begins with a description of the organization of each course, participation guidance given to them in the syllabus and
Table 2

**Course Composition**

<table>
<thead>
<tr>
<th></th>
<th>Course 1</th>
<th>Course 2</th>
<th>Course 3</th>
<th>Course 4</th>
<th>Course 5</th>
<th>Course 6</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>28</td>
</tr>
<tr>
<td>Males</td>
<td>3</td>
<td>9</td>
<td>11</td>
<td>2</td>
<td>10</td>
<td>12</td>
<td>47</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>8</td>
<td>14</td>
<td>16</td>
<td>6</td>
<td>14</td>
<td>17</td>
<td>75</td>
</tr>
</tbody>
</table>
message guidance sent to them by the instructor. After these descriptions of teaching style, the resulting participation rates are discussed in a variety of ways.

Course organization begins with conference organization. These courses were all organized around electronic conferences analogous to different class sessions. All classes had both academic and non-academic conferences. The non-academic conferences were set up for administrative and social interaction. The academic conferences were also constructed for different purposes. There were discussion conferences where the whole class would be involved in exploring a particular topic. Other conferences were set up for tests, projects and small group work.

Each course issued formal written instructions to the students found in a syllabus that outlined the organization and assigned various student activities. The activities were assigned a value (percent of grade) toward a final grade by the instructor. The instructors also issued personal guidance by message to their students which amplified and clarified the instructions in the syllabus. These facets of teaching style are discussed in this section. Table 3 shows a summary of the general characteristics for the courses. It provides a centralized reference for the subsequent discussions.
### Table 3

**Summary of Course Organization**

<table>
<thead>
<tr>
<th>Type of Actions</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of grade for participation</td>
<td>30%</td>
<td>20%</td>
<td>10%</td>
<td>20%</td>
<td>20%</td>
<td>30%</td>
</tr>
<tr>
<td>Guidance on participation</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Guidance on length of answer</td>
<td>Yes short</td>
<td>No</td>
<td>No</td>
<td>Yes 3 screens</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Emphasis on participation</td>
<td>Yes Strong</td>
<td>Yes Very strong</td>
<td>Yes Mild</td>
<td>No</td>
<td>No</td>
<td>Yes Strong</td>
</tr>
<tr>
<td>Planned 2 discussion conferences</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Used 2 discussion conferences</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Course 1

Course one was the foundation course of the program and thus was required for all students. The instructor organized the course into five sections around the chapters in the assigned book. The academic discussion conferences were numbered 1-5 with Guided and Open conferences for each chapter. In Guided conferences, the messages were required to be "formal, well written, clear, concise, well thought-out, to the point, supported by more than just your opinion, and edited for grammar and spelling." Additionally these messages should deal with only the current topic. The instructor required the students to react to, comment on, and evaluate parts of the readings and research topics. About three questions were formally posed during the course of the conference. Students were directed to only write a paragraph or two as "quantity is seldom quality". Shorter answers would better focus the input and encourage others to read the comments and, if appropriate, to raise questions or provide further comments.

On the other hand, Open conferences were designed to allow the students to comment on responses in the Guided conferences, or talk about anything remotely relevant to the topic under discussion. The instructor encouraged the students to critique others because much of the real learning would be achieved in the Open conferences. He also
advised them that he would not always join their hopefully heated debates but would only participate when appropriate. To further enhance active participation, 30% of the grade was based on course participation, with 30% for the quizzes, 30% for application exercises and 10% for the final paper. The course started with 10 students and had 8 complete the course, five females and three males.

The organization of the course was executed as designed with no major changes in requirements or instructions to the students. As new students are apt to do, a student asked how long "a couple of paragraphs" were suppose to be. In clarifying this, the instructor said no more than two or three screens. He never gave more specific instructions. As will become clear later, this lack of firm length requirement may be a key point in teaching style. The students accepted this response with no further questions on the issue. The responses to the questions in the guided conferences did not suggest in any way that the students felt either hindered by instructions or nervous that they may not be writing enough.

As this was the first distance education course for these students, there was some discomfort with the software system. Students occasionally re-sent messages that they were unsure made it into the system and sent administrative messages indicating their problems with the software. Part
of their difficulty stemmed from an early failure of the whole system that even caught the professor unaware. This aside, after the first two weeks, the students were able to use the system effectively. The school had a very active student support system which had graduate assistants call students that were having trouble with the system or who were not actively participating in the classes. While no data exits to support this claim, this group of students mastered the software challenge quickly, possibly due to the proactive student support system.

The students followed the framework of the course. Guided conferences were used primarily to answer formal questions from the instructor. Those answers were normally addressed to All. This is evidenced when 80% of the messages in the Guided Conferences were posted to All while only 19% were addressed to an Individual. In either case, whether a message was sent to all or addressed to an individual the entire class could read the messages. This is similar to comments addressed to an individual in a face-to-face classroom that can be heard by all members of the class. The Guided Conferences produced fewer but longer messages while the Open Conferences produced shorter but more numerous messages. It is in the open forum that the most interaction between students occurred. More detail results on conference types are presented later in the
Chapter.

Course 2

Course 2 is another core course which is normally taken second in the program. The instructor organized it into conferences which corresponded to each chapter in the two assigned books. Again there were two conferences per chapter. However, in this course they were designated as Question Conferences and Discussion Conferences. There was no explanation for the use of the conferences on-line or in the syllabus and in practice the Question Conferences were virtually unused. Course participation was very clearly emphasized in the course guide. Each student was required, as a minimum standard to achieve an "A" in participation, to submit at least one substantive comment for each instructor question posed. The instructor carefully pointed out that students in the summer session had been dropped to a "B" for lack of participation. Quality of message was stressed; great length was discouraged. Criteria for quality participation was explained in detail with a final point that no one should dominate the discussion. Participation comprised 20% of the grade.

Along with general discussion conferences, each student was assigned two design projects which their colleagues were required to critique. Finally tests were given after each block of chapters. Although the project conferences
generated a large number of messages, they were not of a
general discussion nature and therefore not used in this
study. Only the general discussion conferences and the
occasional message that appeared to be misplaced in the
Question Conferences were used for the analysis of
participation.

The execution of the course did not follow the
conference design. Assignments normally included a few
chapters from each of the two books. The conference
organization would lead one to believe that the questions
from the instructor for each of the assigned chapters would
be found in the Question Conference for that chapter.
Instead the questions were posed, when found, in the
Discussion Conference for the first chapter from the second
book assigned for that block of instruction. Thus the
majority of the chapter conferences were empty; messages did
not appear to be posted in a very coherent manner. Although
the question messages were hard for the investigator to
locate in this course, there was no message traffic that
alluded to difficulty for the students. In fact no
referrals of significant difficulty with the software or
course organization were found. All had successfully
completed one course and no longer had trouble with the
software. In courses 2-6 the students expressed no
difficulty with the software.
Course 3

Course 3 which is the last of the core courses examined is the same subject as course 2 taught by a different instructor in a different semester. The course organization consisted of a series of four conferences: TestPrep, Project, Extra, and Test for each block of instruction. Each conference's purpose was thoroughly explained. TestPrep and Extra fulfilled the same functions as the Guided and Open Conferences in Course 1. The instructor used the words guided and open to describe these conferences. However, one difference was that the students were told that discussions in the Extra Conferences did not count toward the course participation grade. Formal questions were posed and answered in the TestPrep Conferences. Length of answer was never discussed by the instructor and was not questioned by the students. The Project Conferences were used to conduct student-led projects such as developing a needs analysis for Course 3. Students were selected to lead these and the rest of the class was instructed to comment on the developing product. The grading break-down was as follows: 40%—Tests; 40%—group projects; 10%—participation; 10%—final exam. The course, which started with 17 students, finished with 5 females and 11 males. Because of the nature of the other conferences, only the TestPrep and Extra conferences were studied.
The course unfolded as organized. The TestPrep conference was the most heavily used because the students answered the formal questions posed in it. The Extra conferences were not as active. This is not surprising since the instructor told the students that participation in those conferences did not count toward the course participation grade. The number of messages addressed to "All" was again higher in the TestPrep Conferences as it had been in Course 1 in the Guided Conferences but not to the same extent.

Course 4

Course 4 is the first advanced course to be examined. The instructor distributed a very detailed set of instructions and declared that he would use, in addition to the on-line opportunities and the normal written materials, audio tapes that would deliver lectures of interest. The conference structure for this course was very straightforward. Conferences were numbered based on the block of instruction. Again, this instructor advised the students that for graduate courses participation was most important. He expected replies to his questions to be clear, based on the readings and not just personal experience. He emphasized quality over quantity in his syllabus. Unfortunately, as will be clear shortly, he told them on-line that for any given block of questions the
answer should be no more than 3 screens of text. This is the first instructor to set forth very clearly reply length without being asked. He administered a mid-term and final exam each worth 25% of the grade. A project consisting of a 15-20 page paper was also due at the end of the semester which counted for 30% of the grade. Finally 20% of the grade was based on course participation. Six experienced students, four females and two males, started and finished the course. The instructor’s guidance that questions would be answered with about 3 screens was followed to the letter. The students answered the questions and did literally nothing else in the discussion conferences. This process became the routine and continued throughout the semester.

Course 5

Course 5 is the second of the advanced courses. Its students were very self-directed as they initiated discussion before the instructor had even signed on. The course was designed around one primary book and a few other articles for the class. The conferences were organized in numbered units, 1...10, with specific chapter question conferences under each of the 10 units. The instructor commented on his participation grade as being worth approximately 20 points (points were not defined) which he admitted was worth much less than that of the tests. He went on to say that the participation grade was only

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considered if a student's performance was on the line between an A or B. If this was the case, the participation performance would decide the final grade. He did not expect everybody to contribute to each chapter of the discussion but rather felt that something in the book would peak each student's interest enough to comment. Thus he played down active classroom interplay and told people that he would answer private and administrative messages quickly. However, with so many students in the class, he could not answer all the questions raised. The class started with 17 and ended with 14.

The execution of the class was mixed. As it turned out the Unit conferences 1-3 were used but 4-10 were empty. The individual chapter question conferences were virtually empty and those that did have messages were not from the entire class and had many personal non-academically related messages. Because of the lack of consistency of the chapter question conferences, only the Unit conferences were coded and used.

Course 6

Course 6, the last to be examined, is an advanced seminar taught to a group of experienced students. Class participation was mentioned early and often in the syllabus for this course. 30% of the class grade was based on participation with 60% on tests and 10% on a required
report. The instructor outlined conventions designed to enhance discussion. These included:

- Making appropriate and insightful comments
- Knowing when to lead and more when to follow
- Referencing inputs
- Providing constructive feedback to participants
- Willingness to question

In addition to these broad conventions, each student was asked to provide an estimated numerical grade for class participation along with justification for that proposed grade at the beginning of each examination. Feedback for the examinations which was sent privately would contain the instructor’s comments on the student’s participation grade. This is the only course where the instructor gave feedback on participation to all the students. In the other classes, private messages were sent to those whose participation was substandard.

The academic conferences were divided into four types. The first two were named Discussion Conferences and Application Conferences. The Discussion Conferences served as Open Conferences but the instructor did some guiding in them. Application Conferences which closely resembled Guided conferences were used to complete small projects that were in the book. The other conferences, named Hallways, were used for small group work while Test conferences were self-
explanatory. This course started with a great deal of active discussion by the class. By design, after about 45 days of the course, the class was divided into small groups for the rest of the semester. Although these small groups conducted Hallway conferences and were very active, these special discussions were not included in this analysis because it was not part of the open classroom discussion. The analysis does include the Discussion and Application Conferences.

The execution of the course went as planned. There was a large amount of discussion in the two types of conferences. Again the Discussion conferences in this course generated the shorter but more numerous messages. The split between the messages sent to All and to Individuals was also the same as the earlier courses. The "to All" were more prominent in the Application Conferences with more personally directed messages in the Discussion conferences.

**Participation by Course**

In order to compare the participation of the students fairly, the raw data in table 4 were transformed to averages per student for each variable. For example, the message count was changed to the average number of messages per student and the total number of lines is now an average total number of lines per student. Because Course 6 stopped
### Table 4

**Participation Results by Course**

<table>
<thead>
<tr>
<th></th>
<th>Core Courses</th>
<th>Advanced Courses</th>
<th>Total Av</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>Msg #</strong></td>
<td>36</td>
<td>44</td>
<td>42</td>
</tr>
<tr>
<td><strong>Length</strong></td>
<td>576</td>
<td>440</td>
<td>333</td>
</tr>
<tr>
<td><strong>Enc-g</strong></td>
<td>5.9</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td><strong>Enc-r</strong></td>
<td>5.3</td>
<td>3.8</td>
<td>6.6</td>
</tr>
<tr>
<td><strong>Referrals</strong></td>
<td>17</td>
<td>26</td>
<td>25</td>
</tr>
<tr>
<td><strong>Questions</strong></td>
<td>4.3</td>
<td>4.6</td>
<td>4.2</td>
</tr>
<tr>
<td><strong>Q-replies</strong></td>
<td>3.5</td>
<td>8.3</td>
<td>3.8</td>
</tr>
<tr>
<td><strong>Q-ignored</strong></td>
<td>2.5</td>
<td>1.6</td>
<td>1.9</td>
</tr>
</tbody>
</table>

**Note.** 
Msg # = number of messages sent; Length = total number of lines sent; Enc-g = encouragement given; Enc-r = encouragement received; Referrals = number of messages a given student was mentioned in; Questions = number of questions asked; Q-replies = number of messages received in answer to a question asked; Q-ignored = number of messages that contained a question that received no answers.
having open class discussions before the semester was over, its data were projected to reflect a more accurate performance if the class had continued to the end of the semester rather than breaking into small groups. A detailed explanation is given in the Section entitled Participation Timing. Course 1, which made the best use of Guided and Open discussion conferences, produced the most lines per student of all the courses with 576. Course 2, whose instructor issued the firmest guidance as to the importance of the class discussions, produced the most messages per student with 44. Course 3 had the second most messages with 42 but the lowest number of lines, 333. Course 4 students produced the lowest number of messages per student, 17, but their number of lines was the second highest, 517. This performance is a direct result of the instructor's detailed guidance on three-screen length messages which caused the students to consistently produce long messages. The other two advanced seminars, Course 5 and 6, produced fewer and shorter messages. To test the differences in numbers of messages sent, a 2x2 Analysis of Variance (ANOVA) was conducted using gender and course type. The main effects (F = 8.3, p = .001) were significant with course type being significant (F = 14.8, p < .001) and gender not being significant (f = 2.5, p = .121). All the results are in table 5.

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### Table 5

#### 2x2 ANOVA Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Main Effects</th>
<th>Gender</th>
<th>Course Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>p</td>
<td>F</td>
</tr>
<tr>
<td>Msg#</td>
<td>8.3</td>
<td>.001</td>
<td>2.5</td>
</tr>
<tr>
<td>Enc-g</td>
<td>4.2</td>
<td>.018</td>
<td>1.1</td>
</tr>
<tr>
<td>Enc-r</td>
<td>5.9</td>
<td>.004</td>
<td>1.2</td>
</tr>
<tr>
<td>Referrals</td>
<td>11.7</td>
<td>&lt;.001</td>
<td>1.9</td>
</tr>
<tr>
<td>Questions</td>
<td>9.8</td>
<td>&lt;.001</td>
<td>1.3</td>
</tr>
</tbody>
</table>

Note. Msg # = number of messages sent; Enc-g = encouragement given; Enc-r = encouragement received; Referrals = number of messages a given student was mentioned in; Questions = number of questions asked
The Core Courses consistently out-performed the Advanced Courses in every category. The Core Course Referral performance was three times better than the Advanced Courses (24.2 to 8.1). The students in the Core Courses were more engaged in the discussions. They asked more questions, paid more attention to each others ideas (referrals) and exchanged more encouragement.

**Individual Student Course Comparisons**

To pursue this comparison of the Core versus Advanced courses further, Table 6 shows individual student course performance comparisons between the Core and Advanced courses.

There were 15 students that were in more than one of the courses studied. Fourteen of them were in one core course and one advanced course; Student Number 16 was in one core and two advanced courses. The Core Courses were nearly equally represented with about five students in each while none of the students were in Course 4. The student's performance in a Core course and an Advanced course is presented in Table 5.

All students sent more messages in the Core courses than they did in the Advanced courses with the exception of one student who sent the same number. The average messages sent in the core courses (42) was nearly twice as many as the advanced courses (23). Five students sent more lines in
### Table 6

**Individual Student Course Comparisons**

<table>
<thead>
<tr>
<th>Student Number</th>
<th>Core Courses</th>
<th>Advanced Courses</th>
<th>Core Courses</th>
<th>Advanced Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>44</td>
<td>18</td>
<td>525</td>
<td>253</td>
</tr>
<tr>
<td>4</td>
<td>74</td>
<td>39</td>
<td>1097</td>
<td>569</td>
</tr>
<tr>
<td>5</td>
<td>27</td>
<td>12</td>
<td>598</td>
<td>201</td>
</tr>
<tr>
<td>8</td>
<td>34</td>
<td>21</td>
<td>484</td>
<td>330</td>
</tr>
<tr>
<td>9</td>
<td>41</td>
<td>18</td>
<td>439</td>
<td>320</td>
</tr>
<tr>
<td>12</td>
<td>98</td>
<td>44</td>
<td>560</td>
<td>782</td>
</tr>
<tr>
<td>13</td>
<td>30</td>
<td>21</td>
<td>213</td>
<td>257</td>
</tr>
<tr>
<td>14</td>
<td>23</td>
<td>12</td>
<td>257</td>
<td>132</td>
</tr>
<tr>
<td>16</td>
<td>97</td>
<td>55/43</td>
<td>1154</td>
<td>763/583</td>
</tr>
<tr>
<td>18</td>
<td>30</td>
<td>14</td>
<td>477</td>
<td>239</td>
</tr>
<tr>
<td>21</td>
<td>25</td>
<td>11</td>
<td>223</td>
<td>198</td>
</tr>
<tr>
<td>39</td>
<td>53</td>
<td>31</td>
<td>394</td>
<td>422</td>
</tr>
<tr>
<td>41</td>
<td>6</td>
<td>6</td>
<td>118</td>
<td>169</td>
</tr>
<tr>
<td>42</td>
<td>23</td>
<td>14</td>
<td>514</td>
<td>330</td>
</tr>
<tr>
<td>43</td>
<td>22</td>
<td>15</td>
<td>220</td>
<td>274</td>
</tr>
<tr>
<td>Average</td>
<td>42</td>
<td>23</td>
<td>485</td>
<td>364</td>
</tr>
</tbody>
</table>
the advanced courses but, again the average for the Core Courses (485) exceeded the Advanced Courses (364). When comparing students against themselves in the two types of courses the trend persists. Namely, the Core Courses fostered more participation and effort then the Advanced Courses. Two of the three Core Courses used the two discussion conference model while only one of two in the Advanced Courses used that model. Participation was more strongly emphasized in the three Core Courses than in the Advanced Courses. Additionally two of the three Core Course Instructors were permanent professors of the department while all the others were adjuncts.

**Faculty Participation Rates**

Table 7 shows that none of the instructors dominated the discussion conferences; they facilitated student-centered learning. Most of them indicated to their students that they would only join these sessions if needed. The first five course instructors presented mini lectures or summaries prior to moving on to the next conference and subject. This increased their average message length. They did not tend to answer academic questions individually but rather gathered questions and then answered them all in their summaries. All were very active in the administration and private feedback functions which do not appear in these numbers.
<table>
<thead>
<tr>
<th>Course#</th>
<th># Msg</th>
<th>%</th>
<th>Length</th>
<th>Mean To All</th>
<th>To Indiv</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>41</td>
<td>12</td>
<td>539</td>
<td>13</td>
<td>19</td>
</tr>
<tr>
<td>2</td>
<td>76</td>
<td>11</td>
<td>810</td>
<td>11</td>
<td>24</td>
</tr>
<tr>
<td>3</td>
<td>112</td>
<td>14</td>
<td>2505</td>
<td>22</td>
<td>64</td>
</tr>
<tr>
<td>4</td>
<td>15</td>
<td>12</td>
<td>528</td>
<td>35</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>60</td>
<td>17</td>
<td>1025</td>
<td>17</td>
<td>19</td>
</tr>
<tr>
<td>6</td>
<td>25</td>
<td>08</td>
<td>185</td>
<td>7</td>
<td>10</td>
</tr>
</tbody>
</table>

Note. # Msg = total number of messages sent; % = the instructions percent share of messages; Length = total number of lines in messages; Mean = The average length of messages sent; To All = number of messages addressed to everybody; To Indiv = number of messages sent to a student.
Conference Construction

Three aspects of conference construction are discussed here: The nature of Open and Guided conferences, the differences between messages addressed to All or to an Individual, and the comparison of the two conference model to the performance of the one conference model.

While Courses 1, 3 and 6 named their discussion conferences differently, the two conferences in Courses 3 and 6 served the same purposes as the Guided and Open Conferences of Course 1. Course 3 performance outcomes did not conform to the other two because the instructor told the class that the Extra (Open) Conference participation did not count toward the participation grade. As a result only data from the other two Courses are used to compare Open Conferences to Guided Conferences. There is a difference in the message traffic within the two conferences. In the Guided Conferences, where the students were directed to answer instructor questions, there were fewer messages, 210 vs. 379, but the average message length was longer, 30 vs. 12 and more of the messages were addressed "to All", 152 vs 112. Conversely, the Open Conferences generated more but shorter messages with a great majority of the messages addressed to a specific individual, 267 to 58. Thus, each type of conference serves a different role. The Guided Conference contains messages that substitute for the short
oral or written reports rendered by students in the face-to-face classroom. The Open Conference mirrors the open discussion after such reports are rendered.

There is a difference between these types of messages. There were more messages addressed to an Individual, 1456, compared to those addressed to All, 863. However the average length of the to All messages is longer, 22 vs. 8 lines. This reflects their different purposes. The to All messages usually answer instructor questions while the to Individual messages serve as the short interactions between students.

Returning to the two conference design in comparison to the one conference design, the student performance was somewhat different as shown in Table 8. Even though Course 2 produced the highest average messages per student, due to the strong guidance to participate given to Course 2 students, the two conference design generated more messages per student. While it is not clear from the combined numbers because Courses 2 and 4 are skewed in the opposite direction, the two conference design produced a more even split between message addressed types. Messages addressed to All and to an Individual were more evenly distributed within those courses.

**Participation Timing**

Participation timing is interesting for two reasons.
<table>
<thead>
<tr>
<th>Course</th>
<th>(N)</th>
<th>Av # Msg per Stu</th>
<th>Av Length per Stu</th>
<th>To All %</th>
<th>To Stu %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two Conference Design</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td>36</td>
<td>576</td>
<td>42%</td>
<td>58%</td>
</tr>
<tr>
<td>3</td>
<td>16</td>
<td>42</td>
<td>333</td>
<td>35%</td>
<td>65%</td>
</tr>
<tr>
<td>6</td>
<td>17</td>
<td>22</td>
<td>368</td>
<td>41%</td>
<td>59%</td>
</tr>
<tr>
<td>Combined</td>
<td>41</td>
<td>32</td>
<td>394</td>
<td>38%</td>
<td>62%</td>
</tr>
<tr>
<td>One Conference Design</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>17</td>
<td>517</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>5</td>
<td>14</td>
<td>19</td>
<td>318</td>
<td>36%</td>
<td>64%</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
<td>44</td>
<td>446</td>
<td>25%</td>
<td>75%</td>
</tr>
<tr>
<td>Combined</td>
<td>34</td>
<td>29</td>
<td>406</td>
<td>36%</td>
<td>64%</td>
</tr>
</tbody>
</table>

Note. N = number of students in class; Av # Msg = average number of messages sent per student; Av Length = average number of lines generated per student; To All = percent of messages addressed to everybody; To Stu = percent of messages sent to student or instructor.
It provides helpful insight to designers of on-line classes and because these timing trends were used to adjust the Course 6 results in Table 4. The results of the 6 courses have been gathered together to show the individual results and the overall trend which are depicted in Table 9. Participation started out heavy but tapered off toward the end. Because tests, small group work and final papers were required toward the end of the semester, student energy for discussion waned in those time periods. Course 4 yielded unexpected results. Since it was essentially conducted as a correspondence course, one might have expected its participation to be more steady than the results show. In Course 6, it is obvious that normal full class discussions ended in time period 8. After that time only small group discussions were conducted. The accumulative message traffic timing for the first 5 courses shows 89% of the messages were sent when only 75% of the class time was completed. Using this cumulative information, Course 6 student performance data was adjusted.

In order to compensate for Course 6 using small group activities exclusively after the 8th time period, the following actions were taken. Since the discussions ended in the 8th time period, it was assumed that Course 6 message traffic for the normal classroom discussions would have been similar in timing to the other 5 courses. Since 79% of the
Table 9

Frequency of Messages within Time Period

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Course 1</th>
<th>Course 2</th>
<th>Course 3</th>
<th>Course 4</th>
<th>Course 5</th>
<th>Cumulative Percentages Course 1-5</th>
<th>Course 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>24</td>
<td>1.26%</td>
<td>0</td>
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<tr>
<td>2</td>
<td>33</td>
<td>66</td>
<td>88</td>
<td>25</td>
<td>44</td>
<td>14.17%</td>
<td>18</td>
</tr>
<tr>
<td>3</td>
<td>44</td>
<td>51</td>
<td>101</td>
<td>36</td>
<td>66</td>
<td>29.20%</td>
<td>96</td>
</tr>
<tr>
<td>4</td>
<td>48</td>
<td>59</td>
<td>56</td>
<td>19</td>
<td>8</td>
<td>38.78%</td>
<td>140</td>
</tr>
<tr>
<td>5</td>
<td>28</td>
<td>108</td>
<td>72</td>
<td>7</td>
<td>9</td>
<td>50.08%</td>
<td>11</td>
</tr>
<tr>
<td>6</td>
<td>15</td>
<td>95</td>
<td>81</td>
<td>11</td>
<td>32</td>
<td>61.88%</td>
<td>9</td>
</tr>
<tr>
<td>7</td>
<td>30</td>
<td>31</td>
<td>86</td>
<td>3</td>
<td>35</td>
<td>71.21%</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>43</td>
<td>73</td>
<td>24</td>
<td>0</td>
<td>11</td>
<td>78.82%</td>
<td>21</td>
</tr>
<tr>
<td>9</td>
<td>17</td>
<td>86</td>
<td>100</td>
<td>1</td>
<td>2</td>
<td>89.21%</td>
<td>3</td>
</tr>
<tr>
<td>10</td>
<td>9</td>
<td>16</td>
<td>30</td>
<td>0</td>
<td>8</td>
<td>92.39%</td>
<td>0</td>
</tr>
<tr>
<td>11</td>
<td>19</td>
<td>32</td>
<td>56</td>
<td>1</td>
<td>20</td>
<td>98.84%</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>2</td>
<td>0</td>
<td>9</td>
<td>2</td>
<td>10</td>
<td>100.00%</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: Time Period = consecutive ten day segments of the class.
other courses' messages were sent by the end of that period, one assumes Course 6 data must only reflect 79% of its total. To estimate Course 6 results for the end of the semester, the raw course data was multiplied by a factor of $100/79 = 1.27$. All Course 6 data was adjusted by this factor to reflect full active participation to the end of the semester.

**Lurking Analysis**

Lurking, which refers to the practice of reading all the messages in a conference but not sending very many, has been a subject of interest since Hiltz and Turoff dealt with it in their 1978 work. Because some 20-25% of their students were considered lurkers and 10% of their class contributed 50% of the messages sent, they warned that the actual size of an on-line class is often much smaller than the enrollment. While no numeric definition of a lurker could be found, for purposes of this analysis, a lurker was defined as any person who contributed less than half of their fair share in a class. Thus if there were 10 students in a class than a student's fair share of the total messages was 10%. All students that contributed less than 5% of the messages are considered lurkers. The number of lurkers in the courses studied was very low, ranging from zero for Course 4 to three for Course 2. For all the courses, only 9% of the students were lurkers. This is well below the
expected outcome based on Hiltz's work. On the high end of participation, in no case did 10% of the students contribute 50% of the messages. In this whole program 54% of the students sent 50% (1160) of the total messages sent. The number of students contributing their fair share or more was also 54%. Thus these lurking results indicate this program had many fewer students not actively participating and that participation was more evenly distributed than in the past.

The Gender Environment of the On-Line Classroom

This section addresses the second research question of the study. Does the on-line classroom generate a more gender-neutral environment? Because flaming, defined in the networking community as the display of extreme emotion in a message, is a common method to silence others, especially women, in a computer conference, it is discussed first. Then the participation comparisons of gender performance are shown. In order to further strengthen or refute the gender neutral environment contention of this study, three other aspects of classroom participation are examined. These include an identification of the high and low participation performers, a determination of whether women were silenced by the end of the semester, and an examination of performance within individual courses.
Flaming

There was no indication of any flaming within the 2649 messages reviewed for this study. Additionally, there were no remarks to which other students took exception or that hinted of sexual harassment. Students and instructors treated each other with respect and restraint. Students’ interaction was courteous and friendly. Seldom did any student take open exception to another’s comments. On the other hand, comments were often positively reinforced. A student’s comment might be questioned for clarity or stated by another in a different way but never directly challenged. In all but Course 4 an easy camaraderie was established between the students. This course did not have significant interchange for such bonding to occur. Again no overt or obvious comments were made against an individual or group. People tended to poke fun at themselves but not at others. Very polite behavior was observed throughout the messages. Thus the message content results are supportive of a more gender-neutral environment.

Gender Participation Performance

If the on-line classroom generates a more gender-neutral environment then men and women should participate equally. No significant difference at the 5% level of confidence was found. Table 10 shows the average measures for each of the variables captured. T-tests were run for the
Table 10

Selective Descriptive Statistics by Gender

<table>
<thead>
<tr>
<th>Variable</th>
<th>Female Means</th>
<th>Female SD</th>
<th>Male Means</th>
<th>Male SD</th>
<th>t=</th>
<th>2tail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>40.1</td>
<td>6.77</td>
<td>43.24</td>
<td>6.09</td>
<td>2.01</td>
<td>.048</td>
</tr>
<tr>
<td>Workexp</td>
<td>3.04</td>
<td>1.34</td>
<td>2.98</td>
<td>1.00</td>
<td>-.21</td>
<td>.833</td>
</tr>
<tr>
<td>Milexp</td>
<td>.185</td>
<td>.396</td>
<td>.456</td>
<td>.504</td>
<td>2.42</td>
<td>.018</td>
</tr>
<tr>
<td>Msg #</td>
<td>26.26</td>
<td>13.21</td>
<td>33.37</td>
<td>29.01</td>
<td>1.28</td>
<td>.206</td>
</tr>
<tr>
<td>Length</td>
<td>357</td>
<td>152</td>
<td>449</td>
<td>244</td>
<td>1.8</td>
<td>.076</td>
</tr>
<tr>
<td>Avln</td>
<td>16.5</td>
<td>8.6</td>
<td>17.8</td>
<td>10.3</td>
<td>.52</td>
<td>.601</td>
</tr>
<tr>
<td>Encg</td>
<td>4.07</td>
<td>3.23</td>
<td>5.17</td>
<td>6.28</td>
<td>.89</td>
<td>.379</td>
</tr>
<tr>
<td>Encr</td>
<td>3.67</td>
<td>3.34</td>
<td>4.04</td>
<td>3.73</td>
<td>.33</td>
<td>.745</td>
</tr>
<tr>
<td>Referrals</td>
<td>13.78</td>
<td>10.43</td>
<td>17.67</td>
<td>18.77</td>
<td>1.01</td>
<td>.315</td>
</tr>
</tbody>
</table>

Note. Milexp = military experience: 0 = none, 1 = some; Workexp = work experience: 1 = lowest; 5 = highest; Encg = encouragement given; Encr = encouragement received; Msg # = number of messages sent; Length = total number of lines sent
gender groups to test for significant mean differences. The
demographic comparisons show that the males were
significantly older and had significantly more military
experience but did not test significantly different for work
experience. In each case, the null hypothesis assumed there
was no difference between the genders in the given
performance indicators. Although the female participation
averages were below the males in both number of messages and
total length, the results show that, at the 5% confidence
level, the null hypothesis can not be rejected for any
variables. However the total length of lines indicated a
significant difference at the 7.6% level. This is close
enough for this study to conclude that the males did perform
differently. In the measure of referrals, encouragement
given and received the results were not significant. Thus
women's messages were not ignored and they were encouraged
to participate. These quantitative results support the
contention that the on-line classroom is more gender-
neutral.

Gender Representation Among High and Low Performers

If the on-line classroom is gender-neutral, then
highest and lowest participants should include a
representative mix of males and females. The high and low
performance data for the variables, number of messages sent,
message length, and referrals, did not support the gender-
neutral contention. The top five performers in all three categories were males. In fact there were only two females in the top ten of each category. The bottom five performers in messages sent and length had two females each which was the expected result based on the population composition. The bottom seven students in referrals all had a score of zero. Of them, five were females. The females are under-represented at the top and over represented in referrals at the bottom.

**Effect of a Dominating Student**

In the face-to-face classroom, a very vocal individual can effectively dominate a class discussion. Because of the rules of waiting one's turn to speak in this environment, a dominating student or group of students can silence others. Because nobody has to wait for "air time" and could send messages freely while others were doing the same, silencing of other females and males did not occur in the on-line classrooms studied here. In spite of some very active students in the courses, the rest of the students could still participate at a high level. This finding makes the fact that the most active participators were male much less important since it does not mean that others could not participate as much as they desired.

Examining individual Course 1 performance, one male stood out as having contributed 25% of all the message
traffic. From this one might conclude that he was a dominant force in the course and the center of attention. However his messages, which constituted 25% of the total message traffic, only attracted 18% of the referrals and he was only encouraged to participate 2% of the group's total. While he was a prolific message sender, the rest of his class averaged 31 messages which equaled the average for the entire population. Thus he did not silence the rest of his class but rather only contributed more.

In Course 2, a group of three males sent over 85 messages each while the most active woman sent 60. This time the rest of the class averaged 30 messages. Three of the five females contributed above that average again indicating no silencing.

In Course 3 there were three males the contributed 41% of the messages but the rest of the class averaged 32 messages. None of the rest of the courses had one or more males or females that participated so actively. The results in these three courses demonstrate that even if one or more students contribute heavily to their course it does not mean that the rest of the students do not still contribute.

Silencing in the Classroom

Message timing supports the more gender-neutral contention. Lewis and Simon (1986) reported that women become increasingly more quiet as a face-to-face class

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proceeds and by the end of the class they are nearly silent. If this is true in the on-line classroom, the timing of women's messages would be skewed heavily to the beginning of the course. Since all message traffic in the courses was skewed, a comparison with the male timing was examined. Again the courses were broken into ten day increments and the cumulative percent of messages sent was investigated. Although the female message cumulative percent was always slightly higher, it never exceeded the males by more than 10%. There was a 10% difference only once in the 13 time periods with an average difference of 4%. Although both groups were skewed toward the early part of the semester, there was no indication of increased creeping silence in the classroom by the females.

**Military Group Performance**

The military group was singled out for analysis because while the data were being gather, there was an impression that they would be top performers in this distance learning environment. This was based on their normal familiarity with high technology and their frequent use of the radio to communicate over a distance. This impression did not prove to be valid. The military group were demographically, on average, older, less experienced in the training development field and male. They were below the non-military group average in messages sent, 24 vs 35, total lines sent, 395 vs
429 and referrals, 10 vs 20. Although there was no significant differences between the groups in length of messages (p=.52), T-tests did establish a difference in the groups in the number of messages sent at the 6% level of confidence. Testing the means of referrals (10.0 vs 19.6) did establish a significant difference at the .05 level of confidence. Being inexperienced in this field compared to the others may have contributed to these results.
CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE STUDY

This chapter presents conclusions based on the results from the previous chapter, and informed from past research that answer the two research questions: How are different on-line teaching styles related to on-line participation and does the on-line classroom generate a more gender-neutral environment? The following three sections provide implications of the findings, recommendations for future research, and a final summary.

Conclusions

Impact of Teaching Styles

The first research question asked the question, how are different on-line teaching styles related to on-line participation? Instructors have found that they need to modify their teaching style to accommodate the on-line classroom environment (Kaye, 1989; Nipper, 1989; Turoff, 1990; Konttinen and Marttunen, 1991). It is normally more appropriate for the instructor to pose questions rather than just supplying answers or to deflect student questions to the whole class for consideration. This shift to a more facilitative style normally means that instructors monopolize less class time. Having contributed less than

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15% of the message traffic in the discussion conferences all the studied instructors demonstrated their use of this teaching style.

There were four actions that instructors used that influenced the participation performances of their classes. First, the organization of the conferences influenced participation performance. Because the instructor is not seen, his/her stage becomes the active conferences of the on-line classroom. The organization of these conferences is one expression of the instructor's style. The two discussion conference models out-performed the single conference models in message traffic. Course 5 used only 3 conferences and essentially did both the tasks of the open and guided conferences in one large conference. That course performed below average in all categories. Course 4 was an anomaly among these courses. Its students did very well in length of messages sent, but, following a one conference design, they generated the least messages.

Because the two conference model had two active conferences running at a time, and each was active for only a short time, the students had more total conferences in which to participate. That design motivated students to continually post messages to the new conferences. If instructors desire to achieve the most active participation among their students, a two conference design for each small
block of instruction generates more activity on the part of the students than a single conference design.

Secondly, instructor guidance, which was issued by message, had a profound effect on student performance. Firm guidance on the importance of frequent participation was a key factor in classroom participation. The most messages per student were generated in Course 2 in which the instructor gave the clearest emphasis on participation. No other instructor emphasized participation more firmly or clearly issued a veiled threat that one's grade could be finally determined based on participation. In all courses that stressed participation, the message traffic was above average except for Course 6.

The Course 6 instructor spent some time explaining his definition of good participation which stressed providing helpful comments to fellow students. His use of feedback on each student's response on how well they were participating was unique. That technique ensured all students received feedback on participation performance rather than only those that the instructor considered marginal or unacceptable. There is no apparent explanation why Course 6 did not perform as well as the top courses: 1, 2, and 3. The guidance in these courses covered the amount of participation but did not stress the length of messages.

On the other hand, Course 4 guidance instructed
students that messages would be no more than three screens long and that is exactly what was produced. Each student faithfully answered the posted questions with an answer that was approximately 3 screens long. The Course generated the second most lines with the least messages.

The instructor of Course 3 issued instructions that his course would have two conferences for discussion but that participation in the second one would not count toward the final grade. As a result, the Testprep Conferences (475) far exceeded the Extra Conferences (201). Even the name, Extra, reinforced the guidance that this was not an important activity. The fact that the Extra Conferences were used as much as they were is a testament to the self-directed nature of adult students.

The common thread throughout these course comparisons is clear. The instructor received from his students that which he asked for. Namely, in the case of Course 4, the instructor wanted fairly long answers to his posed questions but did not stress the need to interact before the course or express any interest in doing so during the course. Thus one sees a class that generated a large number of lines but only a few messages per student. On the other hand, the Course 2 instructor went to great lengths to impress upon his students that interaction between the students was very important. His class generated the most messages per
student with less lines generated per student. Course 1 struck a balance between his Open and Guided conferences, generated the third most messages with the most lines per student. The important implication here is that the instructor must be sure of what he/she wants before issuing personal written guidance, because these students produced exactly what the instructor asked for.

The effect of the written syllabus was much less than the personal message. Each instructor assigned a percent of his final grade based on participation. The relative weight was not vastly different among the courses (10%-30%). In each case, it was declared to be earned by quality participation throughout the class. This guidance, which was issued in the syllabus, was part of the explanation of all the student activities that counted toward the final grade. This particular program used tests extensively and weighted them heavily. One instructor, in discussing the syllabus, told his class that the participation grade was hard to ascertain and that he only really used it if somebody was on the line between grades. Because he lessened the impact of the importance of participation his class was one of the lowest. Since there was large variation in the classroom participation, but all the courses weighted it about the same, this guidance appears to have been relegated low on the students' priority. Thus guidance given in a prepared
syllabus which the students received both in paper and electronic form does not have the same impact as a personal instructor message that is written as special guidance.

Finally, at the start of the study, it was assumed the instructors would provide most of the on-line encouragement to students to participate. During the coding process it became obvious that this was not true. Fellow students provided most of the positive social encouragement to participate. The instructors extended some encouragement but more often than not gave out "pats on the back" to the entire class. This student-centered result reinforces those researchers that have contended that computer-mediated communications do support social interaction and is not some cold box which transfers mere information. One only needs to read the messages sent, except in Course 4, to agree that a friendly learning atmosphere was developed among the students in these courses. Haile (1986) lamented the lack of discussions in the classes she studied but confidently predicted that students would participate more in the future. Not only did these students conduct student-centered discussions but they also self-motivated the group to participate more.

Teaching style did have a large effect on participation. The results of this study indicate conference organization should be considered a key variable when
designing an on-line course. If instructors want to generate the most participation and effort, a two conference design for each small block of instruction generates more activity on the part of the students than a single conference design.

Issuing a syllabus with each class is not enough to stress participation. Guidance in a message issued to students is more effective than only issuing the syllabus itself. The guidance needs to be clear and well thought out. What is asked of students is given.

Being very specific about the message length to answer questions should be considered carefully. If that requirement is too long it may deter students from entering lengthy discussions after the answers are posted. In fact, the least guidance on message length may be the best solution. This allows students to answer the question the way they feel is necessary. Some will be considered too short by the instructor but most will submit a reasonable answer. In fact Course 1 produced the longest messages with little guidance given. With no length requirement, most students will participate further in the discussions.

Instructors did have a profound influence on the participation of the on-line classroom. That instructor influenced his classroom with organization, syllabus, and, most importantly, personal guidance.
Gender

Does the on-line classroom foster a more gender-neutral environment? While a few of the results are mixed, on balance, the on-line classroom does support a more gender-neutral environment.

There was no flaming or questionable innuendoes detected in any of the messages. Although this is still being discussed heatedly on the Internet, the students of these classes never attacked each other in any open manner. Sharp disagreement on positions was not normally even openly raised. Rather, requests for further explanation or clarification were as close as any discussion came to heated debate.

The t-tests did not show a significant difference between male and female participation performance except for length of message. Females were encouraged by their peers to participate and their messages were not ignored. Although the males did produce more written lines, one might speculate that this difference may be due to their inability to express themselves as succinctly. Certainly the difference in the means could very well lie in one of the many confounding variables that were not controlled for but will be discussed during the recommendations for further study.

The only area of concern that did not support the
gender-neutral contention is the representation in the performers at the two extremes. The top five performers in participation were male, while the bottom five performers consisted of both males and females. While the women were not the best in participation they had their percentage share among the worst.

Perhaps the most telling indication that women were active members of the courses throughout the entire semester, was the timing of the messages in the courses. The women's message traffic did not indicate they were being silenced over time. Since their message traffic was skewed as was the males toward the beginning of the semester, the fall off at the end mirrored the males.

In individual courses where a few males did participate very actively, females and other males participated above the population average. This was a strong indication that this environment allows for very active participation by some while permitting the rest to also contribute to the discussion. Since one did not have to wait a turn to speak in these on-line classrooms, there was more air time for all. In these courses the verbose did not silence the rest.

Prior research (Hall, 1982; Rich, 1979; Spender, 1980; Selfe, n.d.) had indicated that females in the face-to-face classroom had been silenced by small groups of verbose white males. Their contributions to discussions were often
ignored and they became progressively withdrawn from discussions. These adult students of the on-line classroom did not exhibit any of this behavior. Their participation rates supported the findings of Hiltz (1991) and Harasim (1989). Their lack of flaming, and the inability of a few males to dominate a discussion is counter to the findings by Hall (1982) in the face-to-face classroom. Finally, contrary to the experience in the classroom of Lewis and Simon (1986) there was no gradual silencing of the women in these on-line classrooms.

Other Research Findings

Although not part of the original effort and beyond the two research questions considered in this study, there were other observations and conclusions important to the field that can be made. They will be briefly highlighted now.

The software package, 1st Reader, used by the University under study allowed for the creation of numerous tailored conferences. There were many administrative and social conferences established that gave the students outlets to send non-academic messages. This virtually eliminated the unnecessary traffic in the academic conferences and provided for a professional learning environment. Students did not experience many initial difficulties using this software. Additionally the use of graduate assistants as part of the student support worked
very well. The software and the student support system were first class.

The rhythm of the courses was quite similar. Based on the timing of messages, the best discussion time occurs within the first two thirds of the semester. This seemed to be the case for all courses studied regardless of the teaching style of the instructor.

The three core courses ranked one, two, and three in messages sent. Course 1 did so even though all the students were new to the delivery system and new to the material. One would have thought that the electives, which had all experienced students, who generally knew at least one or two others from previous classes, would have generated more heated and lengthy discussions. This was not the case. Based on their informal messages, these adult students, faced with competing priorities of family, job and school, may have deduced, by the time they were taking electives, the level of effort necessary to succeed in school and only worked to that level.

The findings of this study challenges the previous research on lurking. Hiltz & Turoff (1978) believed that the ideal number of students in a class needed to be about 25 because 20-25% of their students were lurkers. In order to sustain a viable class with the large number of lurkers this may have been true. It was not the case in this study. The
courses ranged in size between 6 and 17. Disregarding Course 4 which had 6 students and was designed for no discussion, Course 1 had the least with 8 students. Based on all the previous discussion about the participation in that course the number 25 is inflated. None of the course studied had 25 and none of them had any difficulty sustaining conversations. In fact the smaller classes had fewer lurkers. Absence of discussion by any member of those classes was more apparent. In this study, the size of the class was not important.

Recommendations for Future Research

A number of areas identified within this study that need additional research are discussed in this section. The first set of topics concern specific actions that constitute a part of an instructor's teaching style. Because this study was restricted by the type of data that was available, the gender-neutral environment of the on-line classroom needs to be more thoroughly tested under closer experimental conditions. Suggestions for controlling for a number of confounding variables that restricted the conclusions in this study are made. Finally topics which were outside the scope of this particular effort are also presented. This section discusses these opportunities for additional research that the community should consider.
The organization of conferences within a class is a variable that could be studied further. Course 1 had a very balanced organization and received a balanced response. Does one generate more and better discussions using a two conference organization like the guided and open conferences of Courses 1, 3 and 6 or does an instructor get the same participation using only one conference for general discussion and answering of questions? An instructor could easily vary the organization of conferences even within the same class to see what would be the effect.

Personal guidance affected participation significantly. How critical is the firmness of guidance to participation? Did course 4 become a correspondence course because of the guidance on length of responses or was it due to a lack of encouragement to cross talk that ensued after the class started? Unfortunately there may not be an ethical way to test this subject without cheating the students in the class.

After all this work to generate a database there is much more that could be done with these transcripts. Having identified the consistently heavy participators, one could then isolate their messages and do a content analysis to determine what they consistently talked about in their messages. Did they spend most of their time answering instructors' questions, commenting on other students'
messages or introducing outside items for the class to consider? If they spent most of their time commenting on other students' messages, did they mostly engage in cross talk with the other most active students or did they try to draw others into the discussion?

The gender environment of the on-line classroom should be investigated further with more controlled variables. In the future, as a minimum, a pre-class measurements should be done. Because of the nature of this delivery system, a computer attitude instrument similar to the one administered by Hiltz (1990) would be insightful. Students that have an aversion to the use of technology may not participate as much in the on-line classroom. Hiltz's instrument could identify those students. Typing ability should also be measured. Other measures, either aggressiveness or an introvert/extrovert determination, should be done because it may be a key toward the gender issue. There are other gender questions suggested by this study. What is the effect of a female instructor on participation of the genders? Do the genders participate differently if the females outnumber the males?

Additionally, distance learning enthusiasts realize that different educational delivery systems appeal to different students. Two of the more promising individual preference measurements that may predict persistence and
performance in a distance environment are the locus of control measure and the learning style preference.

The on-line student must have persistence to participate in and complete classes (Hiltz 1991). The locus of control measurement is one of the keys to persistence. Developed by Rotter (1966), it tests the extent that a person feels in control of her/his destiny. People who believe that luck, fate, or in the famous "they" are responsible for all ills experienced, possess an external locus of control. These people tend not to exhibit tenacity in their life challenges. They are more likely to quit projects and blame it on the actions of others. On the other hand, those who feel in control of their destiny are said to have an internal locus of control and are likely to exhibit the necessary tenacity to carry out projects to completion. Thus, students with an internal locus of control are normally better distant learners.

There are a number of learning style models currently available for researchers and practitioners to study learning preferences by students. These include the Kolb Learning Style Inventory, the Meyers-Briggs Type Inventory, the Group Embedded Figures Test, Gregorc's Transactional Ability Inventory and Hill's Cognitive Style Interest Inventory. Each has strengths and weaknesses but they do not appear as useful for a distance learning study as
Canfield's Learning Style Inventory because they do not specifically address the classroom environment. The Canfield Learning Style Inventory addresses more facets than the others. This inventory was developed by Canfield and Lafferty (1980) to measure individual preferences for environment, values, needs and expectations that are developed by students in an educational setting. An investigation to determine how well these various needs are met by the on-line environment would yield information that could identify students at high risk whose participation performance would need to be closely monitored.

A researcher with a database that had extensive demographic information, a computer attitude instrument, a locus of control measure, and the students' learning style could control for these measures when examining various groups. Exploration to determine dominant characteristics for the heavy participators, the completers and the highest achievers would be more fruitful. Better gender issue diagnosis would also be possible because fewer confounding variables would exist.

Beyond the scope of this study there were other topics raised that could be explored further. During the coding phase of the effort, it became clear that small group work resulted in some very active and intense activity. Understanding the techniques used to investigate the
interaction within the three person decision groups that were discussed in Chapter II, and the message coding methods used within this study one could design a number of quasi-experiments using small group work within the on-line classroom. One might examine the participation of students in small groups and compare it to their performance in the general discussion conferences. By varying the composition of the small groups, one could examine the effect of different gender balances within the groups. Perhaps single gender groups act differently than mixed gender groups. This same technique could be used for other groups such as the lurkers. It would be interesting to determine what happens if one assigns all the heavy participators to one small group and all the lurkers in another. Would this put added pressure on the lurkers to participate? Would they interact at a minimal level to produce their project or would they become dysfunctional? On the other hand, would the heavy participators as a group somehow change? Would some become quieter in the smaller group? The number of questions that can be raised here are endless.

With the lurker results less severe and the class sizes much smaller than was deemed necessary to sustain discussion, the whole question of how small is too small to conduct on-line classrooms comes into question. More work needs to be done to determine a more realistic minimum
number. The eight students of Course 1 were plenty to sustain an active discussion in this program.

**Summary of the Study**

Two major questions guided this study: How are different on-line teaching styles related to classroom participation; does the on-line classroom generate a more gender-neutral environment? The data source for this study was a classroom instruction and performance program at a mid-size university in the Northwest. Included in this study were 59 students (38 males and 21 females) with 75 separate course records from six classes. Each academic discussion conference transcript was coded by message to record message traffic flow for each instructor and student. These were transcribed on spreadsheets for data manipulation.

This exploratory effort to determine if teaching styles did effect participation rates does provide key insights into style. Conference organization, and guidance to students had a profound affect on classroom participation within the courses studied.

The results showed that females did participate more equally in this environment than the face-to-face classroom. Many of the manifestations of this silencing were not shown to exist in the on-line classroom. It should make the on-line classroom a more attractive alternative for those who
feel stifled in the face-to-face classroom.

There is still inadequate research tied to theory and a need for cross institutional investigations where results can be better generalized. The study provided a very small step along the expanses of the unknown territory that is the dawning of the Information Age.
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### BASIC CLASS WORKSHEET

**CONFERENCEn#** GU2

**START DATE**

**END DATE**

### CONSOLIDATED RESULTS

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Howard F Bachman
9424 Wooded Glen Ave.
Burke Va 22015
703-455-8913 (Home)

BACKGROUND
Broad and valuable experience and increasing responsibility in training and education. Market research experience in recruiting. Extensive staff experience in program planning and execution. Financial programmer for both personnel and training programs with solid experience in developing and executing budgets within the bottom line.

LEADERSHIP
Led organizations of from 42 to 2000 people. Have a history of promoting team building and active participation by subordinates by empowering people to achieve their maximum potential. Have attended numerous leadership workshops.

EDUCATION MANAGEMENT
As Dean of Administration for a University, managed the team-building process that developed the organization's long-range action plan. As the Deputy Dean with responsibility for both administration and students at the Information Resources Management College (IRMC), planned the total reorganization of the College to better support its flagship course, The Advanced Management Program. The reorganization eliminated redundancy, matrix management needs and established clearer lines of responsibility. Reduced the faculty by 17% while increasing the student input by 50%. Updated the five-year plan for the College that captured the major initiatives to be accomplished in the future. Designed the training of faculty in adult education methods and established the distance learning prototype test for the college. Served as the Chairman of the Coordination Board between a community and its elementary and high schools with the task of enhancing the community support for its serving school system.

EDUCATOR
Taught undergraduate students mathematics for three years. Researched emerging educational techniques that resulted in a carry-over problem that illustrated the practical use of calculus. This problem is still being used at the United States Military Academy some fifteen years later. Developed and ran a two-month freshman remedial mathematics program that saved 75% of those students from dropping out of West Point. Tutored high school students in all levels of mathematics that resulted in each raising at least one grade level. Served as an Adjunct Professor for leadership and resource management at the Army Management Staff College. Taught leadership classes for Information Resources Management College. Acted as Academic Dean of IRMC for 8 months when we revamped all the short courses-1 to 2 weeks- and the long course-15 weeks in order to update the entire program.

TRAINING MANAGEMENT
Planned, directed and supervised a 2000- student training program with an annual operating budget of two million dollars. Prepared study on the best training strategy and land use in Germany that resulted in enhanced gunnery performance. Developed and published a six-month training plan for the use of a newly developed computer-driven training
device that maximized utilization rate and training effectiveness.

PERSONNEL MANAGEMENT
Have personally managed the hiring process for the University to include salary negotiations. Led a concerted effort to upgrade the college's faculty (72) through careful hiring and an active professional development program that has increased the number of PhD holders by 160% in less than a year. Generated a recruiting resource package that turned a 16K deficit into a mission producing organization. Maintained personnel quantity and quality balance within a highly transient 2000 person organization. Conducted extensive performance and career counseling throughout my career. Executed a weekly training program for staff members that focused on better job performance. Have made numerous discipline decisions the outcomes of which were fair to the person and the organization.

RESOURCE MANAGEMENT
Managed the operational funds ($1.8M) of a small college that enabled the organization to grow and mature into a full fledged college. Chief Programmer for the five-year plan in both personnel and training for the entire Army. This included priority setting in both declining and growth resource periods, consensus building, and program defense before Defense and Congressional staffers.

INFORMATION MANAGEMENT
Recently completed overseeing the installation of a local area network for the University. Managed the design of a system to automate the registrar's function at the college. This program reduced the administrative work load 60% through the automatic generation of reports, letters, rosters, and mailing lists. Hands-on experience with Word Perfect Office, Word Perfect 5.2, Lotus, and Harvard Graphics.

FACILITIES MANAGEMENT
Responsible for upkeep and order within nine buildings: 3 cafeterias, office space, recreational rooms, laundry facilities and dormitories for 1500. Managed all cafeterias to break even while providing quality food.

EDUCATION
United States Military Academy BS
Rice University MS in Mathematics
Virginia Polytechnic and State University EdD Adult and Continuing Education

EMPLOYMENT SUMMARY
94- Senior Program Analyst A B Technologies Inc
92-94 Dean of Administration, National Defense University
91-92 Deputy Dean, Information Resources Management College
89-91 Deputy Director of Training, The Army Staff
87-89 Brigade Commander, Fort Hood Texas
85-87 Department Chief of Personnel Analysis, The Army Staff
84-85 Student, Army War College
81-84 Battalion Commander, Germany

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