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A COMPARISON STUDY OF GROUP DEVELOPMENT, AND RATE, AMOUNT AND DEPTH OF PARTICIPATION BY GENDER, STATUS AND PERSONALITY IN A HYBRID (FACE TO FACE / ONLINE) COURSE.

by

Linda Murphy-Boyer

A thesis submitted in conformity with the requirements for the degree of Masters of Arts
Graduate Department of Curriculum, Teaching and Learning, Computer Applications Specialization
Ontario Institute for Studies in Education.
University of Toronto

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A comparison study of group development, and rate, amount and depth of participation by gender, status and personality in a hybrid (face to face / online) course.

Linda Murphy-Boyer

Master Of Arts, 2001

Department of Curriculum, Teaching and Learning

Ontario Institute for Studies in Education at the University of Toronto

ABSTRACT

Although much research has been devoted to comparing discourse from computer-mediated-communication (CMC) to that of face-to-face (FTF) communication, few studies compare discourse from both environments in a repeated measures study in which the same population participates in both environments. Courses that offer both FTF and CMC components are known as hybrid courses. Hybrid courses offer a unique opportunity for researchers to compare discourse in both environments by holding constant population, instructor and subject matter. The present study compares the communication of 19 graduate students in a hybrid course on the rate, amount and depth of communication by gender and personality. Results show: (i) Social communication is greater in a FTF environment. (ii) Participants submit fewer turns in CMC, but each turn is deeper than that seen in a FTF environment. (iii) Women and men participate equally in both environments (iv) CMC does not decrease the amount of participation contributed by dominant members (v) Introverts participate more in a CMC environment than in a FTF environment, but do not state a preference for the addition of a CMC component.
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I. Introduction

For years, researchers have tried to understand which method of learning benefits which type of learner. Some strategists, such as Price, Dunn and Dunn (1990, as cited in Hein & Budny, 1999), focus on environmental and developmental characteristics that influence learning styles. They suggest that the type of instruction one receives should be based on those influences. Others, like Kolb (1981), concentrate on defining and categorizing individuals' learning styles. However, with the first appearance of computers in the classroom in the early 1960's (Becker & Hativa, 1994) and the introduction of computer mediated communication (CMC), a new debate began. This one centered on the comparison of face-to-face (FTF) or traditional class learning versus CMC learning.

Early CMC was quite limited in its scope, so much so that it is often referred to as "plain vanilla" CMC (Fjerrnestad & Hiltz, 1997). This overall blandness made it difficult to compare it to FTF learning in terms of efficacy. One of the reasons for CMC's early limitations stemmed from the fact that it was entirely text based. The lack of a user-friendly interface imposed many restrictions on the forum itself. Early CMC often resembled paper and pencil testing without the paper and pencils. In fact, some authors maintain that early CMC was used simply "...as a diversion or change of pace (from FTF teaching), rather than as an essentially different instructional medium." (Becker, 1991 as cited in Becker & Hativa 1994, p. 5). In addition, many classrooms used early forms of text-only CMC for drill and practice type learning or teleconference lecturing which Hiltz (1986) describes as "the model of a dull lecture" and an "empty classroom." (p. 96)

At the same time, CMC research was also in its infancy. Early comparison studies of FTF and CMC often suffered from confounds. In some studies, CMC users were given supplementary exposure to CMC in addition to their FTF classes, while other studies failed to use control groups (Becker & Hativa, 1994). Still other studies (Hiltz, Johnson & Turoff, 1986) gave students in CMC
and FTF conditions the same amount of time to participate, neglecting to take into account the time difference required for typing versus speaking.

More recently, comparison research in CMC and FTF learning has developed to a greater level of sophistication. However, some researchers still feel that there are many aspects of CMC and FTF learning that have not been fully examined, and that certain methodological issues still need to be addressed. Among their concerns is the lack of longitudinal studies in comparing the efficacy of FTF and CMC modes of learning and the lack of control for confounds. In their paper, Fjernestad and Hiltz (1997) submit their findings that, as of 1997, only five studies surveyed looked at change over time, while 72% of the studies surveyed looked at comparisons based on a single episode. Moreover, Ocker, Fjernestad, Hiltz and Turoff (1997) maintain that only three studies investigated the usefulness of combining CMC and FTF over time. This is problematic as longitudinal research in group work shows that “...groups require some experience in order to learn how to coordinate their interaction using technical supports, particularly if they are using spatially distributed or asynchronous modes of communication” (Fjernestad & Hiltz, 1997, p. 51). Furthermore, Fjernestad and Hiltz (1997) “...found that FTF groups significantly outperformed CMC groups for the first five weeks, but not in the last four weeks.” (p. 51). It would seem that one trial is not sufficient for comparing the CMC - FTF learning experience.

In addition, some researchers express concern that treatment variables should be better defined and other, extraneous variables should be held constant to control for error variables (Fjernestad & Hiltz, 1997; Smith & Dillon, 1999). One problem seen in many comparison studies is the lack of controls for teacher, task, and population. Some studies undertake comparison studies that examine different participants in the CMC - FTF conditions (Coleman, Paternite, & Sherman, 1999; Schulman & Sims, 1999; Sullivan & Pratt, 1996; Walther, 1992), while other researchers engage in comparisons that fail to hold the instructors constant in both the CMC and FTF conditions.
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(Benbunan-Fich & Hiltz, 1999; Hillman, 1999; Lind, 1999; Ocker et al., 1997). Although the nature of educational research is such that it is often difficult to hold all variables constant, one possible way to compare the FTF and online components of a single class taught by one instructor using identical subject matter is by studying a type of class often referred to as a “hybrid” class (Bolding, 1999; Etzioni & Etzioni, 1999; Leon de la Barra, Leon de la Barra & Urbina, 1999) or an adjunct mode course (Hiltz, 1986). In this paper, the term “hybrid class” will be used to describe this type of forum.

A hybrid class is one in which a portion of the course-time takes place in a FTF environment, while a second portion of the course-time consists of CMC. Often, the FTF portion takes place at the beginning of the week, during a one and a half hour to three-hour class, in which a topic is introduced in hopes of generating interest and discussion. The latter portion of the week (six days) is devoted to discussion of that particular topic via CMC; thus (arguably) eliminating the problem of time differences in typing versus speaking (as seen in Bordia, 1997; Hillman, 1999; Quinn, Mehan, Levin & Black, 1983; Walther, 1992). In a course such as this, students must have access to a computer, either at home or on campus, to allow student discussion to take place at any time of the day or night for the next six days of the week. This type of CMC discussion is said to be asynchronous: meaning that a student “posts” or contributes a note to the discussion which can be read by other students at any time. Alternatively, students can contribute a response to other students’ contributions at any time. Very little research has been done on hybrid courses (Etzioni & Etzioni, 1999) According to Ocker et al.(1997), as of the date of their paper, only three studies have investigated a hybrid method of course delivery.

1.1. Study Goals and Research Questions

The purpose of this study is to investigate how FTF and CMC environments differ in terms of rate, amount and depth of participation by gender, status and personality of its participants. To
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avoid some of the methodological problems in earlier FTF/CMC, the present study will consist of a longitudinal analysis of a hybrid course, keeping population, teacher and topic constant. The following research question will be addressed:

1. What percentage of speech is social and what percentage of speech is task-related in CMC and FTF environments?

2(i). How does the amount of conversation compare in CMC and FTF environments?

2(ii). How does the depth of conversation compare in CMC and FTF environments?

3(i). Is there an effect of gender on the amount of conversation contributed in FTF or CMC environments?

3(ii). Is there an effect of gender on the depth of conversation in CMC and FTF environments?

4. Do certain individuals dominate a greater proportion of the conversation in a FTF environment?

5. Does the instructor contribute a greater percentage of the turns, sentences and words in a FTF class?

6(i). Do introverts participate proportionally more in a CMC environment than they do in a FTF environment?

6(ii). Is there a relationship between extroversion, agreeableness, contentiousness, emotional stability or sophistication and the percentage of participation in CMC and FTF environments?

6(iii). Do shy individuals prefer the addition of a CMC component to a FTF course?

6(iv). Is there a relationship between extroversion, agreeableness, contentiousness, emotional stability or sophistication and a preference for working in a course that offers the addition of a CMC component to a FTF course?

A general introduction to CMC and a discussion of comparison research in learning, group
development, rate and depth of participation, gender, status and personality will be discussed in the following sections.

1.2. What is Computer Mediated Communication?

The definition of CMC varies greatly. Yet all forms of CMC involve the use of a computer by a student or a group of students for the purpose of communication with each other. CMC can be synchronous or asynchronous. It can take place in an environment where all students are communicating over their computer in the same lab or it can take place from the student’s home terminal. It can involve the use of elaborate software or the use of a simple LISTSERV or email interface.

Synchronous CMC describes a situation in which all participants are logged onto their individual computers at the same time and all participants can see each other’s contribution to the discussion as participants type in their messages - in real time. With many participants, this form of conferencing can become quite frenetic, or as Herring (1999) so adeptly puts it:

...the effect of overlap and the incomplete, redundantly initiated exchanges can be likened to a chaotic, cocktail party in which every conversation is taking place, equally loudly in the presence of every guest (p. 4). However, synchronous communication remains extremely popular, as can be seen by the hundreds of thousands of dedicated ICQ users around the world. It is in turn, both dysfunctionally and advantageously incoherent (p. 1).

Asynchronous communication is primarily text based, although many forms of asynchronous CMC allow for the inclusion of graphics and often incorporate simple drawing programs. CMC

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1ICQ is a popular, real-time, text based communication software program that can be downloaded free from any computer terminal that is connected to the Internet. For more information on ICQ please see:www.icq.com.
participants connect via their computer to a common data base where messages are submitted and saved to be retrieved by other users at any time of the day or night. One of the major benefits of asynchronous CMC is that all users can participate at their convenience "when and where they want" (Hammond, 1999. p. 354). In addition, participants are able to take their time to thoughtfully construct their responses (Hewitt, 2000). In this paper, the term CMC will be used to describe asynchronous communication.

1.3. Scholarly Concerns Involving the Use of CMC

1.3.1. Depersonalization and Deindividuation

The benefits of (CMC) has been extolled by many researchers (Hiltz, 1986) and condemned by others (Krendl & Lieberman, 1988). Much of the concern about computer learning centers around the social aspects of CMC. Some authors suggest that the use of CMC in a classroom leads to depersonalization and deindividuation (e.g., Bordia, 1997). Deindividuation\(^2\) takes place when the individual experiences a diminished sense of self. This can result in "individuals (who) may not perceive themselves and others as individual people", (Coleman et al., 1999. p. 53) but rather as part of a faceless group. When this happens, behaviour can become more impulsive and one’s concern for others diminishes. Often the task at hand becomes more important than the people who are performing the task. In CMC, deindividuation or a related condition called depersonalization is often said to lead to flaming and general misbehaviour of the participants (Hiltz, 1986). In her 1995 paper, Gruber describes a CMC experience charged with hostility, resulting in some participants’ withdrawal from participation. Although Gruber does not mention deindividuation by name, her anecdotal evidence seems to aptly describe the phenomenon. In the case excerpted below, two distinct and quite vocal groups, divided by gender lines, emerge from a CMC course. The women had been submitting deprecatory comments about the mens’ method of participation. The men responded

\(^2\) For a more complete explanation of deindividuation please see Zimbardo, 1970.
by expressing their displeasure at such generalizations. To this, one woman remarked:

I do wonder why it seems that whenever women make
OBSERVATIONS that may include a man or men in them, the men
seem to be quick to think that they're PERSONAL ATTACKS on
them (is this, - I dare say, - an ego thing that men feel that they must
always be the specific topic of conversation?) (p. 71).

The discussion became progressively heated over time and the exchange left many in the group
feeling uncomfortable. Some of the participants eventually withdrew altogether, leaving their
instructor to reply:

Talk about being silenced! Speechless... I don’t understand why any
of you could possibly think that what you write (or say?) will not be
taken personally by the men in the class. Do note that we, as
females, outnumber the men - yes I know it’s usually the other way
around and will be when you get your jobs. But my point is that men
are bound to be defensive. How could they respond other wise? 
This is not an academic argument. Granted we want (men) aware of
the issues - we want them sensitive to wrong headed, stupid notions
and behaviour. But gosh, why the invective...( p. 73)

It would seem that the members of the group experienced symptoms of deindividuation and became
lost in the task at hand. The instructor had to remind the participants that they were talking to other
human beings, not just to their computer screen. By directing their comments at faceless participants,
the male and female members of the class became part of two faceless groups who found it easier to
make disparaging remarks towards each other. However, Hiltz and Wellman (1997) suggest that the
incidence of flaming and other “normlessness” behaviour decreases when participants feel they are
part of a long-term learning community. This leads to another point of debate; whether or not a
“community” can develop in CMC.
1.3.2. Lack of Community

A second common problem often cited in CMC is the lack of development of a sense of community similar to that found in a FTF environment. Many authors decry what they call an inherent emotional coldness found in a CMC environment and complain that distance learners often suffer from isolation (Khal & Cropley, 1986). The stereotype of the lonely computer "geek" typing away, late into the night, who is more successful communicating with his on-screen interface than he is with a live human being, is not an image that fosters the idea of community. However, the definition of community is, in and of itself, an ill-defined concept. If we simply define a "community" as group of individuals who are spatially connected at regular intervals, we can quickly see that physical proximity in a FTF environment is not the primary qualification for the formation of a community. As Etzioni and Etzioni (1999) contend:

...merely being in the same space does not necessarily engender FTF communication or community building as many have observed about contact avoidance on New York City subways and the anticommunication culture of many car pools. For FTF contacts to provide for communications requires mores that legitimize and value communications (p. 242).

The aforementioned authors define community as a situation in which relationships “cris cross and reinforce one another, rather than just a chain of one on one relationships” (p. 241) and something that “requires a measure of commitment to a set of shared values, mores, meanings and a shared historical identity” (p. 241). If one uses their definition as a measure of community, it would seem that CMC forums do indeed qualify.

In their paper, Hiltz and Wellman (1997) describe long-standing CMC communities in which 2500 participants exchange up to five email digests daily on their shared interests concerning their love of BMWs. In other examples of CMC communities, Reingold (1994) describes dozens of online
groups bound together by their shared history and experiences on parenting, death and love. He relates tales of commitment from online supporters when "real" friends have gone to sleep or tire of listening. One particularly emotional story in Reingold's book describes how the WELL, a CMC community, supported one of its members while his child recuperated from a bout of leukemia:

The Parenting regulars, who had spent hours in this conference trading quips and commiserating over the little ups and downs of life with children, chimed in with messages of support. One of them was a nurse. Individuals who had never contributed to the Parenting conference before entered the conversation, including a couple of doctors who helped Phil and the rest of us understand the daily reports about blood counts and other diagnostics and two other people who had firsthand knowledge, as patients suffering from blood disorders themselves. Over the weeks, we all became experts on blood disorders. We also understood how the blood donation system works, what Danny Thomas and his St. Jude Hospital had to do with Phil and Gabe, and how parents learn to be advocates for their children in the medical system without alienating the care givers. Best of all, we learned that Gabe's illness went into remission after about a week of chemotherapy. (Chapter One)

According to Reingold, it would seem that the commitment, support, shared values, mores, meanings and identity found in a CMC community can often equal and sometimes exceed those found in a FTF community.
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II. Previous CMC Research: How Do CMC and FTF Communications Compare?

Over the past decade, it has become clear that CMC is an important component of our education system. As of 1999, more than 400 accredited universities in North America offered some form of online education. As of 1997, at least 150 accredited institutions offered entire bachelor degrees online. Some colleges, such as Duke University in the U.S., even charge a premium for their online courses (Schulman & Simms, 1999). With this proliferation of courses, it comes as no surprise that CMC has been the subject of much research. One common method used to assess the efficacy of CMC has been via comparison studies of FTF and CMC modes of learning. According to Fjermestad and Hiltz (1997), in 1982, Turoff and Hiltz carried out the very first experiment on group decision process using a comparison study, after which there was little other experimental work published until the mid-eighties. However, since then, many studies have compared learning in CMC and FTF modes.

2.1. Learning, Satisfaction and Motivation

Among the many variables that are commonly studied in comparison research are learning, satisfaction with the mode of course delivery and motivation. As one would imagine, research shows that high achieving students who are successful in FTF courses also do well in CMC courses (Wilson, 2000). In terms of learning, CMC, especially when used in a hybrid mode, seems to have a somewhat positive effect on many student outcomes. In one study, Ocker et al., (1997) compared FTF-only, CMC-only and hybrid methods of course delivery. Participants were asked to work in groups to reach a common solution to a decision-making task. Solutions, rated by expert judges, were found to be superior in the hybrid course condition in terms of creativity and quality. In addition, students in the hybrid condition reported greater levels of satisfaction with their group solutions. However, the authors' hypothesis that process satisfaction in the hybrid condition would be higher
was not supported. In this particular case, participants in each of the conditions were made up of different students, run in different time periods, and taught by different professors.

Although statistical procedures determined that there was no difference in the groups, the authors caution “the results of this study should be considered exploratory rather than definitive, because of the fact that groups were assigned to different conditions at different points in time” (p 573). They also concede that “The current experiment was run over a two-year time period where subjects and groups were not randomly assigned to conditions. Although these issues appear to be insignificant, it is impossible to say, with out a doubt, that they had no effect on experimental results” (p. 576).

In a later study, Ocker and Yaverbaum (1999) correct for this by having participants serve as their own control in a repeated measures design. In this case, each group completed two problem solving tasks: a FTF task and a CMC task. Tasks were counterbalanced to control for order effects. To assess the effects of learning, group solutions were once again judged by an expert and students were given a quiz at the end of the term. Results of this study showed no significant difference in test scores or solutions in either the FTF or CMC condition. However, the authors did not include a hybrid condition so the results of this repeated measures study cannot be used to confirm the efficacy of the hybrid mode as seen in Ocker et al. (1997).

Other studies report that students in CMC-type environments work harder because their work is available on-line for their peers to see. Participation online also informs students of how much each of their classmates have contributed. This information seems to help motivate students to keep up in terms of participation. (Hiltz & Wellman, 1997) Still other research (Bordia, 1997) concludes that CMC produces more ideas overall and more non-redundant ideas. Moreover, the same study found that CMC participants perform better than FTF groups on tasks that require less socio-emotional interaction. Conversely, the study found that CMC groups perform poorly in comparison
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to FTF groups on tasks that required more socio-emotional conversation or interdependence, but only when a time limit on participation is imposed. When given enough time to adapt, CMC groups fare as well on socio-emotional tasks as do FTF groups. Furthermore, other studies find that the addition of CMC to distance education also increases the percentage of students who stay in the course by increasing motivation and raising the persistence and achievement outcomes of students. (Cookson, 1989).

A study by Schulman and Sims (1999) however, is less optimistic about the effects of CMC on learning. In this study, participants were allowed to select their mode of course delivery - CMC or FTF. Learning was measured by comparing both groups’ pre and posttest scores. Pretests were designed to measure the students’ level of course-related knowledge prior to the start of the course. Pretest results ascertained that CMC students scored significantly higher than the FTF students. In other words, students who self-selected the CMC mode had greater subject knowledge at the outset. Unfortunately, a posttest showed that the CMC and FTF students had similar scores at the end of the course, suggesting that the CMC students experienced less learning overall. However, the findings could be a result of the method of delivery and not the result of CMC learning itself. The CMC portion in this particular study may have been transmitted over a slow modem line, thereby creating an ineffective method of learning, or student access to the system may have been severely limited, or the software program may have been badly designed. Any of these scenarios could have caused reduced participation due to frustration and lower learning outcomes. Since the author fails to describe the CMC system in question, the reader is unable to draw any definite conclusions from the paper.

2.2. The Group Process: Interpersonal Speech Versus Task Completion

Development of the group process is another important concept in comparison research. Studies on group work have shown that groups resolve issues more effectively than individuals (Hill
1982), that individuals learn through interaction with others (Scardamalia & Bereiter, 1991), and that group work facilitates learning and enhances higher cognitive processes (Mevarech, Zemira, Silber, Ora & Fine, 1991). If this is true, then it becomes important to understand the process itself and find out which environment, CMC or FTF, best promotes group development and task completion.

Time spent on interpersonal issues can be said to be either helpful or harmful in group development. A certain amount of time spent on social talk is necessary if a group is to develop a sense of solidarity. However, too much time spent on social talk may take away from the task at hand. Researchers differ on their opinion of how much time CMC users should spend on discussing interpersonal issues. In their 1998 longitudinal study, McDonald and Gibson found that interpersonal speech made up a maximum of 75% of all speech segments to a minimum of 45%. Statements involving "openness" and "solidarity" increased as the semester progressed, from 18% to 36% and 40% to 54% respectively. The authors maintain that similar results are seen in FTF courses, but proportions of time spent on interpersonal issues in their FTF study are not given. Although the authors maintain that interpersonal speech is necessary for group development and is, in and of itself, a learning experience, it could still be said that great a proportion of time spent solely on interpersonal issues may take away from the academic aspect of the course.

An author who agrees, in part, with that line of thinking is Hewitt. In his paper, (2000) he discusses findings from another researcher's study:

In the final condition, the teacher adopted an open, conversational style. The authors discovered that the conversational intervention elicited the highest level of student participation. However, it was not determined which style best promoted learning. Future research should investigate the possibility that efforts to promote participation through open-ended discourse may actually subvert pedagogical goals. Open-ended discussion forums offer more opportunities to avoid intensive intellectual effort than problem-
centered discourse - and therefore, the educational returns may be lower. (p. 3)

Admittedly, a teacher’s conversational style and interpersonal communication are not identical in nature, but both may arguably offer opportunities to avoid intensive intellectual effort. Hewitt adds that: “Without a strong focus for the discussion, there is a danger that participants will develop a ‘path of least resistance’ strategy during their online sessions.” (p. 3)

Contrary to McDonald and Gibson (1998), who found that interpersonal speech was overemphasized in CMC forums, many researchers find that CMC is more task-oriented than FTF situations. For example, Coleman et al. (1999) say that CMC communication is more immediate and all encompassing, involving greater sensory overload. Participants in the Coleman et al. study reported feeling more immersed in the task than their FTF counterparts and their statements were more directly related to the assigned topic than those of the FTF participants. Hiltz et al. (1986) found that participants in the CMC condition made only half as many statements as those in a FTF group, but were found to have the same quality of solution as the FTF group. Similarly, Bordia (1997) found that in a given time period, CMC and FTF groups produce the same number of task focused ideas, in spite of CMC groups producing fewer overall statements.

Oliran (1995) is among those who feel that CMC groups are more task-focused than FTF groups. She points to social presence theory as one of the reasons behind her argument. Social presence theory postulates that the degree to which other participants are believed to be involved in the communication process will impact the participants’ interpretation of the situation. Since CMC lacks visual and nonverbal cues, it is said to be low in social presence and therefore less social-oriented and more task-oriented. In addition, decisions made in a CMC forum should be more objective and therefore express less social information because the decisions are based on text rather than subjective social influence.
An alternative to this point of view is that interpersonal communication in CMC is similar to that of FTF environments, but research that examines CMC-FTF comparisons fails to give CMC participants enough time to work together beyond the early stages of group development. According to Bordia (1997), FTF and CMC groups complete their work at different rates. Tasks take longer to complete in a CMC environment, if only because of the amount of time required to type in an answer. However, when CMC groups are given enough time to complete a task, they make as many remarks as participants in FTF groups do. In the Bordia study, participants were given six days to communicate via CMC and three hours to communicate in a FTF class. Quinn et al. (1983) found that the average FTF response took only seconds to compose, while the average CMC message took 28 minutes to compose. In addition, some research shows that the CMC group process itself takes longer to develop. In order to understand this last idea better, one must look at how the group process develops and how this relates to CMC use as a whole.

Some early work in understanding the group processes was done by Robert Bales. In his 1951 paper, Bales developed what he called, the “phase hypothesis” to study differentiated phases in group work. With this hypothesis, he proposed that groups move through problem-solving cycles as such:

Stage 1. Orientation to the problem at hand.
Stage 2. Evaluation of the problem.
Stage 3. Search for control over the problem and each other.
Stage 4. Conflict escalation.
Stage 5. Consensus and social integration.

To demonstrate his hypothesis, he first tested the length of a phase by examining eight group interactions. He then divided the length of each of the interactions into thirds. Bales found that the rate of orientation was at its highest level in the first third of the interaction, and that the rate of
evaluation was at its highest level in the middle third of the interaction, while the rates of control, conflict and consensus were at their highest level in the final third of the interaction.

More recently, comparison researchers have used Bales work, or work that proposes similar group structuring, as a theoretical foundation for their studies. For example, Walther (1992) expresses concern that, given Bales' phase hypothesis and the fact that most comparison studies give both FTF and CMC conditions equal and very limited time periods, CMC groups may never have the chance to develop beyond the orientation stage. According to Walther, "If computer-mediated groups are working more slowly than FTF groups, finding that CMC is more task-oriented may be due to cutting off experiments before other, more socio-emotional phases ... occur." (p. 222) He contends that "various studies of CMC using different time spans have reached drastically different conclusions" (p 220) and stresses that more longitudinal research is required to solve this predicament. In addition, he feels that problems comparing time allowances in the two modes must be worked out if one is to properly compare the two forums. His concern is that previous research which gives equal, limited time to CMC and FTF participants shows that CMC does not provide an arena for rich communication and that it may not be a good arena for group decision making. However, a study discussed in Fjerrnestad and Hiltz (1997) found that FTF groups did indeed outperform CMC groups, but only in the first five weeks. After that point, the CMC groups began to outperform the FTF groups. It seems clear then, that the group process takes more time to fully develop in a CMC forum than it does in a FTF forum. It is possible that, in terms of group development, CMC only appears to be socially impoverished when compared to FTF because most research is based on single episode trials.

In the Walther (1992) study, participants were given five weeks to complete three tasks. FTF groups had three meetings, while CMC participants had the entire five weeks of 24 hour, seven-day-a-week communication open to them. His results showed that both CMC and FTF became more
social over time, but the CMC group showed its highest level of sociability at time two, whereas the FTF group showed the most task focus at time two. The author does not explain this finding in terms of Bales phase hypothesis, however, the results could be due to the fact that the second measurement of the group process was taken when the FTF group met for only the second time. At this same point in time, the CMC group had been communicating online for two and a half weeks. It is possible that two FTF meetings only allowed the FTF group to develop to the second or third stage of Bales' scale, which is a more task-oriented stage, while the CMC group may have had the opportunity to communicate more over the two and a half weeks and develop beyond the third stage into a more social stage. Although word counts were made and sample statistics show that there was no significant difference in the group by condition analysis, a significant group by time interaction was found in two of the measured variables, composure and formality (Note 5, p 230). These measures could have produced the effect mentioned: Overall, it seems that further research is needed to see if time spent on interpersonal issues is indeed the same in FTF and CMC modes of learning.

**Research Question 1:** What percentage of speech is social and what percentage is task-related in CMC and FTF environments?

**Hypothesis 1:** Most research suggests that CMC produces fewer socially-oriented statements and more task-related statements than those seen in FTF discussions (Bordia, 1997; Coleman et al., 1999; Hiltz et al., 1986 to name a few). However, Walther (1992) expresses concern that CMC groups develop more slowly than FTF groups and need to be given an appropriate amount of time to allow for social development to take place. Consequently, if CMC groups are allowed enough time for social discussion to develop (six days of CMC discussion compared to three hours of follow up discussion in a FTF class as seen in Bordia) it is possible that CMC groups will produce a similar amount of social conversation as is found in FTF environments. Question 1 is therefore considered exploratory and not subject to a hypothesis.
2.3. Rate, Amount and Depth of Participation

Another set of variables often studied in comparison research is that of rate, amount and depth of participation. Rate of participation is often measured in terms of how often participants contribute in CMC and FTF forums, while amount of participation is often measured in terms of the amount of words and/or ideas. Depth of participation has been measured in terms of the number of contributions, the average number of speech acts per contribution and the average number of words per contribution. More often than not, all of these measurements are interconnected in research that examines which type of forum leads to richer contributions and richer learning experiences.

In one of the earlier experiments to study depth of learning in both environments, Krendl and Lieberman (1988) compared learners who used paper encyclopedias to learners who used computerized encyclopedias. They hypothesized that computer learners would experience broader learning, while traditional learners would experience deeper learning. It was felt that the easy availability of cross referencing in the computer condition would lead to broad learning because computer learners would explore many different areas while studying, while the traditional learners would rely more heavily on careful reading of the most directly relevant entries as a result of greater demands required to seek out other entries in the print version (p. 375). The results showed that computer learners were superior in both broad and deep learning. However, the authors were quick to attribute this to the fact that computer learners were able to print out hard copy versions of their search results, thereby effectively turning them into paper learners. Follow up studies were never conducted to see what would happen if students in the computer condition were unable to print out hard copies of their searches. As a result, the authors’ conclusions are difficult to verify.

Other researchers compare contributions submitted to the CMC database and spoken contributions in a FTF class. For example, Quinn et al. (1983) compared students in a CMC and FTF class for amount and depth of participation. The authors found that CMC answers were more
complex than FTF messages. On average, CMC responses were 106 word in length while FTF answers were 12 words in length. In addition, the CMC condition averaged more speech acts per contribution than did the FTF condition. Quinn et al. suggest that this confirms CMC’s ability to generate multiple threads of discourse. The increased number of words in CMC messaging is attributed to the fact that CMC participants take more time and put more thought into composing their messages.

There is much discussion on how best to operationally define an equivalent contribution in CMC and FTF environments. The task of defining a contribution is simpler in CMC because of the physical separation of the discourse into “notes” or “turns” (see Figure 1 for an example of threads and notes), but the FTF environment presents a greater challenge. Researchers propose many different operational definitions for comparisons. Bordia (1997) synthesizes 18 studies that compare the content of CMC and FTF courses. Of the six studies that directly compare contributions in both forums, five studies look at “separable units of thought,” while one study compares the number of comments in FTF with the number of messages in CMC. Along the same lines, Mabrito (1991) uses “idea units” as a basis for his comparisons. According to Mabrito, an idea unit is defined as “a segment of discourse that coincides with a person’s focus of attention.” These are “marked by intonation, pauses and syntax and generally correspond to a single clause.” (p. 517). However, it can be difficult to achieve high interrater reliability on idea units in a FTF environment.

Hiltz et al. (1986) equates one comment in a CMC environment to one turn in a FTF environment, while Sullivan and Pratt (1996) compares the number of turns taken in CMC and FTF environments. However these methods used individually, seem somewhat lacking. For example,

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3 Examples of a speech act can be asking a question, giving a suggestion or making a general comment.
Flight Notes

Please select a note:

- The problem #76 by richard on Aug 2 1997 (16:56:49)
- Air pressure pushes #78 by T.C. on Aug 3 1997 (8:04:56)
  - More info #79 by mary on Aug 3 1997 (8:06:07)
  - Hard to explain #80 by T.C. on Aug 3 1997 (8:06:59)
- Shape of the wing #81 by richard on Aug 3 1997 (8:08:29)
  - Oval shaped #82 by hector on Aug 3 1997 (8:09:58)
  - Need picture #84 by pablo on Aug 3 1997 (8:10:37)
  - Picture of airplane #97 by hector on Aug 5 1997 (1:46:11)
  - Pressure difference #153 by guest on Nov 13 1997 (10:54:34)
  - Drawing of wing #154 by guest on Nov 13 1997 (10:58:00)
  - Function of Feathers #217 by pheobe, marge, dana, marge, pheobe on Apr 6 1998 (11:44:40)

Figure 1. Example of "threads" and "notes" in Knowledge Forum CMC software.

Threads denote the start of a new conversation. There are three threads on this page "The problem" begins the first thread. "Air pressure pushes" begins the second thread. "Shape of the wing" begins the third thread. Notes are represented by the number of contributions in each thread. "The problem" is comprised of one note. "Air pressure pushes" is comprised of three notes. "Shape of the wing" is comprised of seven notes.
looking at Hiltz et al.'s operational definition, a “comment” in a CMC environment could be as long as 10 sentences, while a “turn” in a FTF environment could be comprised of only a simple “I agree.” In this case, one CMC comment would not be equivalent to one turn in a FTF environment. Moreover, if we recall Quinn et al.'s (1983) findings that, on average, CMC responses are 106 words in length while FTF answers are 12 words in length, it may be that Sullivan and Pratt’s operational definition of a “turn” being equivalent in CMC and FTF is problematic.

Hillman (1999) contends that using word counts alone can give little basis for comparison. FTF classes are limited by the number of words each student can produce over a three-hour class. Using some simple calculations, the author estimates that the average three-hour FTF class is limited to producing 37,500 words per week, while it is possible that “a single person typing thirty-five words per minute could, theoretically type 352,000 words in a single week.”(p. 39). A second problem with using word counts alone for comparative purposes is that the number of words say nothing of the content of the contribution. “For example, the message, ‘What was the assignment for the next class?’ could be described as a single post containing forty-two characters. It pedagogical meaning would be rather different from the message ‘The answer to the last test question is 42’ or ‘You sir are a disgrace to the profession’, both of which meet the same numerical criteria” (p. 37). Hillman proposes the use of sentences for comparisons of CMC and FTF communication. He does, however concede that sentences can be difficult to define in a FTF environment.

Depth of conversation in CMC is also a matter of concern for some researchers. It has been suggested that on-line conversations are highly disjointed (Herring, 1999), shorter and therefore not as deep as FTF discussions. In their 1999 study, Hewitt and Teplovs looked at 1571 threads in seven CMC courses. They found that the average length of a thread in an online graduate course was 2.69 notes. An earlier study by Guzdial (as cited in Hewitt & Teplovs, 1999) showed similar results. In addition, Hewitt and Teplovs found that 80% of online discussions contain four notes or less, while
50% of the discussions are single note entries. In fact, the same study showed that once an on-line thread contains 5 notes, the probability of further development levels off drastically. Similar results were found by Brett et al. (as cited in Hewitt & Teplovs, 1999). However, if we return again to the results discussed in Quinn et al. (1983) in which it was found that an average FTF contribution consists of 12 words, while an average CMC contribution consists of 106 words, it could be that CMC threads are shorter, but that the notes within the threads are more substantive.

The problem remains then, how does one compare contributions in FTF and CMC? The answer seems to be to use a combination of methods to achieve an accurate comparison. Although Sullivan and Pratt’s use of a “turn” is, in and of itself, problematic, it does offer a fairly objective FTF/CMC comparison by allowing the participant, not the researcher, to determine when participation starts and stops. Turns do not, however, take into account the depth of the contribution. Using Quinn et al.’s (1983) average number of speech acts per turn is an effective measurement of depth, but speech acts are again subjective. However, by using an average number of sentences (Hillman, 1999) per turn, instead of speech acts, the researcher may find a similar, yet more objective way to compare depth in the two forums. Finally, a third objective measure of average words per contribution (Quinn et al, 1983) could be added to the overall analysis to compare the depth of participation. By employing a combination of methods using turns, sentences and word counts it may be possible to achieve a more objective measure of rate, amount and depth of contribution. In this paper, CMC “notes” and FTF contributions will both be referred to as “turns”.

**Research Question 2(i) and (ii):** How does the amount and depth of conversation compare in CMC and FTF environments?

**Hypothesis 2 (i) and (ii):** As indicated by the findings of Hewitt and Teplovs (1999) that CMC environments generate fewer turns than FTF environments, and by the findings of Quinn et al. (1983) that CMC turns generate more words per turn than FTF environments do, it is hypothesized
that the FTF environment will generate a greater amount of participation than the CMC environment in terms of the overall number of turns. However, the turns contributed in the CMC environment will have more depth to them as measured by a greater number of sentences and words per turn and by a higher level of word complexity than is seen in the FTF environment.

2.4. Gender in Comparison Research

According to Lind (1999), little research has been done on gender and CMC. However, a literature search on the topic reveals that gender is a very familiar subject in comparison research (See Herring 1993; Jaffe, Lee, Huang & Oshagan, 1999; Mabrito, 1991; Olaniran, 1995; Ruberg, Moore & Taylor, 1996; Savicki, Kelley & Lingenfelter, 1996; Wilson, 2000 and Yates, 1997 to name but a few) While most of the research suggests that women fare better in CMC than they do in a FTF environment, some research on CMC and gender is less positive. Yates (1997) maintains that CMC fails to promote equality between the sexes, in part because women are not as comfortable with technology as are men. The author goes on to say that even on the Internet, men outnumber women three to one. However, other research seems to contradict this. According to the 1997 Canadian A. C. Neilson survey of 10,000 households, as of 1996, 45% of all Internet users were female. Moreover, as of 1997, fully half of all users were female. Furthermore, a full 56% of all new users in the last six months of 1997 were female. The survey points out that, should this trend continue, over half of all Internet users will be females in the near future.

Another survey by Jupiter Communications and Media Metrix as reported by Connie Guglielmo (2000) in ZDNet, corroborates the Canadian Neilson findings, at least for North America. According to this survey, “the number of women online surpassed that of men for the first time ever in the first quarter of 2000 in the United States. Not only that, but the study found the population of women online is growing faster than the online population overall” (no page number).

Why such a discrepancy in findings? Columnist Charles Pappas, (no date) also with ZDNet
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maintains that.

Women are online, but they are not being counted for a number of reasons. Why?

- Husband signs up for account, he and his wife use it. She isn't counted, and neither are his daughters.

- Many surveys are self-directed [user goes to a site and fills out a form]. Many women don't have time for this.

- Women go to chat rooms and are hassled. They change their handle to George, and everyone leaves them alone. (No page number)

In other words, according to Pappas, women are quite comfortable with, and are using the Internet. They just get passed over by those who count the heads.

Another author who feels that CMC fails to democratize the learning environment for women is Susan Herring. In her 1993 paper, she summarizes findings from three of her research papers that are based on a year's worth of data collected from a CMC forum. In the course of her studies, Herring found that women participate only 16% to 30% of the time, depending on the topic of discussion, and that their individual posts are shorter than men's posts. In addition, she found that posts by women tend to go unanswered, which in turn, discourages women from further participation. For example, in one of the CMC discussions, 70% of the women's posts received an explicit response, while 89% of the men's posts received an explicit response. Interestingly enough, women were the most infrequent respondents to other women's posts. Finally, Herring contends that males respond in a more adversarial style which tends to alienate the women participants, but which male participants accept as a normal part of the discourse. However, contradictory to Herring's reports, a study by Savicki et al. (1996) found that women's CMC messages contained more words than the men's messages. Once again, we find conflicting data in comparison research. In this case, it is possible that the difference seen in Herring's and Savicki et al.'s results were caused by comparing
two classes whose discussions centered around two very different topics. The Herring case is similar to the situation discussed in chapter 1.21 of this paper in which Gruber (1995) took part in a CMC class where the participants experienced depersonalization, hostility and withdrawal of participation by the female participants. In both the Gruber and Herring situations, the topic of discussion was "sexism" and the discourse became increasingly hostile. In the Savicki et al. case, the discussion took the shape of a task-based, problem solving situation over a four-week period. Perhaps the hostility experienced in the Herring situation caused some of the women to withdraw, whereas in the task-based, anxiety-reduced situation, discussed by Savicki et al., women became equal, if not the more verbose, participants. A study by Wilson (2000) supports this possible explanation. In this case, the author investigated sex difference over two semesters using a task-based format and found, similar to Savicki et al., that women and high achievers had a higher level of CMC participation than did the men. The conflicting results seen in the Herring and Savicki et al. studies illustrates the need to control for topic when comparing participation rates in CMC and FTF environments.

Other researchers concur that CMC is a great "democratizer." In a comparison study, Lind (1999) found that women felt more inclusive in the CMC condition and that CMC allowed for more equal participation of the sexes, while Mabrito (1991) maintains that CMC is "a comparatively safe and non-threatening" environment" (p. 511). Oliran (1995) contends that CMC facilitates uninhibited and equalized participation between men and women because it gives women a chance to participate at their own rate, without interruptions and without looking to others for approval. Althaus (1997) and Ruberg et al. (1996) agree that men tend to dominate a FTF discussion, while CMC forums are more egalitarian and therefore better for women. In addition, Ruberg found that women are less inhibited in a CMC forum than they are FTF. Hiltz and Wellman (1997) and Jaffe et al. (1999) also agree that CMC levels the playing field for men and women. However, Jaffe et al. found that, given the opportunity to do so, women will mask their sexual identity in a CMC forum, while men tend not
to do so. In one particular study, when given the opportunity to do so in a CMC forum, 81% of the men kept their own gender via a male pseudonym, while 81% of the women adopted a male pseudonym. The author suggests that this tendency to mask gender is a way for women to equalize the playing field. However, it could reflect simple curiosity as to how others will respond to them when they are disguised as a male.

**Research Question 3:** (i) Is there an effect of gender on the amount of conversation contributed in FTF or CMC environments?

(ii) Is there an effect of gender on the depth of conversation in CMC and FTF environments?

**Hypothesis 3:** (i) As suggested by the research of Savicki et al. (1996) and Wilson (2000), it is hypothesized that women will submit a higher proportion of turns and words than men do in the CMC environment. In addition, as suggested by Althaus (1997) and Ruberg et al. (1996) it is hypothesized that men will submit a higher proportion of turns and words than women do in the FTF environment.

(ii) It is also hypothesized that the women's average number of sentences per turn and words per turn will be greater in the CMC environment than in the FTF environment.

2.5. Status in Comparison Research

2.5.1. Social Status

Gender is but one factor that can affect the status of participants within a group. Also at issue is the social status of the student contributors. Often times, in a FTF class, one individual dominates the discussion. These individuals may be more able to express their opinions or they may enjoy a more respected status within the group. Hiltz et al. (1986) define a dominant contributor to be one who, in a five-person group, contributes 33% or more of the conversation. CMC forums appear to decrease the dominance of these group members (Benbunan-Fich & Hiltz, 1999; Hiltz & Wellman,
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According to Bordia (1997) participation in a CMC class tends to be more equitable because of a reduction in the attention paid to social factors. Hiltz et al. (1986) maintain that dominance is, in part, determined by whom starts the conversations FTF. They postulate that the lack of clear turn-taking and verbal cues in a CMC environment precludes the development of social dominance. If all participants remain unseen by each other and are typing at the same time, there is no turn-taking and more equality results. The lack of dominance clearly opens the door for those students who would be less likely to fight for floor time in a FTF class. Sullivan and Pratt (1996) examined patterns of discourse in both FTF and CMC courses and found that only 50% of all students in a FTF environment participated. However, a full 100% of the students in a CMC class participated at least once.

Most researchers seem to be in agreement that high status members are less likely to dominate the conversation in a CMC environment. In some cases though, this can be disquieting to the dominant members. Ruberg et al. (1996) studied conversations in a hybrid course and found that, although CMC did not encourage the quieter students to increase their participation, it did take the floor away from the more dominant member. In a FTF class, members are forced, out of politeness, to listen to their more dominant peers. Not so in a CMC class. In the Ruberg study, one of the most dominant members of the FTF class expressed her dislike for the CMC forum. It seems she became less influential in the CMC forum when her peers refused to acknowledge many of her messages.

**Research Question 4:** Do certain individuals dominate a greater proportion of the conversation in a FTF forum?

**Hypothesis 4:** According to research by Benbunan-Fich and Hiltz (1999), Bordia, (1997), Hiltz and Wellman (1997), Mabrito (1991), Ruberg et al.(1996) and Sullivan and Pratt, (1996), CMC produces a more equitable environment than a FTF environment and is less susceptible to dominance by a few individuals. It is hypothesized that the FTF environment will be subject to more
2.5.2. The Teacher's Role

Since teachers often hold the most status in the classroom, their participation, in either a FTF class or a CMC forum, often directs the flow of the conversation. Many authors note that teachers, in a FTF class, are responsible for a greater amount of the talk time than in a CMC environment.

Hillman (1999) recorded the conversations from four FTF courses and two CMC courses. Both types of courses covered similar material, but were taught by different instructors to different student populations. The results of this study showed that teachers uttered 73% of the sentences in the FTF classes, while they wrote 41% of all postings and 49% of all sentences in the CMC forum. This suggests that although the teachers contributed fewer posts to the CMC forum, their postings, on average, were longer than those of the students. In addition, teachers in the CMC condition used organization significantly more so than their FTF counterparts did. Hillman explains: “Whereas in FTF or video-based forms of CMC, much can be communicated nonverbally, for the present study, Organizing (sic) information had to be, quite literally, spelled out” (p. 44). The amount of lecturing was also investigated in this study, with some interesting results. Hillman found that, not only did FTF and CMC teachers use lecturing equally, but students in the CMC course used lecturing significantly more than the students in the FTF class. This suggests that students in the CMC course were taking over the role of the teacher in some respect and that they were able to speak at length on the course material without interruption, thereby giving them a status similar to that of the teacher.

Other researchers agree that the teachers' contributions decrease in CMC. Hiltz (1986) studied the teacher/student talk-time ratio in a CMC class and found that students contributed 66% to 83% of the lines of dialogue. Although this was not a comparison study per se, Hiltz speculates that teachers talk for a much higher percent of the class time in a FTF class. Althaus (1997) maintains that FTF instructor-moderated sessions may appear collaborative, but may in fact keep students from
interacting with one another. CMC forums however, are less instructor-dominated and therefore more naturally interactive and collaborative. Ruberg et al. (1996) concur that teachers speak more than students in a FTF situation. The authors write, “The rules of classroom dialogue are quite different from those of conversation of social equals. Such rules may inhibit childrens’ use of language by setting up a social situation in which they play a passive role, give short answers to discrete questions, and seldom initiate discussion” (p. 245).

Quinn et al. (1983) operationally define three types of questions teachers ask their students: choice questions, which require a response from alternatives provided in the question; product questions, which require a factual answer to the question; and process questions, which require interpretations and/or opinions. The occurrence of these questions were then compared in a FTF and CMC context. The authors found that not only did the teacher direct twice the number of questions to students in the FTF environment, but that the greatest number of questions asked by the teacher in the FTF mode were process questions, while the greatest number of questions asked by the teacher in the CMC forum were product-type questions. Upon first reflection, this seems contrary. CMC intuitively seems to be the type of forum that inspires discussion and therefore process-type or opinion-based questions, while a FTF forum, with its lecture style format, seems more amenable to product-type questions. However, if we revisit Ruberg et al.’s claim that the social structure of the FTF classroom encourages an environment in which the teacher has the greatest status and students take on a passive role, responding mainly with short answers, it becomes clear why teachers would try to encourage discussion in a FTF class by asking for their students’ opinions. A passage of discourse taken from Sullivan and Pratt’s paper (1996) illustrates this pattern of repetitive question asking in an attempt to provoke a response during a FTF class. The following is a transcript taken from a FTF class discussion of a book on animal rights. Comments in brackets are mine.
Teacher: What is the author’s argument? (Synthesis or interpretation - Process question)

Silence

Teacher: How does she support her argument? (Interpretation - Process question) What does she want us readers to do? (Opinion - Process question) What is her aim or her reason for writing this? (Opinion - Process question)

Silence

Teacher: What does she do to support her argument? (Interpretation - Process question) What are the points she tells us about in the essay? (Fact-based question - Product question)

Silence

Teacher: How does she start the essay? (Fact-based question - Product question) Did you understand the first part? (Interpretation - Process question)

Silence

Teacher: She says could you imagine someone outside the building with a fishing hook.... (teacher continues with a long statement) What comparison is she making here? (Interpretation - Process question)

Silence

Teacher: She gives us examples, situations. What are some of them she uses? (Fact-based question - Product question)

Silence.

Teacher: Animals in different places. Where? (Fact-based question - Product question)

Student: The circus. (p. 497)
In this FTF example, the teacher asks seven process questions and four product questions. The product questions are massed toward the end of the question sequence after the teacher tires of trying to generate discussion with process/opinion-based questions. Sullivan and Pratt compare this discussion to one on the same topic in a CMC forum. In this case, the teacher asks only one product question: “What are some of the examples she gives us to support her argument?” (p. 498). To this, nine students respond with multiple-sentenced answers. For all her effort to generate multiple process questions to stimulate interest in the topic, the teacher in the FTF class is rewarded with only a monosyllabic answer. However, the teacher in the CMC class needs to ask only one product question and receives multiple answers.

The teacher’s propensity to ask multiple process questions (however well meaning it is) may further the status inequality of the student-teacher relationship, thereby causing the students to respond minimally. It becomes a vicious circle:

Students take on a passive role. Teachers, to encourage participation, ask process questions to generate interest, but process questions require thoughtful answers. Students become more passive because their lowered status prevents them from publically risking a thoughtful answer which may or may not be right. When confronted with a low-risk product question, the passive students answer with as few words as possible to ‘get their participation out of the way’ as painlessly as possible.

**Research Question 5:** Does the instructor contribute a greater percentage of the turns, sentences and words in a FTF class?

**Hypothesis 5:** Based on arguments presented in the research of Hillman (1999), Hiltz (1986), and Ruberg et al. (1996), it is hypothesized that, in a FTF class, the instructor will contribute a greater talk-time ratio than in a CMC class.
2.6. Personality in Comparison Research

There is another factor that should be taken into account when discussing the incidence of response: the personality of the participants themselves. FTF classes may make it difficult for shy or introverted students to risk speaking out. Many researchers agree that CMC seems to benefit shy students (Althaus, 1997; Coleman, et al., 1999) and helps level the playing field for at risk students (Cookson, 1989). However, little actual research has been done in this area. Most of the evidence cited is anecdotal. A common thread that runs through a number of research papers is that there is a need for further study on the interaction of personality types and CMC. Ayersman and von Minden (1995) contend that as of 1995 there was “no available research that examined personality types and HAI” (hypermedia assisted instruction - a form of CMC. p. 386). Ehrman (1990) maintains that “In the field of distance education, much research on individual difference factors needs to be done. Results of such research must then be applied to different learning programs and settings” (p. 18). Mabrito (1991) states that “Further research should examine other individual differences among students, such as personality differences, ...to assess how these variables may affect the ways in which students interact when communicating via a computer network.” (p 529).

Research that has been done in this area is contradictory. In his 1991 study, Mabrito examined low and high “apprehensives” in both FTF and CMC conditions. He found that high apprehensives contributed more in the CMC environment than they did in the FTF environment and were more likely to take editing suggestions from their peers while in a CMC environment. In addition, high apprehensives made more editing suggestion to others while in the CMC environment. However, the sample was very small, consisting of only four high apprehensives and four low apprehensives. In contrast, Ruberg et al (1996) used a hybrid course, also with a small sample, and found that the proportion of participation does not increase for shy students, although it does decrease participation rates for those who monopolized FTF conversations.
In terms of preference, research suggests that shy or introverted participants do prefer CMC over FTF environments. Wilson (2000) hypothesizes that introverts may prefer CMC to FTF, but concedes that the relationship has not yet been studied extensively. Hammond (1999) used case studies and interviews to investigate participants' feelings about CMC. He found that several frequent CMC contributors reported that they felt uncomfortable and often became embarrassed about participating FTF, suggesting that CMC does indeed help shy or introverted participants to feel better about communicating with their fellow students.

A line of thought related to Wilson’s (2000) hypothesis is elicited by a statement from a paper by Khal and Cropley (1986). In it, the authors maintain that distance education is responsible for a feeling of isolation among its users. One could conclude from that statement that introverts may actually prefer the isolation of distance education as isolation reduces external stimuli and removes some of the social pressures inherent in FTF situations. In support of this idea, Campbell and Hawley (1982) extend Eysenck’s 1967 neurological model of introversion/extroversion to learning styles. Eysenck proposed that extroverts are actually under-stimulated and therefore require greater levels of stimulation to achieve optimum performance levels. Introverts, on the other hand, are actually hypersensitive to even small amounts of stimulation and therefore function best at lower levels of stimulation. There is much evidence for Eysenck’s neurological model. Some of this evidence shows that introverts’ performance deteriorates in the presence of a distraction, while an extrovert’s performance actually improves when a distraction is present. This suggests that learning environments, which are just stimulating enough for extroverts, may be too stimulating for introverts. To demonstrate this, Campbell and Hawley looked at 102 participants randomly selected in a school library. The library in question was designed to allow for socializing on the second floor and quiet study on the first and third floor. The researchers first noted the participants’ preferred location of study, then asked them to complete a personality inventory scale to determine their level of
introversion/extroversion. In addition, participants were asked questions about their study habits. The results showed that extroverts preferred studying on the second floor with its increased noise level and increased opportunity for socializing. Introverts on the other hand, preferred the less stimulating environment of the first and third floors. It would seem to follow that if, as Khal and Cropley say, distance education and CMC are isolating, it may prove to be a more adaptive method of study for introverted and shy students. Further research on personality and CMC using hybrid courses for study may shed light on this issue.

**Research Question 6:**

i) Do introverts participate proportionally more in a CMC environment than they do in a FTF environment?

ii) a) Is there a relationship between extroversion, agreeableness, contentiousness, emotional stability or sophistication and the amount of participation in CMC - FTF environments?

iii) Do shy individuals prefer the addition of a CMC component to a FTF course?

iv) Is there a relationship between extroversion, agreeableness, contentiousness, emotional stability or sophistication and a preference for working in a course that offers the addition of a CMC component to a FTF course?

**Hypothesis 6: i) and ii)** The research by Mabrito (1991) and by Ruberg et al (1996) on shyness/introversion and participation rates is contradictory and inconclusive. Further study is required. In addition, little or no study has been done on other aspects of personality such as agreeableness, contentiousness, emotional stability or sophistication and participation rates. Question 6 i) and ii) are therefore considered exploratory and not subject to a hypothesis.

iii) Most researchers agree that shy or introverted individuals are more at ease in a CMC forum (Benbunan-Fich & Hiltz, 1999; Bordia, 1997; Hiltz & Wellman, 1997; Mabrito, 1991). In addition, the results of Campbell and Hawley’s study (1982) demonstrated that introverts preferred a more solitary environment for study while extroverts preferred a more social environment. It is
hypothesized that introverts will show a preference to the addition of a CMC component to a FTF course as an outlet for participation.

iv) Little or no study has been done on other aspects of personality such as agreeableness, contentiousness, emotional stability or sophistication and preference for a CMC or FTF learning environment. Question 6 iv) is therefore considered exploratory and not subject to a hypothesis.
III. Methodology

3.1. Methodological Considerations

3.1.1. Operationally Defining the Method of Delivery and the Subject Population

One of the more disconcerting things about comparison research, as seen in the previous discussion, is that often, the results of comparison studies seem contradictory. For example, some studies find that learning with CMC is greatly enhanced (Alavi, 1994; Althaus, 1997) to moderately enhanced (Mevarech et al., 1991), whereas others find learning with CMC is worse (Schulman & Sims, 1999), or no different (Ocker & Yaverbaum, 1999) than learning in a FTF environment. Part of the reason for this instability is that CMC incorporates many different types of software and delivery methods. Two comparison studies can measure the results of CMC and FTF learning, but the type of CMC intervention used in the two studies can differ greatly. Comparing the two studies then becomes a case of comparing apples and oranges.

Smith and Dillon (1999), maintain that before we use comparison studies, we must address the conceptual issues surrounding comparison studies. The authors feel that the most pervasive confound in this type of study is that of media versus delivery method. Many comparison studies look only at media type (CMC) without taking the delivery system into account. For example, one study may employ a video conferencing CMC system, while another comparison study may employ an audio graphics CMC system. Should the results of these two studies show that one system was superior to FTF while the other was not, one cannot say that these studies show contradictory results vis a vis CMC and FTF learning. Rather, it could have been the type of CMC that made the difference. Alternately, one system may have been delivered over a slow modem connection, while another system may have been delivered over a high speed connection. In this case, speed of delivery may affect learning more than the system itself. Because of this, Smith and Dillon (1999), strongly
advise that treatment variables be adequately defined in the sense of how the specific attributes of each system may contribute to learning. The authors give an example of a study in which synchronous and asynchronous CMC systems were compared and found to be the same in terms of objective performance measures. However, it was noted that the synchronous portion of the study took place over two weeks, while the asynchronous portion continued for seven months. In this case, it was not merely the systems that were being compared, but also the time line for the treatment. In the present study, the CMC system, connection speed, and time allotted for participation in both forums will be well defined. In addition, the teachers' philosophy of student/teacher participation will be examined via a short interview (see Appendix 1) to help understand how the teacher's influence helped to shape class participation.

Furthermore, test populations must be adequately described and controlled for. In some cases, a computer novice may work more effectively with a more simplistic version of CMC, while an expert may work better with a more complex version of CMC. A study by Althaus, (1997) aptly demonstrates how a confound in the sample population can call into question the results of a study. In this case, Althaus examined learning in a CMC, FTF and hybrid environments. The sample was made up of 134 students enrolled in a FTF section of the author's course. All students were invited to participate in a CMC portion of the course which took the form of email discussion. Students received no extra credit for their participation, but were told that contributions in excess of one per week would count for five percent of their participation term mark. Of the 134 students, 31% became regular CMC participants. These students represented the hybrid condition. In addition, eight students from outside the regular course served in the CMC-only condition. Althaus claims the results showed that students in the hybrid mode scored higher than students in the FTF-only mode on both their first written assignment and their final exam. These results sound very positive for CMC learning, however, one must take into account the observation that the students in the hybrid
condition scored higher even on the very first test, which could suggest that these students were brighter to begin with. In addition, the hybrid students self-selected the hybrid condition for a five percent participation credit which could suggest that students in this group were more highly motivated before the study took place. Finally, the author did not include the data from the CMC only condition, as the group was part of an entirely different course and could not be tested with the same assignments. Although the author concedes that this study can not be generalized to the population because of the self-selection confound, it does demonstrate nicely how comparison studies without strict control for confounding factors can lead to results that may not be as reliable as one would hope.

A comparison study by Alavi (1994) found similar results to Althaus (1997). However, in this case, the researcher factored in change over time. In this study, the researchers found no significant difference in the first round of test scores for CMC and FTF students, thereby suggesting that both groups were adequately matched for scholastic ability at the beginning of the year. It was only by the final exam that CMC students showed a significant increase over the FTF groups in their test scores. This control for error makes the Alavi study more generalizable in scope than the Althaus study. To help understand the makeup of the sample in the present study, all participants were given a questionnaire to assess their computer experience (see Appendix 2). Results showed that all members of the group had similar previous experience using a computer and a keyboard.

3.1.2. The Use of a Hybrid Course to Control for Error

Another concern in comparison research is that often the CMC and FTF classes are made up of different participants (Benbunan-Fich & Hiltz, 1999; Coleman et al., 1999; Hillman, 1999; Lind, 1999; Ocker et al., 1997; Olaniran, 1995; Quinn et al., 1983; Schulman & Sims, 1999; Sullivan & Pratt, 1996; Walther, 1992), are taught by different teachers (Benbunan-Fich & Hiltz, 1999; Hillman, 1999; Lind, 1999; Ocker et al., 1997), or are centered on different topics (See the
discussion in section 2.4 regarding conflicting results in the papers by Herring, 1993 and Savicki et al., 1996). Comparisons of this nature may lead to results that are attributed to the mode of delivery when they are actually caused by differences in teaching style, group composition, or topics of discussion. Some researchers suggest using a hybrid course to hold these variables constant (Etzioni & Etzioni, 1999; Ocker et al., 1997), while others suggest that a repeated measures paradigm would benefit comparison research (Fjerrnestad & Hiltz, 1997). Consistent with this line of thinking, the same instructor and the same group of participants were used in both FTF and CMC conditions in the present study. The topic of discussion was also held constant. All topics were introduced in the week-long CMC portion of the course and continued in a three hour FTF class at the end of CMC discussion period.

3.1.3. The Use of a Longitudinal Study to Compare CMC and FTF Group Activity

Researchers have also published contradictory findings in the group development process in CMC and FTF environments. Some say that interpersonal speech is overemphasized in CMC (McDonald & Gibson, 1998), while others suggest that CMC is too task-focused (Coleman et al., 1999; Hiltz et al., 1986; Oliran, 1995). Part of this confusion may be due to the fact that the group process develops along different timelines in CMC and FTF (Bordia, 1997; Fjerrnestad & Hiltz, 1997; Quinn et al., 1983; Walther, 1992). Fjerrnestad and Hiltz (1997) found that 72% of comparison research was based on a single-episode study. They contend that more longitudinal studies are needed in comparison research if we are to truly understand the differences and similarities in group development in these environments. Other researchers echo Fjerrnestad and Hiltz’s comments (Ocker et al., 1997; Walther, 1992). To take these concerns into account, the present study looks at a three, week-long participation periods taken over the course of an entire semester from a single hybrid course.
3.1.4. The Analysis of Face-to-Face Samples in Comparison Research

Although CMC and FTF modes have been studied for comparison purposes, some researchers contend that the CMC samples in comparison studies are often studied more rigorously than the FTF samples. For example, Herring (1999) in her paper on topic decay, strongly suggests that conversation in CMC decays more rapidly than in FTF communication. However, no direct comparison is made between CMC and FTF. In consideration of this, she suggests that "research comparing topic decay in computer-mediated and face-to-face communication is needed to address this question" (p. 7). Hillman (1999) is in agreement with Herring in that few FTF samples have been analyzed in direct comparison research. With this study, an attempt is made to address this concern by analyzing both the CMC and FTF components of the hybrid course in question.

3.1.5. The Need for Further Study of Personality Differences in Comparison Research

Finally, the question of personality differences is one that few researchers have studied in CMC/FTF comparison research. Many researchers who do look at this variable, have called for further study (Ayersman & von Minden, 1995; Ehrman, 1990). In addition, Wilson, (2000) states that "introverts find that association with other people drains their energy. For this reason, introverts may prefer computer-mediated communication over face-to-face interaction. However, this relationship has not been studied extensively". (p. 70). In response to this, personality variables will be examined in relation to the amount and type of participation in both CMC and FTF environments.

3.2. Participants

Participants were 16 graduate students (seven males and nine females) enrolled in an introductory class to computer applications in education at the Ontario Institute for Studies in Education (OISE). The students varied in their experience with computer conferencing systems and the number of graduate courses already completed, although all participants reported feeling comfortable using a computer and a keyboard. One female participant was dropped from the study.
due to her lack of participation in most all aspects of the course on the three dates recorded for this study.

3.3. Environment

The hybrid class studied spent three hours a week in a FTF environment. The first 90 minutes of the three-hour interval were spent on scholarly discussion, while the second 90 minutes were spent in the computer lab, sampling different CMC systems, learning HTML and examining different software programs. In each FTF class, a new topic of discussion was introduced. At the end of the FTF class, students were required to continue discussing the topic, online, for the next six days. CMC topics usually focused on journal articles concerned with educational technology issues and/or exploratory work done in the lab that week. Requirements for the class were that all students contribute at least two online notes per week to the class conference. In addition, the instructor for the course was interviewed to better determine his philosophy on student teacher participation (see Appendix 1).

3.4. The CMC System

Knowledge Forum (KF) served as the CMC system for the online discussion portion of the class. KF is a threaded, asynchronous discussion forum. Instructors create discussion areas called “views” for the online discourse (Figure 2). Any number of views can be running at the same time. Participants click on the view of their choice and join that particular discussion. Once inside a particular view, participants can see each other’s threads and notes (or turns) that pertain to that view (See Figure 1 on p. 20). Notes can be sorted by author, date of contribution, or thread. The forum is searchable (Figure 3) and contributors can reference others’ notes in their discussions.
Flight Views

Please select a view:

- About Knowledge Forum (22)
- Features (22)
- Flight (22)
- Fossil Fuels (40)
- Human Body (27)
- Knowledge Forum discussion (8)
- More Features (28)
- Vision (71)
- heart (27)

Navigation:
All Views
Selected View
Search

Note:
New Note
Build-On
Edit Note
Delete Note

Resources:
Send E-mail
Personal Directory
Shared Directory
Web Resources
Announcements
Help

Figure 2. Example of a “view” in Knowledge Forum CMC Software
Search Flight database:

Find notes by [marge] ▼

(optional) whose title [contains] ▼

fly

[ ] Case-Sensitive

[Search]

Figure 3. Example of the search function in Knowledge Forum software

Colored icons denote which notes have been read, and the authors can check to see who has read a particular note. Notes can be deleted only by the instructor and the author of the note. The principal support for interaction is a “Build-On” facility that allows online participants to respond to each other’s contributions, forming threads. Submissions to the database are available to all class participants for the length of the course and can be stored permanently in a database for research purposes. Students could connect to the CMC database via a high speed Ethernet connection in the University lab, or through a personal Internet connection from home.

3.5. Procedure

Three FTF class sessions were video and audio taped and then transcribed. The first session was recorded on the third week of the term, the second session was recorded on the seventh week and the third session was recorded on the eleventh week. This was done in order to compare FTF and CMC differences in group development at the beginning, middle and end of the course and follows a schedule similar to the one employed by McDonald and Gibson (1986). In addition, this schedule is
consistent with Bales' study of the phase hypothesis (1951), in which the length of the interaction was divided into thirds to better study the group process.

Online portions of the class discussion from the third, seventh and eleventh week were retrieved from the KF database and analyzed. FTF portions of the class were videotaped using a two-camera method. Two cameras were in place to capture both sides of the room. One student who declined to participate was seated so she was just out of camera range. Participants and the instructor were all unaware as to who the non-participant was. All potential participants were asked to fill out a consent form and told that anyone who did not wish to participate should write "non-participant" on the form instead of filling it out. It was hoped that this method would help any non-participants remain anonymous. The time-allotted-to-contribute ratio in this study (three hours in a FTF class to six days of CMC) is comparable to time allotted in studies by Bordia (1997 - three hours FTF to six days CMC) and Quinn et al. (1983 - 90 minutes FTF to three days CMC).

Questionnaires on computer experience (see Appendix 2) and CMC preference (see Appendix 3) were administered during the first session. Administration of the personality questionnaire (see Appendix 4) was postponed until the second session. It was felt that a postponement of the personality questionnaire would be prudent as OISE is made up of a very diverse student population; some of the students in the class were new to graduate school while others were completing their final course. Results of an early administration of the personality measure could have been be confounded by the possibility that new students were more intimidated by the graduate school experience than students who were finishing off their course of study.

To investigate whether or not shy individuals participate more via CMC, shyness and introversion/extroversion were measured in two ways:

1. By using a personality measures questionnaire and,

2. By looking at overall individual participation rates. According to Hiltz et al., (1986),
individuals who contribute a third or more to the conversation are considered leaders. In the present study, this proportion will be considered a baseline against which to measure major and minor contributors.

It was with careful consideration that FTF exchanges were recorded with the use of a video camera. There were initial concerns that videotaping, or even the presence of a still camera, could make participants hyper self-aware. However, previous research shows that videotaping is an acceptable method of gathering FTF data (Ruberg et al., 1996; Sullivan & Pratt, 1996; Walther, 1992). Coleman (1999) also acknowledges the problems of using videotape, but maintains that there is "no adequate alternative method available for recording ... participants' conversations." (p. 56)

Furthermore, Hiltz, Johnson and Turoff (1986) used audio tapes in a comparison study and had difficulty identifying participants from their voice alone. Results showed a lack of interrater reliability and they recommended videotaping as a way to avoid this problem in future. In the present experiment, as a measure to help participants feel more at ease with the camera and to capture more natural reactions from them, they were assured that the videotape would not be viewed by anyone other than the researcher and that it would be erased as soon as transcription of the dialogue was complete. In addition, participants were told that videotaping was not done to capture facial expression, or to be, in any way, critical of their performance in class.

Ten percent of the dialogue in FTF and CMC transcriptions were subject to interrater reliability testing for social and task-related sentences. Sentences were defined as being social if they were either: 1) a simple agreement 2) a joke or lighthearted remark 3) a "cheerleader" reply e.g., "Wonderful idea Sue" or "Good job Sam". In other words, social sentences were defined as something that added little substance to the conversation. Personal disclosures that added information or knowledge to the discussion were defined as task-related sentences.

The Knowledge Forum software allows the instructor to create views that students use
strictly for social communication. In this case, the instructor created a forum he called the “Café” where students were encouraged to chat about non-academic matters. In addition, there were two other forums where social communication may have occurred. These views were called “Introductions” and “Practice”. To ensure that all social sentences from the CMC environment were included in the analysis, social and task-related contributions to these three views, from the dates in question, were considered in the final analysis.

3.6. Measures

Three scales were distributed to participants in this study. The CMC preference scale was adapted from Hiltz (1986) (see Appendix 3). The computer experience questionnaire (see Appendix 2) is an untested measuring device developed for the purpose of this study. The personality questionnaire (see Appendix 4) was designed by Goldberg (1992). The Goldberg scale is frequently used in psychological research. It was developed as an alternative to longer, more time consuming scales, when “subject time is at a premium” (p 27).

Factor scores from the Goldberg sub-scales show high validity coefficients with the (comparable) parallel NEO - PI subscales. The NEO-PI is one of the more widely used personality tests in psychological research. In addition, the Goldberg scale shows high internal consistency reliability for each factor ranging from .82 -.97 and good discrimination validity for the different subscales, showing strong differentiation among the five factors. All factors measure bipolar traits. A low score on the extroversion factor signifies introversion, a low score on the agreeableness factor signifies disagreeableness, etc. The five factors measured are similar to those measured by the NEO - PI. They are:

1. Introversion/Extroversion
2. Pleasantness or Agreeableness
3. Contentiousness or Dependability
4. Emotional Stability

5. Intellect or Sophistication

These five factors are considered by many researchers to be the five basic personality traits as determined by factor analysis.

3.7. Limitations

The greatest limitation of a study such as this lies in the generalizability of its results. This is due, primarily, to the size and composition of the sample. The present study was made up of only 16 participants from a single class. Replication with a larger sample would help to validate any results found. Furthermore, as each instructor conducts their courses differently, it would be useful to replicate this study with different instructors to see if the results still hold true. Finally, the participants in this study were all graduate students from a major Canadian University. It could therefore be said that data from this study may not be applicable to high school or grade school students.
IV. Statical Analysis and Results

All data were analysed using SPSS. Individual research questions were analysed in the following manner:

4.1. Research Question 1: What percentage of speech is social and what percentage of speech is task-related in CMC and FTF environments?

Since an individual's turn can be made up of both social and task-related statements, sentences were the issue of interest for this question. All sentences were rated as either having social or task-related content. (See chapter 4.4 in this paper for the operational definition of social and task-related sentences). The percentage of social sentences were compared in both forums to see if a difference existed in either environment. Proportional analysis was used to control for the overall amount of data in both environment. A non-parametric Wilcoxon Signed Ranks test was used for the actual analysis. The Wilcoxon test evaluates the difference between two samples in a repeated measures design without making assumptions about the distribution of the two samples. Results from the Wilcoxon test are seen in Table 1.

<table>
<thead>
<tr>
<th>Percentage of Social in FTF &lt; Percentage of Social in CMC</th>
<th>Percentage of Social in FTF = Percentage of Social in CMC (N)</th>
<th>Percentage of Social in FTF &gt; Percentage of Social in CMC (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.50(2)</td>
<td>-1</td>
<td>8.85(13)</td>
</tr>
</tbody>
</table>

Note. By Wilcoxon Signed Ranks, 2-tailed p=.002

**Hypothesis 1:** Most research suggests that CMC produces fewer socially-oriented statements and more task-related statements than those seen in FTF discussions (Bordia, 1997; Coleman et al., 1999; Hiltz et al., 1986 to name a few). However, Walther (1992) expresses concern that CMC
groups develop more slowly than FTF groups and need to be given an appropriate amount of time to allow for social development to take place. No predictions were made for this research question. However, contrary to the Walther’s (1992) proposition, the results from this test show that even when CMC groups are allowed enough time for social discussion to develop (six days of CMC discussion compared to three hours of follow up discussion in a FTF class, as seen in Bordia) there is a significantly higher percentage of social sentences in the FTF environment than in the CMC environment. \(z = -3.124; p<.01\).

### 4.2. Research Question 2(i): How does the amount of conversation compare in CMC and FTF environments?

In order to compare the amount of conversation in both environments, the overall number of turns in the FTF and CMC environments were compared using the Wilcoxon Signed Ranks test. Results are seen in Table 2.

<table>
<thead>
<tr>
<th>Number of FTF turns &lt; Number of CMC turns (N)</th>
<th>Number of FTF turns = Number of CMC turns (N)</th>
<th>Number of FTF turns &gt; Number of CMC turns (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.00(3)</td>
<td>0</td>
<td>10.50(14)</td>
</tr>
</tbody>
</table>

*Note. By Wilcoxon Signed Ranks, 2-tailed \(p=.001\)*

**Hypothesis 2(i):**

In confirmation of the findings of Hewitt and Teplovs (1999) that CMC environments generate fewer turns than FTF environments, and as hypothesized, participants in this study contributed significantly fewer turns in the CMC environment than they did in the FTF environment. \(z = -3.338; p<.01\).
4.3. Research Question 2(ii): How does the depth of conversation compare in CMC and FTF environments?

In order to compare the depth of conversation in both environments, Hillman's method (1999) of measuring the average number of sentences per turn was employed, as well as Quinn et al.'s. (1983) method of measuring the average number of words per turn. Word complexity was analysed by comparing the average word length of contributions in both environments. Results from the Wilcoxon Signed Ranks tests are shown in Tables 3, 4 and 5 respectively.

Table 3
Mean Ranks of Difference in Pairs between the Average Number of Sentences per Turn in FTF and CMC Environments

<table>
<thead>
<tr>
<th>Avg # Sentences Per Turn FTF &lt; Avg # Sentences Per Turn CMC (N)</th>
<th>Avg # Sentences Per Turn FTF = Avg # Sentences Per Turn CMC (N)</th>
<th>Avg # Sentences Per Turn FTF &gt; Avg # Sentences Per Turn CMC (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.38(16)</td>
<td>0</td>
<td>3.00(1)</td>
</tr>
</tbody>
</table>

Note. By Wilcoxon Signed Ranks, 2-tailed p=.001

Table 4
Mean Ranks of Difference in Pairs between the Average Number of Words per Turn in FTF and CMC Environments

<table>
<thead>
<tr>
<th>Avg # Words Per Turn FTF &lt; Avg # Words Per Turn CMC (N)</th>
<th>Avg # Words Per Turn FTF = Avg # Words Per Turn CMC (N)</th>
<th>Avg # Words Per Turn FTF &gt; Avg # Words Per Turn CMC (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.00(17)</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Note. By Wilcoxon Signed Ranks, 2-tailed p=.000
Table 5
Mean Ranks of Difference in Pairs between the Average Word Length in FTF and CMC Environments

<table>
<thead>
<tr>
<th>Avg Length of Words in FTF &lt; Avg Length of Words in CMC (N)</th>
<th>Avg Length of Words in FTF = Avg Avg Length of Words in CMC (N)</th>
<th>Avg Length of Words in FTF &gt; Avg Length of Words in CMC (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.50(16)</td>
<td>-1</td>
<td>.00(0)</td>
</tr>
</tbody>
</table>

Note. By Wilcoxon Signed Ranks, 2-tailed p=.000

**Hypothesis 2 (ii):**

As predicted and seen in hypothesis 2(i), the FTF environment does generate a greater amount of participation than CMC in respect to turns, however each FTF turn has significantly less depth to it as measured by the average number of sentences per turn (z=-3.479; p<.01) and by the average number of words per turn (z=-3.621; p<.01). In addition, word complexity is significantly greater in the CMC environment (z=3.539; p<.01).

4.4. Research Question 3(i): Is there an effect of gender on the amount of conversation contributed in FTF or CMC environments?

In this case, the contribution levels were measured by comparing the percentage of turns and words by males and females in both environments using the Mann-Whitney test. Proportional analysis was used to control for the overall amount of data in both environments. The Mann-Whitney is used to compare two groups when one can not assume a normal distribution. Results from the Mann-Whitney tests are shown in Tables 6 and 7 respectively.
Table 6
Mean Ranks of the Percent of Turns Contributed by Males and Females in FTF and CMC Environments

<table>
<thead>
<tr>
<th></th>
<th>Male (N)</th>
<th>Female (N)</th>
<th>By Mann-Whitney U, 2-tailed p</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTF Environment</td>
<td>8.21(7)</td>
<td>8.72(9)</td>
<td>0.832</td>
</tr>
<tr>
<td>CMC Environment</td>
<td>8.00(7)</td>
<td>8.89(9)</td>
<td>0.707</td>
</tr>
</tbody>
</table>

Table 7
Mean Ranks of the Percent of Words Contributed by Males and Females in FTF and CMC Environments

<table>
<thead>
<tr>
<th></th>
<th>Male (N)</th>
<th>Female (N)</th>
<th>By Mann-Whitney U, 2-tailed p</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTF Environment</td>
<td>8.57(7)</td>
<td>8.44(9)</td>
<td>0.958</td>
</tr>
<tr>
<td>CMC Environment</td>
<td>7.11(7)</td>
<td>9.11(9)</td>
<td>0.56</td>
</tr>
</tbody>
</table>
**Hypothesis 3(i):**

Contrary to the suggestions put forth in Althaus’ (1997), Ruberg et al.’s (1996), Savicki et al.’s (1996) and Wilson’s (2000) papers and to hypothesis 3 (i), women did not submit a significantly higher percentage of turns (z = -.376 p > .05) or words (z = -.582 p > .05) than men did in the CMC environment, nor did men submit a significantly higher percentage of turns (z = -.212; p > .05) or words (z = -.053; p > .05) than women did in the FTF environment.

**4.5. Research Question 3 (ii): Is there an effect of gender on the depth of conversation in CMC and FTF environments?**

Depth was analysed by comparing the average number of sentences per turn (Hillman, 1999) and the average number of words per turn (Quinn et al., 1983) contributed by males and females in both environments. Word complexity was analysed by comparing the average word length of males’ and females’ contributions in both environments. Results from the Whitney-Mann tests are seen in Tables 8, 9 and 10.

**Table 8**

Mean Ranks of the Average Number of Sentences Per Turn Contributed by Males and Females in FTF and CMC Environments

<table>
<thead>
<tr>
<th>Mean Ranks of the Average Number of Sentences Per Turn Contributed by Males and Females in the FTF Environment</th>
<th>Male (N)</th>
<th>Female (N)</th>
<th>By Mann-Whitney U, 2-tailed p</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.57(7)</td>
<td>8.44(9)</td>
<td>0.958</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mean Ranks of the Average Number of Sentences Per Turn Contributed by Males and Females in the CMC Environment</th>
<th>Male (N)</th>
<th>Female (N)</th>
<th>By Mann-Whitney U, 2-tailed p</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.71(7)</td>
<td>8.33(9)</td>
<td>0.874</td>
<td></td>
</tr>
</tbody>
</table>
Table 9
Mean Ranks of the Average Number of Words Per Turn Contributed by Males and Females in FTF and CMC Environments

<table>
<thead>
<tr>
<th></th>
<th>Males (N)</th>
<th>Female (N)</th>
<th>By Mann-Whitney U, 2-tailed p</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTF Environment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>8.29(7)</td>
<td>8.67(9)</td>
<td>0.874</td>
</tr>
<tr>
<td>CMC Environment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>7.71(7)</td>
<td>9.11(9)</td>
<td>0.56</td>
</tr>
</tbody>
</table>

Table 10
Average Word Length Contributed by Males and Females in FTF and CMC Environments

<table>
<thead>
<tr>
<th></th>
<th>Males (N)</th>
<th>Female (N)</th>
<th>By Mann-Whitney U, 2-tailed p</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTF Environment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>9.21(7)</td>
<td>7.94(9)</td>
<td>0.572</td>
</tr>
<tr>
<td>CMC Environment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>7.93(7)</td>
<td>8.94(9)</td>
<td>0.534</td>
</tr>
</tbody>
</table>

**Hypothesis 3(ii):**

Contrary to hypothesis 3(ii) no significant difference was found in depth of participation between males and females as measured by the average number of sentences per turn in the FTF environment ($z = -.053$; $p > .05$) or in the CMC environment ($z = -.159$; $p > .05$). Nor was there a
significant difference in the average number of words per turn in the FTF environment \((z = -1.159; p > .05)\) or in the CMC environment \((z = -0.582; p > .05)\). The differences between the average word length contributed by males and females in the FTF environment \((z = -0.566; p > .05)\) and the CMC environment \((z = -0.622; p > .05)\) were also found to be non-significant.

4.6. Research Question 4: Do certain individuals dominate a greater proportion of the conversation in a FTF environment?

In this case, the proportion of words, sentences and turns for each person were compared in both environments and are represented graphically in Figures 4 through 9. A summary of the data from the four most dominant contributors is seen in Table 11. Proportional analysis was used to control for the overall amount of data in each environment.
Figure 4. Percentage of Sentences Contributed in a FTF Environment
Figure 5. Percentage of Sentences Contributed in a CMC Environment
Figure 6. Percentage of Turns Contributed in a FTF Environment
A comparison study of group development

Figure 7. Percentage of Turns Contributed in a CMC Environment
Figure 8. Percentage of Words Contributed in a FTF Environment
Figure 9. Percentage of Words Contributed in a CMC Environment
Table 11
Percentage of Turns, Sentences and Words contributed by the four most dominant participants in FTF and CMC environments

<table>
<thead>
<tr>
<th></th>
<th>FTF</th>
<th>CMC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Turns</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M3</td>
<td>13%</td>
<td>F3</td>
</tr>
<tr>
<td>M6</td>
<td>10%</td>
<td>F5</td>
</tr>
<tr>
<td>F4</td>
<td>8%</td>
<td>M5</td>
</tr>
<tr>
<td>F3</td>
<td>7%</td>
<td>F8</td>
</tr>
<tr>
<td><strong>Sentences</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M6</td>
<td>11%</td>
<td>M6</td>
</tr>
<tr>
<td>M3</td>
<td>9%</td>
<td>F3</td>
</tr>
<tr>
<td>F4</td>
<td>8%</td>
<td>M5</td>
</tr>
<tr>
<td>F3</td>
<td>8%</td>
<td>F5</td>
</tr>
<tr>
<td><strong>Words</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M6</td>
<td>12%</td>
<td>M6</td>
</tr>
<tr>
<td>F3</td>
<td>9%</td>
<td>F3</td>
</tr>
<tr>
<td>F4</td>
<td>8%</td>
<td>F5</td>
</tr>
<tr>
<td>M3</td>
<td>8%</td>
<td>M5</td>
</tr>
<tr>
<td>F5</td>
<td>8%</td>
<td></td>
</tr>
</tbody>
</table>

**Hypothesis 4:**

Contrary to research by Benbunan-Fich and Hiltz (1999), Bordia, (1997), Hiltz and Wellman (1997), Mabrito (1991), Ruberg et al.(1996) and Sullivan and Pratt, (1996), and to Hypothesis 4, CMC environments do not appear to be any more equitable than the FTF environment. As seen in Figures 4 through 9, and in Table 11, three male participants (numbers three, five and six) and three female participants (numbers three, four and five) appear to be disproportionately dominate in both environments.

4.7. Research Question 5: Does the instructor contribute a greater percentage of the turns, sentences and words in a FTF class?

The proportion of turns, sentences and words contributed by the teacher were compared in both environments. Proportional analysis was used to control for the overall amount of data in both environments.
**Hypothesis 5:**

As predicted with Hypothesis 5 and as seen in Figures 4 through 9, the Instructor is the dominant participant in the FTF environment. While the Instructor still contributes a high proportion of turns in the CMC environment, the turns are made up of a low to medium percentage of sentences and words.

**4.8. Research Question 6 (i): Do introverts participate proportionally more in a CMC environment than they do in a FTF environment?**

Due to the small size of the sample, a median split was used to differentiate introverts from extroverts. As determined by the results from the Goldberg scale (1992), the bottom 50% of participants represented the introverts. In this case, the comparison of interest was the proportion of turns, sentences and words contributed by introverts in the CMC environment. Proportional analysis was used to control for the overall amount of data in both environments. Results from the Wilcoxon Signed Ranks tests are shown in Table 12, 13 and 14 respectively.

**Table 12**

<table>
<thead>
<tr>
<th>Percentage of Turns in FTF&lt;Percentage of Turns in CMC (N)</th>
<th>Percentage of Turns in FTF=Percentage of Turns in CMC (N)</th>
<th>Percentage of Turns in FTF&gt;Percentage of Turns in CMC (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.50(6)</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

*Note.* By Wilcoxon Signed Ranks, 1-tailed p=.014
Table 13
Mean Ranks of Difference in Pairs between the Percentage of Sentences Contributed by Introverts in the CMC and FTF Environments

<table>
<thead>
<tr>
<th>Percentage of Sentences in FTF&lt; Percentage of Sentences in CMC (N)</th>
<th>Percentage of Sentences in FTF= Percentage of Sentences in CMC (N)</th>
<th>Percentage of Sentences in FTF&gt; Percentage of Sentences in CMC (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.60(5)</td>
<td>0</td>
<td>3.00(1)</td>
</tr>
</tbody>
</table>

Note. By Wilcoxon Signed Ranks, 1-tailed p=.058

Table 14
Mean Ranks of Difference in Pairs between the Percentage of Words Contributed by Introverts in the CMC and FTF Environments

<table>
<thead>
<tr>
<th>Percentage of Words in FTF&lt; Percentage of Words in CMC (N)</th>
<th>Percentage of Words in FTF= Percentage of Words in CMC (N)</th>
<th>Percentage of Words in FTF&gt; Percentage of Words in CMC (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.60(5)</td>
<td>0</td>
<td>3.00(1)</td>
</tr>
</tbody>
</table>

Note. By Wilcoxon Signed Ranks, 1-tailed p=.058

Hypothesis 6 (i):

No predictions were made in the case of research question 6(i), however, the highly significant findings of a greater percentage of turns contributed by introverts in the CMC environment over the FTF environment (z = -2.201; p=.014) and the moderately significant findings of a greater percentage of sentences and words contributed by introverts in the CMC environment (z = -1.572; p<.10) over the FTF environment confirm the anecdotal evidence presented by Althaus (1997) and Coleman, et al. (1999) among others.
4.9. Research Question 6 (ii): Is there a relationship between extroversion, agreeableness, contentiousness, emotional stability or sophistication and the percentage of participation in CMC and FTF environments?

In this case, a Spearman correlational test was used to determine if any relationships exist between the variables.

**Hypothesis 6 (ii):**

Once again, no predictions were made for this research question. Proportional analysis was used to control for the overall amount of data in both environments. Only one correlation of interest was found; extroversion and the percentage of FTF turns contributed \( (r_s = .606, p = 0.01) \).

4.10. Research Question 6 (iii): Do shy individuals prefer the addition of a CMC component to a FTF course?

An independent samples t-test was used to compare the mean scores of introverts and extroverts on the CMC preference scale (adapted from Hiltz, 1986). Once again a median split was used to differentiate introverts from extroverts. Results can be seen in Table 15.

<table>
<thead>
<tr>
<th>Table 15</th>
<th>Results from Independent Samples t-test. Mean Scores of Introverts and Extroverts on the CMC Preference Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Introverts</td>
<td>6</td>
</tr>
<tr>
<td>Extroverts</td>
<td>7</td>
</tr>
</tbody>
</table>

**Hypothesis 6(iii):**

Contrary to hypothesis 6(iii), there were no significant differences found in the CMC preference scores of introverts and extroverts.
4.11. Research Question 6 (iv): Is there a relationship between extroversion, agreeableness, contentiousness, emotional stability or sophistication and a preference for working in a course that offers the addition of a CMC component to a FTF course?

Results from the CMC preference scale (adapted from Hiltz, 1986) and the five traits in question as measured by the Goldberg scale (1992), were analysed using Spearman correlations to see if relationships exist.

**Hypothesis 6 (iv):**

No predictions were made for this research question. Two correlations of interest were found; The correlation between dependability and CMC preference \( (r_s = .486, p = 0.05) \) and the correlation between dependability and the percentage of CMC turns contributed \( (r_s = .597, p = 0.02) \).
5.1. Social versus Task-Related Content in CMC and FTF

The first research question in this study dealt with the issue of the social nature of CMC. The question itself was exploratory and therefore not subject to a hypothesis. Previous research suggests that CMC environments are far more task-oriented than are FTF environments. However, those findings have been called to question since many comparison studies fail to give CMC participants an adequate amount of time to develop socially. In the present study, participants were allowed to contribute to the CMC forum for six days as a continuation of discussions that began in a three-hour FTF class. This time frame was suggested by Bordia (1997) as being sufficient to allow equivalent participation in both forums. In addition, the present study took place over the course of eleven weeks, arguably enough time to allow for social relationships to develop in the CMC environment. Nevertheless, social contributions to the FTF environment far outweighed those to the CMC environment, even when taking contributions to the “Café”, “Introductions” and “Practice” views into account – views whose primary function were to serve as social outlets for participants.

The lack of socialization in the CMC environment was not a reflection on the participants themselves. The same participants in the FTF forum who brought donuts to class for all to share, who made jokes with each other and who chattered on well after FTF classes broke up, made very few jokes and, in terms of the actual number of notes, submitted little more than what was required of them in the CMC forum. The CMC environment became a work-focused domain even though participants were given time enough to feel comfortable with each other. Three factors may be at issue here: First, notes take time to compose and time to read (Quinn et al, 1983). When communicating FTF, it takes but a second to interject with a joke or a social comment. If the author of a note is to introduce a joke or social comment into the CMC forum, the author must first decide
whether the joke is appropriate, as it will be there for all to see during the entire semester, and secondly, she or he must decide whether or not the joke wastes the time of the audience. Blathering on incessantly in a work-oriented forum is considered a social faux pas. Given these options, perhaps CMC participants opt for hard work over socialization, knowing that there will be time for that when they meet in the FTF forum.

The second issue may be one of immediacy. In a FTF environment, jokes are immediately rewarded (if they are good ones) with laughter. Socially supportive statements are immediately rewarded with smiles and nods of the head. In a CMC environment, one’s jokes are not rewarded with laughter, nor can the supportive participant see the recipient smile or nod in agreement. As Oliran (1995) suggests, CMC environments are low in the ability to convey social information, hence the tendency to become more task-focused. Although some recipients may read the note and chuckle to themselves, very few will actually take the time to reply to a joke with a comment like “Oh you should have seen me laugh over that one!” All in all, the risks may not be worth the rewards in a task-based environment, like the one studied here. All the same, this would most likely differ in online communities like Reingold’s (1994) WELL where the primary function of the group is to support each other through difficult times and in online chat groups who meet to discuss hobbies and the like. In these types of CMC environments, one would expect a very high level of supportive and social statements.

A third possibility is that the instructor failed to establish an online atmosphere that was conducive to social statements. To some degree, the instructor models behaviour, and if supportive and social statements are missing from the instructor’s notes, students may follow the instructor’s lead. This may be particularly true of the present study in light of the fact that, in a post-study interview, the instructor of the course in question volunteered that he was planning to establish a more social online community in future courses.
5.2. Amount and Depth of Conversation in CMC and FTF

The second question in this study compared the overall amount and the depth of conversation in CMC and FTF environments. As predicted and concurrent with Hewitt and Teplov’s (1999) findings, participants contributed fewer turns in CMC than they did in the FTF environment. However, contrary to Herring’s concerns (1999) that CMC lacks depth, it would seem that in this case, less is more. As predicted, results in this study indicate that, depth, whether measured by sentences per turn, words per turn or word complexity, is greater in the CMC environment than in the FTF environment. It is possible that this result is connected to the finding that CMC environments are more task-focused than FTF environments. Finding a solution, reflecting on a problem, or engaging in serious discussion usually involves greater depth of conversation than that found in an environment with a higher level of social content. CMC contributions are usually well thought out before they are submitted and therefore reflect more depth. Moreover, CMC contributions are uninterrupted so the author can take all the time needed to fully flesh out the point to be made. Communication in a FTF group presents a different story. Off hand comments that spring to mind are more easily submitted in a FTF environment which in turn can result in a contributor being cut off short. In the FTF environment such as the one studied, interruptions were commonplace. Conversation passed quickly from one participant to the next, and single sentence contributions were typical. The mean number of sentences per turn in the CMC environment was 10.26 while the mean number of sentences per turn in the FTF environment was 4.71. It would seem that the solitary nature of a CMC environment affords one the luxury of contributing in more depth than in FTF environments.

5.3. Gender and Amount and Depth of Conversation in CMC and FTF

The third research question concerned the effects of environment on gender; more specifically, whether the CMC environment equalizes the playing field for women. Results showed
that hypothesis 3 (i) and (ii) were not supported. CMC did not equalize the playing field for women as predicted, but only because the playing field, in this instance at any rate, was equal to begin with. In every analysis undertaken, whether it be the number of overall turns, the average number of sentences and words per turn or the average word length, it would appear that males and females did not differ in their participation in either environment. This is contrary to the findings of many researchers (Althaus, 1997; Hiltz & Wellman, 1997; Jaffe et al., 1999; Lind, 1999; Olaniran, 1995; Savicki et al., 1996 and Wilson 2000). The argument presented by many is that male voices dominate FTF environments at the expense of women’s voices and that CMC is the great equalizer. Why such a discrepancy in the findings of the present study? Studies that suggest CMC environments are great equalizers base their findings on the fact that they find no significant difference in the rate of participation by gender. However, some of these studies fail to analyse corresponding discussion from a FTF environment, assuming that the women would have participated less in a FTF environment. (Althaus, 1997). Other studies base their findings on the fact that women reported feeling more comfortable in CMC, but do not measure their actual participation rates or compare those rates to that in a FTF environment (Jaffe, et al., 1999; Lind, 1999; Olaniran, 1995; Savicki et al., 1996). Although hypothesis 3 (i) and (ii) were not met, the findings for these questions are nevertheless interesting since they demonstrate the need for further studies that compare the same populations in CMC and FTF environments. While the idea that women participate more in a CMC environment than they do FTF is a popular one, further study may show that women are more equal in both environments, at least when the discussion is task-based, than was previously thought. A larger sample should be studied to see if the results of this study can be replicated.

5.4. Status and Participation in CMC and FTF

The fourth and fifth research questions were concerned with the effect of status on participation in CMC and FTF environments. Contrary to hypothesis 4, CMC was not a more
A comparison study of group development equitable environment as it did not serve to decrease the participation of the dominant members. The findings from this study indicate that, in both environments, three males and three females appear to contribute a disproportionate amount of the conversation. This is finding is incompatible with research that declares CMC to be the more democratic of the two learning environments (Benbunan-Fich & Hiltz, 1999; Bordia, 1997; Hiltz & Wellman, 1997; Mabrito, 1991; Ruberg et al, 1996; Sullivan & Pratt, 1996). Again, as mentioned earlier, many studies that call CMC the great equalizer are based on user perceptions, self reports, and/or do not look at the actual number of contributions from the same population in both environments. The one study that did measure inequality in a repeated-measures comparison (Hiltz et al., 1986) came up with a non-significant indication of inequality, as did this study. Although hypothesis 4 did not turn out as predicted, the results are once again of interest and demonstrate the need for further studies that compare participation rates for the same sample in both environments.

In the matter of instructor participation, as predicted by hypothesis 5, the teacher was the most dominant participant in the FTF environment with 27% of overall turns, 24% of overall sentences and 22% of overall words. In each instance, the instructor contributed more than any one student. In contrast, in the CMC environment, the instructor contributed the highest percentage of overall turns, but each turn was relatively short, consisting of only 5% of all sentences and only 4% of all words. This pattern suggests that, in CMC, the instructor contributes short notes, perhaps to guide the discussion when it veers off course, rather than to express ideas in depth. This would be concurrent with this particular Professor’s philosophy of online teaching:

...I think it’s important to give students a certain amount of latitude, and not exert too much control over the discourse. On the other hand, sometimes a conversation is obviously going nowhere, and in that case, I feel a need to step in. (See Appendix 1 for further discussion of personal philosophy).
It seems obvious that each instructor will have his or her own ideas about how much to contribute to a discussion. In the Hillman study (1999) for example, the instructor uttered 73% of all FTF sentences and 49% of all CMC sentences. Even though the numbers differ in the Hillman study and the present study, as a reflection perhaps of instructor philosophy, the results from both demonstrate that FTF environments are more instructor-focused than are CMC environments.

5.5. Personality and Participation in CMC and FTF

Few studies in the literature examine the effect of personality differences on participation levels in CMC and FTF environments. For that reason, no hypotheses were offered for questions 6(i), (ii), or (iv). Results for question 6(i) show that introverts participate significantly more in a CMC environment than they do in a FTF environment. This is concurrent with Campbell and Hawley’s (1982) findings on study environment preference and Mabrito’s (1991) research on high and low “apprehensives”. Surprisingly though, the results of this study suggest that introverts do not state a greater preference for the added CMC component than do extroverts. This is contrary to hypothesis 6(iii) and to case studies on preference (Hammond, 1999). It seems highly counterintuitive that introverts would participate more in a CMC forum, but state no preference for it. One possibility for these results could be that introverts participate more in CMC to make up for their lack of participation FTF, but still feel anxious about participating and are therefore somewhat split on their opinion of CMC as a communication medium. The other possibility could be that the scale used in the present study was not a discriminatory enough tool to use with such a small sample. A larger sample and the development of a more direct scale should be used to see if one can tap into participants’ preferences more effectively.

Question 6 (ii) examined the relationship between the five basic personality traits and the amount of contribution in CMC and FTF environments, while question 6 (iv) examined the relationship between these traits and a preference for the addition of CMC to a FTF course. Only
three correlations were of interest; one expected and two unexpected. In the case of question 6 (ii),
results quite expectedly demonstrated a positive correlation between extroversion and the percentage
of FTF turns. Not surprisingly, as extroversion increases, so do the amount of turns one takes in a
FTF environment. The other two correlations were unexpected, showing a positive relationship
between dependability and CMC preference and dependability and the percentage of turns
contributed to a CMC environment. Those high in dependability seem to prefer CMC and contribute
more turns in this environment. No explanation is given for this finding. However, this relationship
deserves further study as it may add to our knowledge of learning preferences and styles.

5.6. Future Considerations

Due to the nature of the sample used, this study is subject to limitations and the results may
not be generalizable to other contexts and situations. First and foremost, the sample in this study was
small, consisting of only nine females and seven males. In addition, the sample was made up entirely
of graduate students from a major Canadian university; a population usually not considered to be
representative of the population as a whole. Graduate students may contribute more to discussions
and/or have different reactions to CMC and FTF than highschool or grade school students.
Furthermore, only one class and one instructor was examined. As previously discussed, each and
every instructor will have his or her own method of teaching their class. This will, of course, affect
the patterns of communication seen in CMC and FTF environments. For example, an instructor who
assigns grades based on the level of participation may have a class that participates more than the one
described in this study. On the other hand, instructors who prefer a lecture style format may have a
class that participates to a lessor degree.

However, this cautionary note should not be interpreted as a dismissal of the results. Rather,
it is hoped that this study will motivate other researchers to explore this area of research with other
repeated-measures comparison studies using larger, more diverse samples. There are many questions
that still need to be answered. For example: Can this study be replicated with other, more diverse, populations and with different instructors? Results from this small sample show that introverts participate more in CMC. Which types of CMC do introverts prefer most? Can we find ways to motivate introverts to participate even more in CMC? If CMC is not the great equalizer for those who participate less, is there a way to make it so? And finally, what is it about participants who are high in dependability that makes CMC so attractive to them? The answers to these questions can only serve to add to our growing knowledge of learning styles.
A comparison study of group development

VI. References


A comparison study of group development

Educational Research Association, Montreal, Canada.


A comparison study of group development

October 2000.


October 2000.


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VII. Appendices

7.1. Appendix A

Instructor interview
Course Organization

Course XXX is a hybrid course offered on Wednesday evenings each fall. Each 3 hour class is divided into two parts. The first one and a half hours is spent discussing the previous weeks' readings and the second half of the class is spent in the computer lab examining educational software.

During the week, the instructor and students work in an asynchronous online discourse environment called Web Knowledge Forum (WebKF). The instructor poses 2 or 3 issues at the beginning of each week, and the students are expected to pursue these issues and relate them to their readings.

Course XXX is an introductory course for the Computer Applications specialty. Over 13 weeks, students study the educational efficacy of various kinds of educational software, including:
- drill and practice
- tutorials
- microworlds
- simulations
- computer conferencing
- MOOs
- Virtual Reality software
- Automatic essay-grading programs
- applications of word processing, spreadsheet and other productivity tools
- knowledge-building software (CSILE / Knowledge Forum)

The class also explore equity issues, access issues, and issues relating to privacy during the 13 weeks. Essays that are critical of educational technology are also included in the readings.

During the weekly labs, the students experiment with some of the educational software titles from the XXX library. Students are expected to critically analyze the strengths and weaknesses of computer
packages and discuss how they might best be integrated into classroom practice.

**Interview Questions**

Please discuss your teaching philosophy in terms of teacher participation and course presentation in F2F and CMC discussions.

I teach in a constructivist fashion, but I'm not convinced that my methods are superior to those who use a less constructivist style of instruction. Much of my class is concerned with the discussion of educational technology issues and I think that's frustrating for some students who are looking for "right" and "wrong" strategies for using computers in education. I try not to dominate the class discussions, or impose my own viewpoints on the students, but I don't know how successful I am.

The online discussions revolve around issues that I present at the beginning of each week. Beyond these initial few notes, I rarely contribute notes during the week. I find that if I present my opinion, it can shut down an otherwise profitable discussion. I generally begin my face-to-face classes with a summary of the previous week's online discussions followed by a brief lecture. This is then followed by either group work or whole-class discussion (in which I act as moderator). Again, I try not to dominate the f2f discussions.

**Do you feel more comfortable leading the discussion, or do you prefer to let the students take control?**

I prefer to guide the discussion, but not necessarily control it. Before a class, I always make a rough outline of the issues that I hope the class will explore during the discussion portion of the class. On occasion, students have surprised me by stumbling on more profitable lines of inquiry than the ones in my outline. So, I think it's important to give students a certain amount of latitude, and not exert too much control over the discourse. On the other hand, sometimes a conversation is obviously going nowhere, and in that case, I feel a need to step in.

**Do you usually use a lecture type method of course delivery or an open forum type delivery?**

Ideally, I'd like my classes to have a lecture element and an open forum element. I think that lectures should be brief - say 10 to 15 minutes. The open forum component usually consumes at least half of the class time.
Do you encourage open discussion in the CMC forum, or a question and answer type discussion?

In the fall of 1999, I used an open discussion format in which I provided the class with almost no guidance at all (other than to discuss the week's readings). About two-thirds of the way through the term, the students indicated that they wanted more structure. Consequently, I began each week by providing the students with a series of questions that they could use to guide their discourse. My intent was not to constrain the discourse through my questions, but to simply provide a useful starting point for discussion. I continued using this approach during the fall of 2000. However, in the fall of 2000, I became increasingly concerned that students were simply writing answers to my questions and not pursuing issues in greater depth. I haven't decided yet what to do about this problem.

Did the students in the course being studied conduct their discussions in line with your philosophy or did their discussions take on a pattern unlike other courses you have taught?

Paradoxically, I feel that the educational benefits of CMC environments are easier to explain using a cognitivist rationale than a social constructivist rationale. That is, I don't believe that online discourse is a particularly good support for the social construction of knowledge. Certainly students have access to each other's ideas in WebKF, but I rarely see learners struggling to understand each other. In fact, online discussions tend to be pretty disjoint. This is probably a function of the medium -- in CMC, the transaction costs are high, and so people often don't bother to clarify points that confuse them. The real benefits of CMC, I feel, are rooted in the individual's efforts to clearly express his or her own ideas. I suspect students learn more from their own writing (and re-writing) than the writing of their peers.

This year was marked by unusual patterns of discourse (at least in my experience) in the face-to-face component of the course. Student contributions to course discussions seemed unusually long. Some students would talk for 3 or 4 minutes at a time. Perhaps students were speaking this way for my benefit? I don't know. I prefer a rapid back-and-forth sequence of exchanges, but sometimes the discourse could be better characterized as a series of related speeches by individual students!
7.2 Appendix B

Computer experience questionnaire
Please check off the one statement that best applies to you:

How experienced would you say you are when it comes to using a computer?

_____ This is the first time I've ever used a computer for conferencing and I am unfamiliar with the keyboard.

_____ This is the first time I've ever used a computer for conferencing, but I am familiar with the keyboard.

_____ I am moderately experienced in the use of computers, both in terms of conferencing and in terms of keyboarding.

_____ I am very experienced in the use of computers. Although I do not write computer programs or develop software, I enjoy trying new software and feel comfortable using a computer.

_____ I am extremely experienced in my use of computers. I have written computer programs and/or developed software in the past.
7.3 Appendix C

Hiltz CMC preference scale
Please answer the following nine questions using the scale below:

The addition of CMC to a course:

1. Provides more student interaction _____
2. Provides better access to the professor _____
3. Allows for increased motivation _____
4. Made the course more interesting for me _____
5. Made me feel more involved _____
6. Encourages peer reviews of my comments which I find useful _____
7. Encourages comments from others which I find useful _____
8. Contributes to an overall better learning experience _____
9. Allows me to learn more _____
7.4 Appendix D

Goldberg personality scale
How Accurately Can You Describe Yourself?

Please use this list of common human traits to describe yourself as accurately as possible. Describe yourself as you see yourself at the present time, not as you wish to be in the future. Describe yourself as you are generally or typically, as compared with other persons you know of the same sex and of roughly your same age.

After each trait, please write a number indicating how accurately that trait describes you, using the following rating scale:

<table>
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<th>Inaccurate</th>
<th>Accurate</th>
</tr>
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<tbody>
<tr>
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<td>Very</td>
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<td>Quite</td>
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<td>Slightly</td>
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<td>Neither</td>
<td>Slightly</td>
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<td></td>
<td>Quite</td>
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Exhausted

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<td>Artistic</td>
<td>Generous</td>
<td>Organized</td>
</tr>
<tr>
<td>Assertive</td>
<td>Haphazard</td>
<td>Philosophical</td>
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<td>Bashful</td>
<td>Harsh</td>
<td>Practical</td>
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<tr>
<td>Bold</td>
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<td>Prompt</td>
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<td>High-strung</td>
<td>Quiet</td>
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<td>Careful</td>
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<td>Careless</td>
<td>Imperceptive</td>
<td>Reserved</td>
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<tr>
<td>Cold</td>
<td>Imperturbable</td>
<td>Rude</td>
</tr>
<tr>
<td>Complex</td>
<td>Impractical</td>
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</tr>
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<td>Conscientious</td>
<td>Inconsistent</td>
<td>Selfish</td>
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<td>Considerate</td>
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<td>Shallow</td>
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<td>Cooperative</td>
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7.5 Appendix E

Ethical Review

(Names and signatures have been removed with regard to privacy concerns)
A comparison study of group development

Expedited Review Qualification

I believe this research qualifies for an expedited review as it meets the following qualifications set out by the ethics review board:

**Qualification 1. Minimal risk**

This research presents minimal risk for the participants. I will be reviewing written participation that is part of the participants’ regular curriculum. Questionnaires also present minimal risk as they are routinely used in personality research and have not been shown to cause psychological harm.

**Qualification 2. Categories of research qualifying for expedited review**

This study meets the criteria of subsection (5) in that it involves collection of data from voice, video, digital or image recording made for research purposes.

This study also meets the criteria of subsection (6) in that it involves research on individual or group characteristics on behaviour cognition, motivation, and social behaviour.

Linda Murphy-Boyer

work: XXX-XXXX

home: XXX-XXXX

e-mail: linda@psych.utoronto.ca
Title of Thesis/Project: A comparison of rate and depth of participation by gender and personality in a face-to-face / online course.

Student Researcher and Faculty Supervisor:

Student Researcher: Linda Murphy-Boyer

Faculty Supervisor: Jim Hewitt

Department: CTL

Contact Information for Student Researcher (provide the address/numbers where you wish to be contacted and/or receive mail):

address

e-mail: linda@psych.utoronto.ca

fax:

telephone: 416-

When is Ethical Review required? An ethical review must be completed for each study that involves human subjects. Such a study involves the gathering of data about people through intervention or interaction with them or the gathering of identifiable personal information about people.

- “Intervention” includes manipulations of a person or a person’s environment that are performed for research purposes
- “Interaction” includes communication or interpersonal contact between the researcher and the subject (e.g., interviews, surveys, questionnaires).
- “Gathering identifiable personal information” includes information obtained from records, documents, or databases from which individuals can be identified.
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"Research involving human subjects" also includes research involving:

- secondary use of data (i.e., information collected for purposes other than the proposed research) that contains identifying information about a living individual, or data linkage through which living individuals may become identifiable; and

- naturalistic observation, except the observation of individuals in contexts in which it can be expected that the participants are seeking public visibility.

"Research involving human subjects" does not include the following assessment activities:

- quality assurance studies;

- performance reviews; or

- testing within normal educational requirements,

unless the activities also contain an element of research in addition to assessment.

"Research involving human subjects" does not include the following data gathering activities:

- research involving only the use of published or publicly available information or materials performances, or archival materials (including records of public interviews or performances); or

- research involving the secondary use of data (i.e., information collected for purposes other than the proposed research) that contain no identifying information.

Studies that do not involve the use of data collected from/about human subjects, or that involve the use of data collected from/about human subjects where such data are in the public domain do not require ethical review.

Please complete the following: Indicate by a checkmark below, the category into which the proposal fits.
A comparison study of group development

[ ] This study does not involve data collection from/about human subjects.

(No Ethical Review required; Ethical Review Protocol not required)

If checked, provide a brief (not to exceed one page) description of the thesis or project that includes a description of the methods of data collection that will be used.

[ ] This study involves the analysis of data obtained from/about human subjects where such data are in the public domain (i.e., either available from public archives or previously published material)

(No Ethical Review required; Ethical Review Protocol not required)

If checked, provide a brief (not to exceed one page) description of the thesis or project that includes a description of the methods of data collection that will be used.

[ ] This study involves the analysis of data obtained from/about human subjects where such data are not in the public domain (i.e., the data are not publicly available or previously published material)

(Ethical Review required; Ethical Review Protocol must be completed.)

[X ] This study involves data collection from/about human subjects.

(Ethical Review required; Ethical Review protocol must be completed)

[ ] This study involves collection/analysis of data obtained from/about human subjects AND an ethical review of the research has been completed either:

[ ] for a larger research project that includes this study, or

[ ] at another institution

(Check as many as are applicable)

(Ethical Review required; attach a copy of the Ethical Review Certificate for the previously-completed review)

______________________________  __________________
Signature of Student Researcher       Date

______________________________  __________________
Signature of Faculty Supervisor       Date
Departmental Coordinator's recommendation regarding Ethical Review:

[ ] No ethical review required

[ ] Ethical review required

______________________________  ______________
Signature of Ethical Review Departmental Coordinator       Date

If the student researcher/faculty supervisor and Ethical Review Departmental Coordinator have recommended that no ethical review is required, submit this form to the Student Education Ethics Review for the Committee Chair's final determination whether Ethical Review is required. The Committee will return a copy to the student research when completed:

[ ] No ethical review required

[ ] Ethical review required

______________________________  ______________
Signature of SEERC Chair       Date

PROCESS:

For student researchers whose studies require an ethical review, the process is as follows:

1. Complete the Statement of Intent form and an Ethical Review Protocol with the help of your faculty supervisor. NOTE THAT THERE ARE INSTRUCTIONS THAT ACCOMPANY THE ETHICAL REVIEW PROTOCOL FORM. CAREFUL ATTENTION TO THE INSTRUCTIONS WILL MINIMIZE THE REVIEW TIME REQUIRED.

2. Submit the Statement of Intent and Ethical Review Protocol to the appropriate Ethical Review Departmental Coordinator, who will conduct a pre-review prior to submission to the Student Education Ethics Review Committee (SEERC). The purpose of the pre-review is to help you make the protocol as clear and complete as possible so as to reduce the time required for review by the SEERC.
3. On completion of the pre-review, the student researcher is responsible for submitting to the SEERC the Ethical Review Protocol and all of its accompanying documentation, plus the completed Statement of Intent, the Student Researcher Checklist for Ethical Review Protocols, and the Departmental Coordinator Checklist. The SEERC is located at XXX Research Services.

4. General instructions for preparing ethical review submissions, forms, and procedures for submission of protocols for ethical review will be available beginning in late August from a variety of sources, including:

  - the Reference Desk, ground floor of the XXX library
  - departmental graduate studies administrative staff
  - the XXX XXX Web Page at XXX
  - your First Class desktop folder entitled “Student Research”

For student researchers/faculty supervisors who have determined that the study does not require ethical review, the process is as follows:

1. Complete the Statement of Intent form (including your signature and the signature of your faculty supervisor).

2. Give it to the appropriate Ethical Review Departmental Coordinator for signature.

3. If the Departmental Coordinator agrees that no ethical review is required, take or send it to the Student Education Ethics Review Committee, located at XXX XXX

4. The SEERC will return the form to the student researcher once the Committee Chair makes the final determination whether ethical review is required.

5. On receipt of the signed form from the SEERC indicating that ethical review is not required, submit a copy of the form to the XXX Registrar’s Office, Graduate Studies Unit.

6. If ethical review is required, follow the process above for studies requiring review.
A comparison study of group development

ETHICAL REVIEW: Student Researcher Checklist for ethical review protocol

Before submitting an ethical review protocol to UTRS, use the following checklist to make sure that you have completed all necessary steps. **Attach this checklist to your submission.**

[ X ] All questions on the protocol form have been answered, using the “Protocol Preparation Instructions” as a guide.

[ X ] Copies of any questionnaires, observation schedules, interview schedules, testing instruments, are attached.

[ X ] A copy of the informed consent document is attached. [If you are not using a signed consent form, the protocol should include a justification for not using one.]

[ X ] Copies of any information sheets, letters, etc. are attached.

[ X ] Copies of any recruitment materials are attached (telephone script, advertisement, flyers, notices, recruitment letters, etc.)

[ X ] I believe this research qualifies for expedited review

[ ] no

[ X ] yes (Attach a brief justification (100 word maximum) for the appropriateness of expedited review in terms of the criteria outlined in the document “Categories of research that may be reviewed through an expedited review procedure: social science and humanities research.” This document is available on the XXX Web Page at XXX

[ X ] I have filled out the Ethical Review Statement of Intent and have included

[ X ] my supervisor’s name

[ X ] contact information for me and my supervisor (the address, fax number, phone number, e-mail addresses, indicating where I and my supervisor wish to have things sent or where to be contacted by phone/e-mail)

[ X ] I have completed the pre-review with my Ethical Review Departmental Coordinator and have attached the signed Departmental Coordinator Checklist
Ethical Review Protocol

To be completed by Principal Investigators for all studies which
-involves the use of human subjects, and/or
-involves the analysis of data collected from/on human subjects where such data are not in the public domain.

Title of Project/Thesis: A comparison study of rate, amount, and depth of participation by gender and personality in a face-to-face / online course.

Principal Investigator(s) or Student and Faculty Supervisor:

Student: Linda Murphy-Boyer

Faculty Supervisor: Dr. Jim Hewitt

Department in which project/ thesis will be housed: C.T.L. Computer applications

Objectives of Study: The purpose of this research is to examine the similarities and differences in online and face to face (FTF) participation. More specifically, I would like to examine the differences in participation rate and depth of participation of males and females in a FTF course with an online component. In addition, I would like examine the relationship between personality variables and participation in both types of forums. For example, I would like to see if shy students participate more in an online environment than they do in a FTF environment.

Implications of Study: Much research is being done to determine which learning environments work best for which type of students. It is hoped that this study will serve to further that understanding.

1. Data Collection

(a) What data are being collected? (achievement scores, attitude scores, experimental test results, etc.)

Attitude scores, computer experience scores, transcription of four FTF classes throughout the term and analysis of the class’ online discussions.
(b) How will the data be collected? (Survey, questionnaire, structured interviews, observation, participant observation)

Attitudes scores are being collected via a questionnaire, computer experience scores will be collected via a survey, transcription of the FTF classes will be accomplished by videotaping the classes and analysis of the online discussions will be done by reviewing the Knowledge Forum data base that students contribute to during the term.

(c) Procedures: Please outline procedures to be followed in (a) and (b) above.

The course I will be studying has both an online and FTF component. Students are introduced to an issue in the FTF class at the beginning of the week and are required to continue their discussion in the online forum for the remainder of the week. After receiving informed consent from the participants, I would like to videotape three FTF classes throughout the term. I will also analyze participant’s online submissions for the accompanying three weeks.

Rationale for videotaping:

The act of identifying 20+ FTF contributors so they can be matched to their online contributions can only be accomplished by way of videotaping. Identification through audiotaping would be unreliable with such a large group

Right to privacy concerns:

Any students who do not wish to participate in the videotaping will be seated so that they remain outside of the camera’s sight lines. I will ensure that these students are seated in such a way so that they are not singled out as non-participants. In order to do so, I will have two to three cameras in place. One camera will not contain videotape. Participants who decide not to participate will be seated in view of this “dummy” VCR. The instructor, will not be informed as to which VCR is the “dummy” and will therefore be unaware as to which students have decided not to participate in the study. Videotapes will be erased as soon as
A comparison study of group development

they are transcribed. In the final write up, names will be replaced with numbers to allow for complete anonymity. Participation in this study will in no way affect the student’s assessment in the course. The instructor will never have access to the raw video footage, not will he see the raw data until the marks for the class have been submitted.

In addition, students will be asked to fill out a short questionnaire on computer experience and attitudes towards computers in general and an attitudes/personality questionnaire.

(d) Instruments: Please list all questionnaires, tests, observation schedules, interview schedules, etc. to be used. Attach copies where possible.

Videotaping schedule:

One class will be taped near the beginning of classes, a second will be taped mid term and a final class will be taped at the end of the term for a total of three classes. Each class is 90 minutes long. An additional practice run to set sound and light levels may be required at the beginning of the term. This practice run, if required, will not be used as data and will be erased immediately.

Online component:

Online submissions for the three weeks accompanying the three taped FTF sessions will be analyzed after the last videotaping session.

Questionnaires:

- The questionnaires will be administered mid term. The Goldberg personality scale (Attached – see Appendix 1) is one that is frequently used in psychological testing and presents little or no risk factors to the participants. It takes less than 20 minutes to complete.

- The computer attitudes questionnaire takes less than 5 minutes to complete and is also attached (see Appendix 2).

(e) Indicate what information will be taken from existing records (e.g. school records,
hospital records).

None

(f) Curriculum Materials: Where the study involves field testing of curriculum materials, please describe the materials (i.e. the substantive content) which are to be developed and tested.

None

2. Subjects

(a) Describe the subject population and give the age/grade level and the affiliation as appropriate (e.g. school, university/college students, school board employees, hospital employees, members of the public). Indicate the number of subjects to be included in the study.

Participants will be selected from a class of 20+ graduate students at XXX. This class will be taught by my supervisor, Dr. Jim Hewitt.

(b) How will the subjects be selected for inclusion in the study?

I will sit in on a class and explain the study to them personally, stressing that participation is voluntary and that their participation (or lack of) will in no way affect their evaluation in the course. I will explain the videotape arrangement and the measures in place to protect the right to privacy for those who do not wish to participate. Those students who agree to participate will be given a consent form to sign (Attached – see Appendix 3) The course instructor will not be in the room when the consent forms are distributed.

3. Data Access, Uses and Interpretation

3 of 4

(a) Who will have access to the raw data?

I will have the only access to the raw video footage. The videotapes will be erased after I have transcribed them. In addition, I will be the only one allowed to access the raw data during the term. My supervisor, the course instructor, will have access to the transcribed conversations and questionnaire data only upon completion of the term and after the final
grades have been submitted.

(b) How will confidentiality and/or anonymity of the raw data be maintained? (e.g. will names
be deleted and replaced by codes known only to the investigators; will data be stored in
locked files?)

Videotapes will be erased after they have been transcribed and names will be replaced with
identifying codes in the final write up. I will extract the data from the Knowledge Forum
class database and store it on password protected WordPerfect files on my home computer.

(c) What disposition will be made of the raw data at the end of the study? (e.g. to be stored in
data archives).

Videotapes will be erased immediately after transcription. Online submissions will be stored
in data archives at my home in password protected files for a period of three years, after
which time they will be erased.

(d) What feedback will be given to subjects and/or to those individuals who provided informed
or administrative consent?

After I have finished videotaping, I will go in to the class and thank the students for their
participation and ask them if they have any questions about the study. I will also offer to send
a summary of my findings to any students who express interest in the results of the study.
Students who express interest will be asked to leave me their name and address. Summaries
will be mailed out to them as soon as the results are written up. I have also provided a spot
on the consent form for students who are interested in this research to leave a home address
to which I will send a summary of the results.

(e) What steps will be taken to maintain anonymity of subjects and test sites in written reports?
All participants’ names will be replaced with identifying codes and the course number will
be omitted in the written report. Pseudonyms will be used to identify the instructor and the
school.
(f) What steps will be taken to alert participants to possible evaluative interpretation and to give them an opportunity to withdraw from the study? (By evaluative interpretation is meant, for example, the indirect evaluation of a teacher's professional performance or of a student's academic performance, as the result of participating in the study, where such evaluation is not an objective of the study).

I will stress that participation is voluntary and that non-participation will in no way affect their evaluations in the course. The instructor will not be in the room when the consent forms are being distributed. In addition, as stated above, any students who do not wish to participate in the videotaping will be seated so that they are outside of the camera's sight lines. I will ensure that these students are seated in such a way so that they are not singled out as non-participants. In order to do so, I will have two to three cameras in place. One camera will not be equipped with videotape. Participants who decide not to participate will be seated in view of the "dummy" VCR. The professor will not be informed as to which VCR is the "dummy" and will therefore be unaware as to which students have decided not to participate in the study.

4. 

**Informed Consent**

(a) Will informed consent be obtained from all participants?

Yes __X__  No _____

(b) Will administrative consent be obtained?

Yes _____  No __X__

(c) What steps will be taken to obtain individual informed consent and/or administrative consent?

I will sit in on a class at the beginning of the term, before any videotaping or examination of the database has taken place, and explain the study to them personally, stressing that participation is voluntary and that their participation (or lack of) will in no way affect their
A comparison study of group development evaluation in the course. I will explain the videotape arrangement and the measures in place to protect the right to privacy for those who do not wish to participate – see 3 (f). Those students who agree to participate will be given a consent form to sign (Attached – see Appendix 3) The course instructor will not be in the room when the consent forms are distributed.

(d) Will the informed consent be written? Yes ___X___ No _____

(e) What information will be given to subjects and/or others who are providing informed consent? Please attach a copy of each letter to be sent to potential participants. This letter should describe the study in lay terms, outline potential benefits/risks to participants, indicate that participants are free to withdraw at any time, outline what safeguards will be taken to maintain the confidentiality of the data and to protect participants from possible evaluation on the basis of the written report.

Consent form also provides information about the study, benefits and risks, the voluntary nature of participation, confidentiality and evaluatory safeguards. (See attached consent form – Appendix 3).

*Administrative Consent*

Administrative consent may be deemed sufficient:

a) for studies which have as their intent and focus the acquisition of statistical information and where the collection of data presents

   (i) no invasion of personal privacy;

   (ii) no potential social or emotional risk;

b) for studies which have as their intent and focus the development and evaluation of curriculum materials, resources, guidelines, test items and program evaluation rather than the observation and evaluation of persons as individuals.

Signature of investigator(s) or Student __________________________ Date __________________________

Faculty Supervisor __________________________ Date __________________________