Effect of Cooperative Structure of Small-group Online Activities on Student Satisfaction, Benefits and Use in Distance Education and an Exploration of Online Strategies

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ABSTRACT

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This study's objective is to improve the design of small-group online activities in computer-supported collaborative learning (CSCL) distance education (DE) environments. Participants were volunteers drawn from an undergraduate education course, $n=38$. Drawing on cooperative learning techniques, students in one section filled in group reflection forms and played assigned student moderator roles in online small-group activities. The level of significance is $p<0.05$. The students in the cooperative condition tended to be more active in ungraded online activity. Specifically, they tended to engage in more instructor-student interaction and informal, social student-student interaction. They also reported spending significantly more time on the course. However, they did not tend to achieve better grades in the course. Nor were there any statistically significant affective differences between the two groups. This study suggest methods by which a DE undergraduate online instructor can increase students' social activity and instructor-student interactions. This has practical implications for those instructors troubled by low online participation.

The study also includes a different perspective of the small-group activities, focusing on interpersonal dynamics. An analysis of critical incidents between group members, identifying good or poor use of online strategies, suggests that four strategies should be added to Burge's (1994) list: 1) Graceful new member entry; 2) Clarifying ambiguities related to task; 3) Coping gracefully with non-participation; and 4) Negotiating shared level of intimacy. The study concludes with practical suggestions for implementing online small-group work in a distance context.

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I dedicate this thesis to Daniel Silverman (March 5, 1968 to July 11, 1992), who never got to finish his own thesis, but inspired those of many others.

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CHAPTER 1: INTRODUCTION

General Statement of the Problem

The use of computer-mediated technologies in education and in the workplace is on the rise. These technologies allow people scattered across distance and time to communicate. They provide distance education (DE) with an unforeseen forum for rapid communication between instructors and students. Also, they may render it possible for students who have never met to work and learn collaboratively in small-groups. Consequently, they may carry the potential to address the intellectual and social isolation of DE students.

Yet, researchers (especially Eastmond, 1994) have mentioned that traditional distance education provides students with a more flexible learning environment. Furthermore, strategies that are applicable to traditional DE may not be applicable to a CSCL DE environment. CSCL DE environments rest somewhere between traditional DE and face-to-face/CSCL environments. Perhaps in recognition of this, many instructors of online DE courses arrange face-to-face workshops and even final review sessions (Hiltz, 1994; Harasim, Hiltz, Teles & Turoff, 1995).

Online small-group learning at a distance is challenging to both instructors and students for a host of factors, including: more dependence between learners and consequently, less flexibility; no ability to deal with problems in a synchronous face-to-face environment; and difficulties coordinating tasks and activities. This study aims to ameliorate problems in online small-group learning through careful instructional design.

With respect to the instructional design of educational online environments, two current concerns evidence themselves in the literature: 1) the design of the learning activities (Davie, 1989; Feenberg, 1989, 1993; Hiltz, 1988, 1994; Harasim, 1987, 1993; Tagg, 1994); and 2) the design of the conference structures (Feenberg, 1993; Harasim, 1993; Wells, 1993; Burge, 1994; Tagg, 1994). The design of the learning activities and the

conference structures is arguably more critical in online environments than in face-to-face ones (Harasim, 1993).

More specifically, a current instructional design issue of considerable importance is how to design groupwork using computer-mediated communication (CMC) (Wells, 1993). Research (Harasim, 1987) indicates that intentionally designing the online environment may be beneficial for collaborative learning by facilitating peer interaction, active participation, and divergent thinking.

This study addresses some issues raised in designing and implementing online small-group activities in a DE context. It falls within the scope of CSCL, a field exploring groupwork mediated by computer technology. More specifically, the study investigates the effect of the design of small group activities (cooperative versus conventional) on three aspects of student acceptance of CMC: student satisfaction, achievement and use.

The study also provides another perspective on the small-group activities, focusing on the interpersonal dynamics of team members. This aspect of the study looks at the development and use of online strategies to improve interpersonal dynamics. This study has direct and immediate relevance to the design of small-group activities in online distance education (DE) environments.

Design of Small-group Activities

Meta-analyses suggest that cooperative learning structures may facilitate achievement, productivity, transfer of learning, motivation, and time on task (Johnson & Johnson, 1989; Slavin, 1990). Also, research indicates that cooperative learning in schools may increase academic skills, develop social skills, assist in mainstreaming of handicapped students, and increase self-esteem. Designing the small-group activities following cooperative learning may be a useful element of the instructional design.

Two aspects of cooperative learning were drawn on: 1) reflection on group productivity; and 2) training in interpersonal and cognitive skills. Students in the cooperative group reflected explicitly on their group's productivity, filling in online group

reflection forms. As well, students in the cooperative group were instructed regarding group maintenance roles, actually playing student moderator roles in one activity. In the implementation process, two aspects were added to the original treatment. First, in the second small-group activity the students in the cooperative condition were assigned learning partners within the groups. Second, in the final online small-group activity -- the debate -- the students in the cooperative condition were provided with suggested sub-deadlines.

This study investigates the effect of the cooperative learning techniques on student satisfaction, online activity and achievement. These outcomes reflect the three broad components of the acceptance of the computer-conferencing (CC) delivery mode identified by Hiltz, Kerr & Johnson (1985) cited in Hiltz (1994), namely student use, satisfaction and benefits, .

Online Interpersonal Dynamics and Strategies

Unique attributes of the online environment may mediate the effect of cooperative learning techniques developed in face-to-face contexts. Consequently, this study investigates the use of online learning strategies in the context of small-group interpersonal dynamics. Learning strategies for the online environment would reasonably be expected to be different from those used in face-to-face educational contexts. Research (Eastmond, 1994; Burge, 1994) suggests that this is the case.

Burge (1994) generalizes a taxonomy of learning strategies from the face-to-face context (Tessmer & Jonassen, 1988) to the CSCL educational environment. The results indicated that learners in CSCL environments need to apply all the strategies in the Tessmer & Jonassen taxonomy, as well as Meta-context Managament Strategies. Meta-context refers to interpersonal dynamics and each member's sense of presence and purpose within them. For example, learners in an online environment need to learn how to temporarily withdraw from online activity gracefully. This kind of strategy has no counter-part in a face-to-face context.

The reader should remain aware that while the first type of analysis strives toward conclusions, the second type is exploratory. This research approach reflects the stage of this field, which is at a point where many questions have been asked and not answered, and many questions have not yet been raised.

Significance of the Study

This study makes a theoretical contribution related to adult learning principles and cooperative learning in an online DE delivery mode. Based on prior research and theory, I hypothesized that the cooperative techniques would be beneficial. The online DE environment has certain aspects that render group work and learning difficult. Cooperative learning techniques may provide a method to improve interpersonal dynamics, student satisfaction, active learning and achievement within the online environment. On the other hand, adult learning principles and motivation suggest that they might be de-motivating. In particular, some research suggests that adult learners are more motivated by the ability to develop their own task objectives and to be free to explore issues from a variety of angles (Velayo & McKeachie, 1994).

The results of this study may have an impact on the instructional design of CSCL environments and related materials to support group work, following the research direction proposed by Wells, 1993. This study may assist educators in designing online activities that support small-group learning. If the group reflection forms and playing of student moderator roles positively influences student use, satisfaction and/or achievement, this would have practical implications to educators who could use these or similar techniques to improve the small-group work in their courses.

Another practical contribution of this study may result from exploring the unique attributes of the CSCL environment and the nature of the interpersonal dynamics that develop within it. The study may illustrate the usefulness of Burge's concept of online

meta-context management strategies. It may also be possible to add to Burge's list of meta-context strategies.

Engaging in groupwork online presents its own challenges to the students and moderators. It is even more challenging in the pure DE CSCL delivery mode than in the CSCL/face-to-face combined delivery mode. This study has practical implications to instructors and developers of CSCL DE. It also has theoretical implications on adult learning principles, cooperative learning and DE.

Operationalization of Terms

Santaro (1995) defines CMC to include three broad categories: computer conferencing, on-line public accessing of information, and computer-assisted instruction. The inclusion of computer-assisted instruction in a definition of CMC is unnecessary and obfuscates the issues involved in the first two categories. Other definitions (Burge, 1994; Mason & Kaye, 1989) have avoided this confusion. However, Santaro's focus on the type of learning environment, rather than on the underlying technology, is effective and appropriate. Therefore, in this proposal, CMC is operationalized to include two broad categories: computer conferencing and online public accessing of information. Following Santaro, the category of computer conferencing (CC) includes the use of e-mail (inclusive of listservs and newsgroups) and bulletin-board systems, in addition to the use of those systems specifically designed for computer conferencing. This definition, unlike many others as exemplified in Hiltz (1993), does not depend on the technology — it would include studies in which a server is not available. The central issue in computer conferencing is direct human-human communication with the computer acting as a transaction router and as a provider of storage and retrieval functions. The computer has a more active role in the second broad category, the online public accessing of information — it acts as the repository or maintainer of organized information. The information, however,

originates with human contributors and is utilized by human retrievers. This category includes many uses of the Internet, such as accessing databases.

Many researchers in the field use the terminology computer-mediated communication, even when writing up studies focusing on online collaborative learning and work. In general, this study will use the terminology of CSCL to emphasize the collaborative processes. Computer-mediated communication is evidently a broader term, and CSCL is more suited to the focus of this study.

Collaborative learning has been defined differently by many people. On one hand, there are narrow definitions whereby only tasks that require the input of all group members can be considered collaborative (Cohen, 1994). These definitions are too narrow for the context of this study, as they exclude many learning activities that occur in groups. This study shall use the term collaborative learning in a much broader sense as in Bruffee (1993):

> Collaborative learning gives students practice in working together when the stakes are relatively low, so that they can work effectively together later when the stakes are high. They learn to depend on one another rather than depending exclusively on the authority of the teacher. They learn to construct knowledge as it is constructed in the academic disciplines and professions — the knowledge communities that students aspire to join when they attend colleges and universities. And they learn the craft of interdependence.
> (p. 1)

CHAPTER TWO: LITERATURE REVIEW

Distance Education and Two-way Communication Technologies

Distance education has traditionally been characterized by a separation between the learner and both the designer/teacher and other learners (Holmberg, 1977; Rumble, 1989). Electronic links between the learner and teacher as well as other students are increasingly present in the DE context, ranging from the electronic transmission of assignments to instructors to organized online small group peer work.

Researchers have suggested that computer-mediated technologies may help address some of the disadvantages of the social and intellectual isolation traditionally characteristic of DE (Keegan, 1986). For example, they may potentially provide the DE student with a community of learners and a forum for active learning (for example, Jonassen, Davidson, Collins, Campbell & Hagg, 1995). On the other hand, the flexibility characteristic of traditional DE is advantageous to most of its consumers (Brookfield, 1982). Consequently, the introduction of interactive communication technologies may lead to disadvantages for some DE consumers. Cautious research and development is key to the appropriate and effective use of CMC in a DE environment (Gunawardena, 1992).

Nipper (1990) describes three generations of distance education: 1) the first is the traditional paper-based correspondence model; 2) the second integrates the use of one-way communication technologies, such as videos and broadcast media; and 3) the third incorporates two-way communication technologies such as computer-mediated communication. The third generation creates the possibility of bringing together the DE learners and teacher.

To respond to problems of high attrition rates and only moderate levels of academic achievement associated with distance study, researchers have focused their efforts on reintegrating the separate acts of teaching and learning through institutional support for learning activity (Bernard & Naidu, 1990). Keegan (1986) contends that reintegration demands institutional support for both learning and interpersonal communication.

Documented applications of increasing interpersonal communication in distance education include: the use of computer-mediated communication, audio-teleconferencing, toll-free telephone lines and voice-mail. This study is focused on the use of computer-mediated communication to increase interpersonal communication in distance education.

Computer-mediated Communication

Interested readers are referred to the following reviews of computer-mediated communication: Kraemer & King (1988), McGrath & Hollingshead (1994) and Sproull & Kiesler (1991). According to Burge (1996), the two books about CMC that readers 'must' have are *Learning Networks* (Harasim, Hiltz, Teles & Turoff, 1995) and *Alone but Together* (Eastmond, 1995).

CMC has a variety of forms in DE. For example, many DE instructors use it to facilitate the transmission of information (i.e. feedback on assignments and making announcements). This use of CMC speeds up the process of communication that generally already exists between the instructor and students in DE. Other uses of two-way communication technologies support teacher-student and student-student interactions, potentially bringing a greater level of interpersonal communication.

Harasim, Hiltz, Teles & Turoff (1995) provide a useful categorization of models or learning approaches in educational networks, distinguishing between learner-centered and teacher-centered approaches. They describe seven models, namely electure, ask-an-expert, mentorship, tutor-support, access to relevant information, peer interaction and structured group activity. The first four are teacher-centered approaches whereas peer interaction and structured group activity are peer-centered.

Teacher-centered approaches do not necessarily suit an online environment. Initial research (Haile, 1986 cited in Harasim, 1987) indicates that computer conferencing activities should follow a group learning approach and be largely learner-centered. Harasim (1987) remarks that unlike the traditional classroom, the instructor simply cannot be present at all times, and thus the environment is naturally learner-centered. In particular, she

suggests that it is not an appropriate environment for the delivery of instruction. CMC naturally moves the teacher from transmitter of knowledge to facilitator (Romiszowski & de Haas, 1989 cited in Jonassen, Davidson, Collins, Campbell & Haag, 1995; Gunawardena, 1992; Lenert & Harris, 1994; Jonassen et al, 1995).

Research in the workplace context similarly suggests that teacher-centered approaches are unlikely to be successful. Research indicates that CMC breaks down traditional authority structures (Sproull & Kiesler, 1991). Sproull & Kiesler synthesize research that suggests that 1) participation is more equal in online environments, 2) people change their stances on decisions more frequently, 3) it is harder for a group to reach consensus via CMC than in face-to-face discussions, and 4) groups communicating online tend to make more unconventional and riskier decisions than do the same groups in face-to-face discussions.

Depending on the context, there are advantages and disadvantages of this breakdown of traditional authority structures. Although it may lead to less efficient decision-making procedures, it may also encourage dialogue and group learning. Since elaboration has been shown to be linked to learning (Webb, 1989), the increased amount of discussion before reaching agreement should increase the amount of learning. Furthermore, participants who are marginalized in one way or another (for example, minorities, women, newer employees) may be freer to participate because the authority structures that normally exclude them from full participation are broken down.

Given research in both the educational and workplace contexts, learner-centered approaches would likely be more effective than teacher-centered approaches in an electronic network. Specifically, the literature suggests that CMC is most suited to support group communication and group learning (Haile, 1986 cited in Harasim, 1987; Harasim, 1987, 1993; Feenberg, 1993; Kaye, 1990; & Davie & Inskip, 1992).

Collaborative Learning & DE

The use of CMC and other novel technologies may widen the DE clientele by increasing interpersonal communication, as discussed above. On the other hand, Eastmond (1994) cautions that collaborative online discussion may negatively affect some students used to traditional DE environments. In one study, he discusses some difficulties that those students familiar with DE experienced with online work. Some DE students may need more flexibility than afforded by the use of online collaborative learning. DE students sometimes have special needs. Many have outside time constraints that can impinge on their availability to study at the same pace as do others. The flexibility of traditional DE allows them to complete their work without coordinating their activity with other students.

Eastmond (1994) suggests that "Course structure and activities should maximize interactivity, collaboration, active participation, reflection and self-direction." However, a tension exists between supporting collaborative, interactive learning and at the same time encouraging self-direction. The need to encourage self-direction at the same time as collaboration are discussed frequently in the CMC literature, yet how to meet both simultaneously, particularly in the distance context, has not been addressed at any length.

Introducing online collaborative learning decreases the independent nature of distance study, even when the communication is asynchronous as opposed to in real-time. The nature of collaborative learning, whether on or off-line, brings with it the need for each individual to lose some flexibility in order to coordinate activity with other members. In online asynchronous activities, it has often been noted that students feel pressured to login and keep up with the flow of conversations, feel out of sync with the environment, and do not know whether to respond to messages if the conversation has moved beyond that topic. This reflects the pressure students feel to be in pace with their classmates, distant though they may be. Although the online environment is asynchronous, it is not a-temporal (Hiltz, 1986).

Online small-group learning/work is even less flexible than online seminars. Promoting dialogue amongst larger groups of students differs from small-group learning/work (Gunawardena, 1992; Harasim, Hiltz, Teles & Turoff, 1995). Larger class discussions are similar to seminars in traditional face-to-face contexts. The pressure to participate regularly in online seminars is lower than in small-group activities. If a student does not participate in an online class discussion for a week, it is possible that no single student will notice, whereas if four students are working in a group together and one person does not participate, the other team members will notice and frustrations may grow. In online small-groups, students need to coordinate their activity at different times, a particularly challenging task. Students in small-groups cannot simply finish online assignments early, or decide to hand them in late. They depend on each other to accomplish the tasks. This interdependence decreases each team member's independence.

Small-group work has its own advantages with respect to learning, but poses considerable challenges in a DE context. Gunawardena (1992) discusses the difficulties associated with DE small-group work as opposed to larger class discussions, and concludes that she may never again moderate small-group work at a distance unless the technology is such that access will not pose considerable difficulties. Cautious design and development is called for in order to make small-group activities viable at a distance.

A Research Approach: Drawing on Face-to-face Literatures

Hiltz (1986) hypothesizes that CMC learning environments can provide more than an emulation of face-to-face learning in the traditional classroom. Harasim (1987) concludes that CMC learning environments can provide qualitatively different learning environments than exist face-to-face. She maintains that online group learning necessitates a new pedagogy; therefore, she does not suggest that developers turn to the literatures relevant to group learning in face-to-face contexts for guidance in developing these online collaborative learning environments.

Other researchers (Feenberg, 1989; Kaye, 1990; Hiltz, 1986; and Scardamalia & Bereiter, 1994) echo the need for a new pedagogy to support group learning in computer conferencing educational environments. Memorably, Hiltz (1986) suggests that developers should take advantage of the unique attributes of the online environment and create novel learning environments that capitalize on these attributes. Feenberg (1993) states that conferencing dynamics should be examined within their own unique context since extrapolating from face-to-face contexts may be misleading. This approach implies that in developing online environments one should not draw on available literatures for guidance, but instead should focus on the novel possibilities afforded by the environment.

On the other hand, Davie (1989) suggests that it should be helpful to look at the literature on small human groups to shed insight on how CC systems can support group discussion or problem solving. Yet researchers in CC educational environments have not followed this advice. Meanwhile, the CMC groupware literature is the most developed CMC literature available. Researchers in groupware (Gallupe, Dennis, Cooper, Valacich, Bastianuttie, & Nunamaker, 1992; Anson, Bostrom & Wynne, 1995) have drawn on theories of groupwork, and on techniques developed in face-to-face contexts, in order to test their applicability in an online environment. This approach has led to some success in indicating similarities and differences between the two environments. In the educational context, researchers have largely ignored the available literatures outside of CC educational research, and are guilty of 'centripetal citation' (Burge, 1994).

A compromise between developing entirely new learning environments and drawing on group learning techniques from face-to-face contexts is emerging in the literature (Kaye, 1990; Harasim, 1993; Burge, 1994). With respect to CSCL DE environments, Kaye (1990) suggests that a new instructional paradigm will develop. Features of independent study and group-based learning will be the basis of the new paradigm. Harasim (1993) suggests that although group learning techniques from face-to-face education may provide some guidance, they will need to be reformulated to suit the online environment. She

indicates that currently there are two problems in transferring group learning techniques: 1) Students are working together, but at different times and in different locations. This demands reformulation of the face-to-face group learning techniques; and 2) The systems are not yet customized for specifically educational communication. Drawing on other fields does not necessarily exclude recognition of the unique attributes of the online educational environment. Researchers in the field can both draw on the findings of other fields while maintaining their focus on unique aspects of the educational environment (Burge, 1994).

The analysis of the literature on CMC and group learning in educational contexts revealed that many researchers argue that computer-conferencing is an ideal forum for group communication and group learning. However, many researchers (Harasim, 1987, 1993; Hiltz, 1986; Scardamelia & Bereiter, 1994) strongly contend that it is impossible to transfer techniques from face-to-face to CC. Evidently, transferring activities directly is not possible given the unique attributes of the computer-conferencing educational environment. However, that does not justify ignoring the variety of available literatures on group learning techniques when developing group learning techniques for the DE CSCL environment. Instructional designers of online educational environments can draw on techniques that are tried and tested in the face-to-face context, and attempt to modify them for use in the CC environment, rather than develop completely new frameworks. At the same time, research in CSCL should investigate those aspects of the online environment that render it unique and capitalize on them.

Cooperative Learning & CMC

This study draws on the small-group literatures to help design the online learning activities. In pursuing research in the youthful field of CC, there are several related areas of research upon which one can draw. Researchers (Kaye, 1990; Savard, Mitchell, Abrami, & Corso, 1995; Riel, 1996) have suggested that cooperative learning structures might provide guidance. Meta-analyses suggest that cooperative learning structures may facilitate achievement, productivity, transfer of learning, motivation, and time on task (Johnson &

Johnson, 1989; Slavin, 1990). Also, research indicates that cooperative learning in schools may increase academic skills, develop social skills, assist in mainstreaming of handicapped students, and increase self-esteem. However, there are few reported attempts to implement cooperative learning structures into the online environment.

Riel (1996) does report on the development of Learning Circles in an online environment. Sharan & Hertz-Lazarowitz's (1979) group investigation model is the basis of Learning Circles. A Learning Circle electronically links several classrooms that interact to accomplish a shared goal. Learning Circle interaction lasts four months. Riel distinguishes this group investigation model from that of cooperative learning in two main ways: 1) the communication patterns are different because the nature of asynchronous communication allows the students to interact with many different groups without chaos that would occur in a face-to-face context; and 2) the teachers work together to develop the overall plans, and no single teacher has control over the activities. She suggests that a network of researchers should conduct a study of cross-classroom collaboration, analyzing both the network level and the effect on the individual students within each classroom.

Cooperative learning structures may ease some of the difficulties in engaging in online small-group work. In particular, cooperative learning structures might help students coordinate their online activity, improve their attitudes toward group work, and increase their satisfaction with the online environment and the course. They might increase students' learning of the course content. On the other hand, it is possible that cooperative learning structures will not be helpful in an online environment due to the lack of face-to-face contact. Johnson, Johnson & Johnson-Holubec (1993) emphasize the importance of face-to-face contact in cooperative learning.

With adult learners the use of cooperative learning structures might even have negative effects, de-motivating them and unnecessarily adding to their workload. Adult learners may be more motivated by the ability to develop their own task objectives and be free to explore issues from a variety of angles, in which case designers of online

environments should deliberately leave the learners fairly unrestricted (Velayo & McKeachie, 1994). Adult learners may resent the imposition of external structures to assist their group work — they may prefer to develop their own strategies. This may be further exacerbated in the context of distance education students, who are used to a higher level of flexibility and independence than are regular students.

It is possible that the cooperative structures will decrease the DE student's feeling of independence, and consequently, motivation. Students who are habituated to traditional DE environments may react differently to the cooperative structures than do students used to traditional classroom teaching. One of the benefits of the online environment is that it is more flexible relative to traditional face-to-face classroom. This may be motivating for adult learners. In a DE course, however, it imposes structure on something that was not structured before. Wells (1993) suggests that students familiar with independent study in a DE environment will need to be convinced that the benefits of peer-peer interaction outweigh the additional time demands. Similarly, Eastmond (1994) discusses the finding that students who primarily took DE courses tended to find the environment restrictive, whereas students who were used to face-to-face contexts tended to find it freeing. The cooperative learning structures might de-motivate those learners habituated to a high degree of flexibility and independence in learning, rather than dependence on others.

The effect of cooperative structures in online group activities may depend partially on whether the online environment is the main delivery medium or is an extension of the classroom. It may be more difficult for students in distance delivery mode to coordinate activity with one another, since they do not have the opportunity to meet face-to-face. The cooperative structures might be very useful in assisting the group members to work together smoothly. It is possible that in a mixed CSCL delivery mode the cooperative techniques may be unnecessary, whereas in the DE CSCL mode they may help allow the group work to be successfully completed. In a mixed CSCL delivery mode graduate-level

course offered at Concordia University in the fall semester of 1995, one student reacted to the debate activity, which was actually designed with a great deal of latitude, as follows:

> One thing I noticed was that in our group we seemed to want to get onto the deeper discussion of how we saw ID and how constructivism fits into the picture. Laura had typed in alist of questions that could have kept us going for a while. However instead of being constructivist and getting on with this discussion we were locked into completing all the steps of the debate process as originally planned. Like it or not we became a little limited by the framework within which we had to operate. By the time we had the assignment steps all completed we had run out of steam. Note I say steam not ideas. Sarah
> (Online message, December, 1995).

It is not possible to investigate the differences between DE and mixed CSCL delivery modes within this study. The scope of the study does not extend beyond DE CSCL environments.

Design of Cooperative DE Online Small-group Activities

This study focuses on the design of the online activities, drawing on cooperative learning structures. Cooperative learning suggests the importance of training students in interpersonal and cognitive skills. It also promotes group reflection on group productivity. This study draws on these two aspects of cooperative learning, exploring the effects of assigning student moderator roles to students during the small-group activities and of students filling out online group reflection forms at the end of each small-group activity.

Research in cooperative learning suggests the usefulness of reflection on group productivity. In this study, students in the cooperative group filled out online group reflection forms following the completion of the small-group activities. The measure was developed from Abrami, Chambers, Poulsen, de Simone, d'Apollonia, & Howden (1995)'s measure of group productivity in a face-to-face context, suitably modified for the online environment.

Also, the cooperative learning literature suggests that training students in interpersonal and cognitive skills is beneficial. One technique is to assign roles for skill practice, and to rotate the roles amongst team members (Abrami et al, 1995). In an online environment, many interpersonal and cognitive skills have been assumed to be the domain

of the moderator, who largely takes on responsibility for functions commonly carried out by team members in face-to-face contexts. Feenberg (1993) has developed a useful typology of functions performed by the moderator along three main dimensions: contextualizing, monitoring functions and meta functions. Consideration of the interpersonal and cognitive skills needed to carry out group work as outlined in cooperative learning (Abrami et al, 1995) reveals that many of the tasks defined as monitoring tasks are considered interpersonal skills (group maintenance roles) and many meta tasks are similar to cognitive skills needed to carry out group work in face-to-face contexts (task roles).

Cooperative learning suggests that performing many of the moderator roles might be beneficial to students. Similarly, CSCL researchers (Harasim, 1993; Burge, 1994; Tagg, 1994) have suggested that students can at least partially fulfill the moderator role with potential increases in achievement and motivation.

Although research into the role of leadership in small group-work online in the organizational context has not been linked to the issue of moderator responsibility in educational environments, it may provide further insight into the nature of the moderator role. Leaders and moderators take responsibility for many group tasks so that the group can attain the shared goals. Assigning a leader in group decisions has proven equivocal in organizational contexts possibly due to the somewhat anarchistic online environment that encourages a greater equality in participation (Sproull & Kiesler, 1991). One solution may be to divide the leadership responsibilities amongst different team members.

Bales (1954) investigated the division of functions between participants that emerges. In almost all groups, there are process and task leaders, and rarely are these the same person. The proper division and exercise of leadership and participation roles is key to the effective working of groups (Bales & Fikes, 1982). They also argued that this might be controlled or facilitated by constraints or supports of the medium of interaction. Olson, Card, Landauer, Olson, Malone & Leggett (1993) argue that developing the technology supporting computer-supported cooperative work (CSCW) to support the proper division

and exercise of leadership might increase the functionality of CSCW. Similar arguments have been put forth by Dicks (1992) regarding the need to focus on the design of the CSCW environment to take over some tasks that are have been traditionally handled by human beings, including possibly the moderator role (Dicks, D., personal communication, December 1995). In the meantime, it is critical that students manage some of the group process and task responsibilities engendered in online small-group work. Knowledge derived from studies concerning student moderator roles may inform the work of designers of CSCW environments.

With respect to training students in interpersonal and cognitive skills, there are differences between the skills needed in a CC environment and those needed in a face-to-face context (Burge, 1994). It is not viable to train students in an online environment in only those interpersonal and cognitive skills that are appropriate to face-to-face contexts.

Turning to the moderator roles provides direction as to which face-to-face skills are needed, yet there are moderator roles a student should not perform (Tagg, 1994; Hiltz, 1994). There are some tasks that students could carry out in face-to-face contexts that they would have difficulties performing online. For example, setting the agenda is a challenging task for students in a small-group, possibly due to the asynchronicity of the environment (Harasim, 1993; Lundgren-Cayrol, 1996).

This research will explore the effects of assigning student moderator roles to students during the small-group activities. Tagg (1994) has developed a typology of moderator functions that students can and cannot do in online seminars. Tagg's model appears useful in the case of an online seminar, where one student's entire task is to moderate the seminar, but does not appear generalizable to other online activities. The review of the literature did not identify an appropriate model to divide the moderator function between instructor and student. Hence, the researcher developed one for the purposes of this study (Appendix A).

In summary, this study looks at the effect of group reflection forms and the playing of student moderator roles on student online activity, achievement and satisfaction.

Research hypotheses: The following hypotheses are investigated:

1. College undergraduates in a CSCL DE environment with cooperative structure of small group activities will achieve higher results than those in a CSCL DE environment with conventional structure of small group activities.

2. College undergraduates in a CSCL DE environment with cooperative structure of small group activities will be more active online than those in a CSCL DE environment with conventional structure of small group activities.

3. College undergraduates in a CSCL DE environment with cooperative structure of small-group activities will be more satisfied with and have more positive attitudes about the online environment and collaborative learning than will those in a CSCL DE environment with conventional structure of small group activities.

Online Strategies within Interpersonal Dynamics

This study presumes that the online environment has unique characteristics that may affect the usefulness of face-to-face techniques in the small-group activities. For this reason, the study also considers the nature of the interpersonal dynamics in the small groups, focusing specifically on online strategies that improve interpersonal interaction.

Hiltz (1993) argues that the online environment has unique aspects that render it qualitatively different from the face-to-face context. Other researchers have followed this line of reasoning, and accumulated a few characteristics considered to be unique:

1) the asynchronicity of the environment (Harasim, 1987);

2) the creation of a collaboratively developed and dynamic text, that renders CMC a good space for dialogue, debate and conversational learning (Mason & Kaye, 1989);

3) the use of writing as the primary means of both learning and teaching, such that CMC may encourage metacognitive skills (Harasim, 1990) and may be a good environment to sharpen analytic and verbally expressive skills.

Abrami & Bures (1996) argue that DE CMC environments are characterized by both asynchronous interaction and asocial interaction, where asynchronous refers to interaction at different times, and asocial refers to interaction that is not generally face-to-face. Abrami & Bures suggest that the consequences of asocial interaction on collaborative learning should be investigated. In a pure DE mode, learners do not generally have the opportunity to engage in face-to-face interaction, but rather depend solely on the asocial interaction of the online environment. Students and instructors cannot use face-to-face interaction to complement the online activity, but rather, can only interact online. The consequences are many. For example, work that may be easier to conduct face-to-face must occur online (i.e. synthesizing individual contributions into a group response). As well, if interpersonal problems occur on line, students cannot discuss them face-to-face. Strategies may well differ between the DE and mixed CSCL delivery modes. In this study, the effect of the lack of face-to-face communication on collaborative learning will be considered. Research indicates that interpersonal dynamics in the CSCL environment may well qualitatively differ from those in the face-to-face contexts both in educational and organizational contexts (Bruce, Peyton, & Batson, 1985; Slatin, 1989; Brown & Duguid, 1991; Sproull & Kiesler, 1991; Scardamalia & Bereiter, 1994).

These and other unique attributes of the CMC environment may make different demands on learners. Some researchers (Eastmond, 1994; Burge, 1994; and Velayo & McKeachie, 1994) have taken a proactive approach with respect to these unique attributes. They investigate learning strategies in an online environment that may help users deal with these unique attributes. In this way, perhaps it will be possible for students to engage in collaborative learning online as easily as in face-to-face contexts.

Eastmond (1994) argues that learners carry some strategies into the online environment from face-to-face contexts, modifying them appropriately, but also they develop new ones. Burge (1994) attempts to generalize a taxonomy of learning strategies from the face-to-face context (Tessmer & Jonassen, 1988) to the CSCL DE educational

environment. Tessmer & Jonassen's taxonomy consists of two major categories of strategy — primary and support — that support four learning functions, namely processing information, interacting with learning resources (human and material), maintaining a productive mental state, and monitoring general progress. The primary category of strategies are for cognitive processing functions: focusing on activities to recall, integrate, organize, and elaborate information, and the active study skills and reading for making notes from and reading printed materials. The secondary strategies are for metacognitive functions: Managing one's state of mind and assessing the methods used for learning.

In Burge's (1994) study, two graduate-level education courses were considered. Both instructors and twenty-three students were interviewed at the beginning and end of the course. For the first interview, the formulation of questions was based on Tessmer & Jonassen's (1988) taxonomy of learning strategies. After the first interview, transcripts were analyzed to identify emerging areas of relevance and to develop questions for the second set of interviews from researcher questions. Online messages were read, prompting more questions and ideas for the formulation of questions for the second round of interviews.

The results suggested that learners in CSCL environments carried out most of the learning strategies in the Tessmer and Jonassen (1988) taxonomy, suitably modified for the online environment. Certain stressors of the online environment were identified, suggesting the necessity of online learning strategies that differ from those in the face-to-face context. Perhaps due to the lack of face-to-face contact (asocial interaction) or the asynchronous nature of the environment, seven main stressors of the online environment were identified: 1) having to use cognition and affect management skills simultaneously; 2) manage loads of information; 3) decide why, when, and how to contribute; 4) not getting timely or useful peer messages; 5) feeling out of sync with class discussions; 6) fearing loss of valuable ideas; and 7) having to decide quickly whether to stay in cognitive synchronicity with the focus of class discussion.

Burge's (1994) results indicated that another group of strategies — Meta-context Management — should be added to the taxonomy to reflect the above stressors. The meta-context refers to the interpersonal dynamics and each individual members' sense of purpose and presence within them. Burge's findings suggest that meta-context management strategies differ between the CSCL and the face-to-face contexts, not only in type, but also in importance.

Burge's (1994) results suggested that the key strategies for handling interpersonal dynamics in CSCL environments revolve around two factors — involvement and temporary withdrawal (See Table 1). Eight main strategies for involvement were isolated, namely community building, negotiating personal and group goals, establishing behavioural norms and standards for message threading, claiming attention, exercising choice, giving support, resolving conflicts, and expressing thinking-in-progress, insights, and conclusion. Three main strategies for temporary, but graceful, withdrawal, were identified — giving notice of that intent, letting go of messages or transferring them to an archive, doing intensive reflective thinking. Two strategies for reentry were identified, namely accurately analyzing the state of cognitive synchronicity of the discussion and deciding on a focused contribution. This tabulation is not exhaustive (Burge, 1994) and should be further tested and developed.

Table 1

Online Meta-context Management Strategies (Burge, 1994)

Online Meta-context Management Strategies
Strategies related to Involvement
negotiating personal and group goals
establishing behavioural norms and standards for message threading
claiming attention
exercising choice
giving support
resolving conflicts, and
expressing thinking-in-progress, insights, and conclusion.
Strategies related to Temporary Graceful Withdrawal
giving notice of intent to withdraw
letting go of messages or transferring them to an archive
doing intensive reflective thinking
Strategies related to Reentry
accurately analyzing the state of cognitive synchronicity of the discussion
deciding about a focused contribution.

The greater importance of meta-context management strategies in a CSCL environment than in a face-to-face environment may be related to the increased importance of meta-communication in the online environment, as the tacit cues that learners are familiar with in the face-to-face context are not present (Feenberg, 1993). Of considerable interest to the researcher is an investigation of cues that are developing in this environment. Feenberg argues that the only one available in the online environment is silence, "a message that is both brutal and ambiguous" (p. 180) but also acknowledges that they may be in the development stage. Learners appear to be developing strategies unique to the CSCL environment. There are potentially two problems in the application of meta-communication strategies: not only do members of a conference not know how to control the expression of tacit cues in this medium; they also do not know how to read those left either deliberately or involuntarily by other team members.

This study investigates meta-context management strategies, which appear to partially reflect unique characteristics of the online environment (Burge, 1994). This aspect of the study provides another perspective on the small-group activities than afforded by the analysis of the effect of cooperative techniques on student use, satisfaction and

achievement, examining in greater detail the interpersonal dynamics of the team members in small groups. The objectives are: 1) to explore the use of meta-context management strategies in a CSCL DE environment; 2) to build on Burge's (1994) list of meta-context management strategies in a CSCL DE environment; and 3) to provide another perspective on the small-group activities.

Hypotheses and Objectives

In summary, the literature review suggests the importance of conducting research related to the design of online small-group activities. Bringing cooperative techniques into online small-group activities may positively influence students' acceptance of CSCL. However, the online environment has unique characteristics that may mediate the effect of face-to-face cooperative learning techniques on the outcome variables. One aspect of this study focuses on the direct effect of the cooperative learning techniques on student use, satisfaction and achievement; the other aspect investigates the use (and failure to use) online learning strategies in interpersonal interactions. These investigations are complementary in that the latter provides a more in-depth description of the interpersonal dynamics between team members.

The hypotheses are as follows:

1. College undergraduates in a CSCL DE environment with cooperative structure of small group activities will achieve higher results than those in a CSCL DE environment with conventional structure of small group activities.

2. College undergraduates in a CSCL DE environment with cooperative structure of small group activities will be more active online than those in a CSCL DE environment with conventional structure of small group activities.

3. College undergraduates in a CSCL DE environment with cooperative structure of small-group activities will be more satisfied with and have more positive attitudes about the

online environment and collaborative learning than will those in a CSCL DE environment with conventional structure of small group activities.

The objectives are as follows:

1. To explore the use of meta-context management strategies in a CSCL DE environment.

2. To build on Burge's (1994) list of meta-context management strategies in a CSCL DE environment.

3. To provide another perspective on the small-group activities, focusing on the interpersonal dynamics of students learning in small-groups.

CHAPTER THREE: RESEARCH METHOD

Sample Selection & Procedures for Human Subject Projection

Description of Sample

The sample used were volunteers enrolled in an undergraduate DE course offered though Concordia University in Canada. The course has no prerequisites, and although it is a 300-level course, first-year university students may enroll in it. (In Québec, first-year university students are equivalent to second-year university students in the U.S.A. and in the rest of Canada). Therefore, the students vary from first-year university students to third-year university students in Quebec.

The final sample size was $n=38$. Altogether, there were thirty women and eight men. In the end, there were three men in the control group, and five in the experimental, with fifteen women in each group. This imbalance was unfortunate. The majority of participants were between the ages of eighteen and twenty-one, but eight were between the ages of twenty-two and twenty-five and two were thirty-five or older.

The course introduces students to educational technology. Thus, generally the students would be limited to those interested in technology, which makes it difficult to generalize results to other similar courses with different subject matters, i.e. Introduction to Instructional Design might attract very different students. The students may have better pre-use attitudes about computers and about technological innovations in education than do average students, which may affect their success in the online classroom (Eastmond, 1994; Hiltz, 1994).

Another issue to consider is that the students are not generally habituated to being enrolled in DE courses nor to online classroom environments. Concordia University does not offer many DE courses, and thus this is most students' first exposure to this form of educational delivery. Consequently, this sample may not be equivalent to DE groups that attract students who tend to have taken DE courses before.

The students are volunteers who are willing to sign consent forms and take part in the research, and may differ from non-volunteers in potentially confounding ways. In particular, some research indicates that volunteers tend to be more sociable than non-volunteers (Rosenthal & Rosnow, cited in Borg & Gall; 1989) which could be a threat to external validity as various researchers have suggested that people who are less sociable will gain differential benefits from the use of a computer-conferencing system (Sproull & Kiesler, 1991) as well as the fact that sociability may be related to cooperative behaviours in small group-work. However, the sample was randomly assigned to treatment conditions involving cooperative learning, and an effort was made to ensure equivalent treatment groups — however, the small sample size may have resulted in non-equivalent groups.

Participants

Over 60 students originally enrolled; however, only fifty-nine students came to one of the four orientation workshops. Six students who did not attend these workshops became active members of the course, but three of these dropped. Nineteen students who attended the workshops dropped, and two did not write the final exam. Forty-two students wrote the final exam, one of them much later than the rest of the class.

No participants were included in any of the analyses who did not write the final exam. Furthermore, the student who wrote the exam several weeks after the completion of the course was not included in the sample, as this student was deemed an outlier. This student was also not a participant. Another participant was dropped from the analyses on the basis that this individual was not considered by any of the instructors to be a participant in the course until the eight week. At that point, the student, despite having lost the 15% for participating in the computer conferencing environment, insisted on being allowed to complete the course. This student was not representative of the experience of students who actually took the course and consequently was not included in any analyses. Another student was not included having never signed the consent form. This left a sample size $n=38$.

Design

Experimental

The research design is a pre-test post-test control-group design. All original participants were randomly assigned to one of two treatment conditions (cooperative versus conventional small-group learning activities).

The cooperative activities differed from the conventional activities in two main ways : 1) Students explicitly reflected on group productivity; and 2) Student responsibilities to group maintenance and productivity were made explicit and students were assigned group maintenance roles that were rotated through group members. As well, two minor additions were made during the implementation process. First, in the design activity, students in the cooperative condition were paired into learning partners within their small-groups. Although students were still in a group of three or four students, each was also assigned a specific learning partner within the group. Second, in the debate activity, students in the cooperative group were provided with suggested sub-deadlines in order to help students coordinate their online activity. These additions were made in response to student complaints from the experimental group regarding difficulties coordinating activity with fellow team members.

Both the student moderator roles and the group reflection forms involved the development of measures on the part of the researcher (see Appendixes A and B).

Qualitative

The online messages provided an opportunity to investigate online small-group interpersonal dynamics from a different perspective. The facility of CC systems to act as an observer is a boon to the CC researcher. The system collects all messages, and thus objectively observes all online interactions. A drawback is that the researcher is left with a vast amount of information to analyze. It is not practical to sift through all the messages at a detailed level of analysis (Hiltz, 1994). The quantity and richness of the information created

online causes moderators to despair of measures for grading CC work that are practical and yet meaningful (Barrington, J. & Bentley, J., personal communication, December 1995). Researchers are similarly faced with the task of finding measures that both are efficient and meaningful.

One option commonly followed is to choose measures beforehand that are easy to collect (such as participation measured by number of messages) (Harasim, 1993). These measures have the benefit of being quantifiable and objective; however they tend to be narrow in focus and may actually inadvertently mislead the researcher. Furthermore, they do not take advantage of the richness of the data collected by the CC system.

Case-studies have proven a useful source of information and knowledge in CC (Riel & Harasim, 1994). Yet the majority of case-studies uncovered in the literature review revealed that the researchers tended to either predetermine measures or codes that force their analysis to ignore important elements of the learning environment or, alternatively, choose to report any messages that seem relevant, without due explanation of why that particular part of the conferencing dynamics was important. The subjectivity of the process by which some researchers in CC report messages that occur in the conferences is a weakness. Furthermore, researchers tend to include quotes without examination of the context in which the message was written, although Eastmond (1994) provides an example of carefully following through on those messages and situations that revealed themselves as important. The critical-incident technique is an observational method developed by Flanagan (1954) that may provide some focus to the CC researcher interested in an in-depth analysis of interpersonal dynamics in online environments.

In this study, critical incidents were analyzed to explore the appropriate use and failure to apply meta-context management strategies in the online environment. The researcher noted incidents involving the use or non-use of meta-context management strategies. Instructors were requested to name any critical incidents they remembered. Burge's (1994) list was used as the base, but any incidents considered as critical (whether

negative or positive) were explored. Student statements on the group reflection forms and on the final course evaluation were also examined to provide a triangulation of results. The results were checked with two experienced DE online instructors. The nature of this part of the design was exploratory. Conclusions were not sought, but rather, descriptions that might lead to a more in-depth understanding of the processes that the learners were engaged in.

Measures

Five main data sources were used: 1) A pre-course questionnaire designed by the researcher to measure pre-course attitudes about computers, expectations of the computer conferencing system, expected time on course, and previous experience with this delivery mode (computers, online courses, and DE courses); 2) A post-course questionnaire designed by the researcher to measure time on course, effort, involvement in the virtual classroom, group productivity, perceived quality of work as a result of the online activities, and attitudes about online versus traditional courses and about computers; 3) The number of online messages to measure online activity; 4) Grades on online activities, projects, and the standardized final exam to measure achievement; and 5) Analysis of online messages based on critical incidents.

Detailed Description of Measures

Pre-Course Questionnaire

The researcher developed a pre-course evaluation to gather basic demographics, as well as to measure various student attitudes and beliefs considered potentially important to a student's overall success in an online DE environment. The pre-course questionnaire included the following categories: 1) Current attitudes about computers; 2) Previous skills potentially useful in this learning environment (typing, online courses, DE courses); 3) Expectations about the CC system; 4) Expected effort -- time on course and online; and 5) Equipment access. The questionnaire also requested information regarding sex, age,

nationality and first language. The measure of pre-use attitudes is a modified version of Hiltz's pre-use attitudes measure (1994).

Post-Course Questionnaire

The researcher developed a post-course evaluation based on the measures of Hiltz (1994) and Savard, Mitchell, Abrami & Corso's (1995). The part of the questionnaire entitled 'General Evaluation of the Course' was developed by Bentley & Bernard (1995). Attitudes toward computers were included on this questionnaire as well as on the pre-questionnaire so that nine items are in common. The other main factors included are: 1) Overall effort; 2) Online effort; 3) Individual versus group learning experience; 4) Comparison to traditional courses; 5) Attitudes about learning online in the future; 6) Involvement in the virtual class; 7) Quality of work as a result of the medium used; 8) Confidence about online learning; 9) Small-group activities: i. Group cohesion and responsibility for one another; ii. Personal ability to work online; and iii. Attitudes about small-group online activities; 10) Evaluation of the course; and 11) Evaluation of computer conferencing overall.

All of the variables measured in the post-course questionnaire can be categorized as follows:

1) benefits: quality of work as a result of the medium used; confidence about online learning; personal ability to work online; effort;

2) satisfaction: course evaluation; computer conferencing evaluation; attitudes to online learning: attitudes about learning online in the future; comparison to traditional courses; evaluation of impact of CMC on learning; and attitudes toward computers; and

3) learning experience: involvement in virtual class; group cohesion and responsibility for one another; individual versus group experience.

The third category — learning experience — consisted of implementation checks to see if the learning experience of the experimental group differed as intended by the treatment.

Achievement

Achievement in the course was measured by the final grade, which was broken down into five sub-components: 1) final exam (25%); 2) computer conferencing participation (15%); 3) online debate (15%); 4) design project (25%); and 5) internet project (20%). The final exam consisted of 25 multiple-choice questions (worth 50%), 5 short-answer questions (worth 25%); and one-essay question (worth 25%). The computer conferencing participation grade was based on quality of online participation. The internet project was graded by the instructor of the control group. The design project was graded by the instructor of the experimental group. The online debate was graded by two different moderators. They developed the criteria together, and graded several together.

Online Activity

The number of messages (Harasim, 1993) was used as a measure of online activity. Researchers in CC tend to measure the number of messages rather than the number of characters, since a correlation of $r=.94$ between the two has been reported (Winkelmans, 1988 cited in Harasim, 1993). However, with the advent of CC systems that provide easy uploading and downloading capabilities, it is possible that the correlation will weaken, as those students who tend to compose off-line will probably write longer and fewer messages than those who tend to compose online.

Analyses of online activity: Since there may be differences between the participation in different areas of the learning environment (Hiltz, 1994; Feenberg, 1993), analyses related to online activity reflect the different types of conferences. Conferences for online activities included those for small-group activities ('internet', 'design' and 'debate') as well as one for the two class discussions ('class discussions'). These were the graded components of the online activity. As well, two conferences were set up for the purpose of ongoing communication: 1) 'Administration', a conference for the entire class to raise and answer course-related questions; and 2) 'Pub', a space for students to chat informally. These were the ungraded components of the online activity. Analyses related to online

activity reflect the different conferences within the online environment ('design', 'debate', 'class discussions', 'administration', and 'pub').

Furthermore, analyses were conducted according to the period of time the message was sent. The course was divided into five basic modules, each of which had an associated online activity. Messages were analyzed within this time frame, across all the conferences including Administration and Pub. This was done to create consistency in interpreting the results, and to appropriately reflect the beginning of experimental manipulation. The time periods are as follows: 1) Jan. 11 to 25th; 2)Jan. 26th to Feb. 4th.; 3) Feb. 5th to 29th; 4) March 1 to March 18; 5) March 19 to April 14; and 6) April 15th and on (post-course). Treatment began on March 1. One weakness with this approach is that some students sent in messages related to a previous online conversation at a later date. These messages generally are not replied to, as others consider them off-topic. They may slightly confound the results, as they are not grouped with the appropriate conversation. T-tests were conducted on the post-treatment online activity to see if there were significant differences between the groups.

Critical Incidents

The choice of critical incidents was based on Burge's (1994) list of meta-context strategies involving the use or non-use of meta-cognitive management strategies in the CC educational environment. Incidents that seemed critical but appeared to be excluded by Burge's list were also included. These incidents were then coded according to Burge's (1994) list, which were modified based on the final choice of critical incidents. These critical incidents were then analyzed. An analysis of what prompted the critical incident, and especially how the critical incident was resolved, was carried out.

Procedures

Step One: The moderators were given specifications as to the general moderator role (Appendix C). There were three moderators altogether. One of them worked in both sections. Each of the other two worked in only one section.

Step Two: Four Orientation Workshops were held. The moderators provided an orientation to the course. Then, the researcher requested participation in the research, adhering strictly to ethical guidelines as appropriate to educational research carried out in public universities. Those participants who volunteered filled out the pre-questionnaire. Then, the researcher then provided an introduction to the computer-conferencing component of the course.

Step Three: Design of Online Environment

A brief description of the online environment is included since these results may not be replicable in different online environments. The online environment is described in sufficient detail to provide other researchers with an indication of the type of environment in which this study took place.

The environment included three main conferences for the whole class — 'Pub' for socializing and non-content related conversation, 'Admin' for course related questions, and 'Class Discussions', for online 'seminars.' As well, each member belonged to a small-group for the first small-group online activity. Each student was reassigned to a new group for the second and third small-group activities.

Each participant engaged in three different types of small-group activities. Two were feedback exercises. Students provided each other feedback related to two different projects (internet and design) that they submitted during the semester. These activities focused on facts, procedures and concepts. The third online activity was the debate activity, and focused on problem-solving and higher-order thinking.

The online grade was worth 30% of the final grade. Fifteen percent was allocated to participation in class discussions and in the two feedback activities. Fifteen percent was allocated to the debate activity.

Step Four: Assignment of Participants to Conditions

Each of the fifty-nine students who attended the workshops was randomly assigned to either the control or experimental conditions. Then the two groups were balanced on the basis of the workshop, since it was deemed possible that different original workshop experiences might influence the results. The groups were also balanced for gender. It was ensured that an equal number of non-volunteers were assigned to each group. There were five non-volunteers, three of which dropped. The two non-participants were in different groups. Students who did not attend the workshops were added alternatively to the control and experimental groups. The student who became active in the eight week was randomly assigned to the experimental group, after it was decided that this individual would not be included in any analyses.

Step Five: The first online activity took place. It was a class discussion. The first activity was designed to introduce students to the system, as well as to promote higher-order cognitive thinking skills through class discussion.

Step Six: The second online activity took place. This was the first small-group activity. Students were randomly assigned into groups of 4 to assist each other in the completion of their internet projects.

Step Seven: The researcher observed moderator behaviours in the first online activity, attempting to ensure that they had similar moderator styles. Despite differences observed, it was decided by the researcher that interference would not help. The styles were subtly different and, as such, it was deemed impossible to actually create the kind of consistency desired.

Step Eight: The third online activity (the second Class Discussions) took place.

Step Nine: The internet projects were sent back in the mail to the students. Instructions for the second small-group activity were included in the mailing. These instructions differed between the two sections. Those in the cooperative condition received instruction on the nature of the student moderator roles and was informed that each member would be assigned the task of playing one role (see Appendix A). They were told that in the next small-group activity they would each play different roles.

The mailing also included a letter to non-participants and to low participants, which. was also posted online privately to each of these participants. As well, all students were provided with online communication guidelines (Appendix D).

Step Ten: The second small-group activity occurred. Students were assigned into groups of four based on GPA, except for those considered non-participants (people who had not left any online messages in Class Discussions or the Internet activity). These students were assigned into a special group (one in each section), considered inactive. None of these students participated in this activity.

To assign people to groups, the students were categorized into high and low GPA based on a median split. Two high and two low were assigned to each group. Some students complained about the instructor assignment into groups, and were unhappy about being moved from their original group.

Students in the cooperative condition were assigned student moderator roles. Furthermore, they were assigned 'learning partners'.

Immediately after the activity was over, students in the cooperative condition were sent via the conferencing system an instrument measuring group cohesion (Table 6). After receiving their online responses, I took the individual responses and synthesized them into the group's general perception of group cohesiveness. I sent this back to a moderator, who then reported to the students in each group.

Step Eleven: The third small-group activity occurred. One of the instructors (the experimental one) had to leave town. Consequently, the moderator who usually worked in

both sections worked only in the experimental section, and I assisted moderating the debate in both sections. It was decided that it would be more confounding to the research if I assisted only in one conference. However, this did create a difference between the groups: each of them lost a moderator temporarily, but a different moderator.

For this activity, students stayed in essentially the same groups. However, a few who had been completely inactive joined into the debate, and were added to groups that only had two or three active members.

This was a new type of activity (a debate), and as such posed different challenges. The treatment was intended to include the filling out of group reflection forms. Students were also to be assigned new moderator roles. However, it was deemed necessary to drop the playing of student moderator roles. All of the instructors felt that the students were over-worked, and it seemed unwise to add to the already complex task of the debate. Suggested sub-deadlines were added to the experimental group's instructions, since there had been numerous complaints about problems coordinating activity with other team members.

Step Twelve: Immediately after the final examination, participants filled out another survey. Several participants took the measure home, and sent it in via the mail.

CHAPTER FOUR: RESULTS

This chapter is divided into two separate parts. The first section presents the research findings of the experimental design, and the second section presents the results of the analysis of critical incidents.

Results of Experimental Design

The level of significance for all statistical outcomes was $p<.05$. Preliminary data analyses of online messages indicated that students in the cooperative condition tended to send significantly more messages overall. Investigating this further, it was found that students in the cooperative group engaged in significantly more online activity in both Administration (where students raised course-related questions) and in Pub (where students were free to discuss non course-related issues), but not in graded components of online activity (the small-group activities and the class discussions.) Furthermore, the cooperative group reported spending significantly more time on the course than did the control group. As well, students reported exerting more overall effort with respect to the course and the online activity. However, no differences in achievement on the final exam, on the online activities nor in the project work were found. Also, students in the structured activities class did not report significantly higher group productivity as measured in the post-test questionnaire.

Effect of Small-group Structure on Online Activity

Graded Online Activities

Online activity in the online environment was measured by the number of messages, following Harasim (1993). There appeared to be no meaningful differences between the groups in terms of the number of messages in the small-group activities (internet, design and debate). Class discussions, the only other graded online activity, occurred during two main periods of time, both pre-experimental. No statistically significant differences were found.

Ungraded Online Activity

Administration. Analyses were conducted on the volume of activity in the administration conference. Figure 1 illustrates the self-evident nature of this difference in terms of the total number of student messages in administration during treatment. The cooperative group appeared to be much more active in administration.

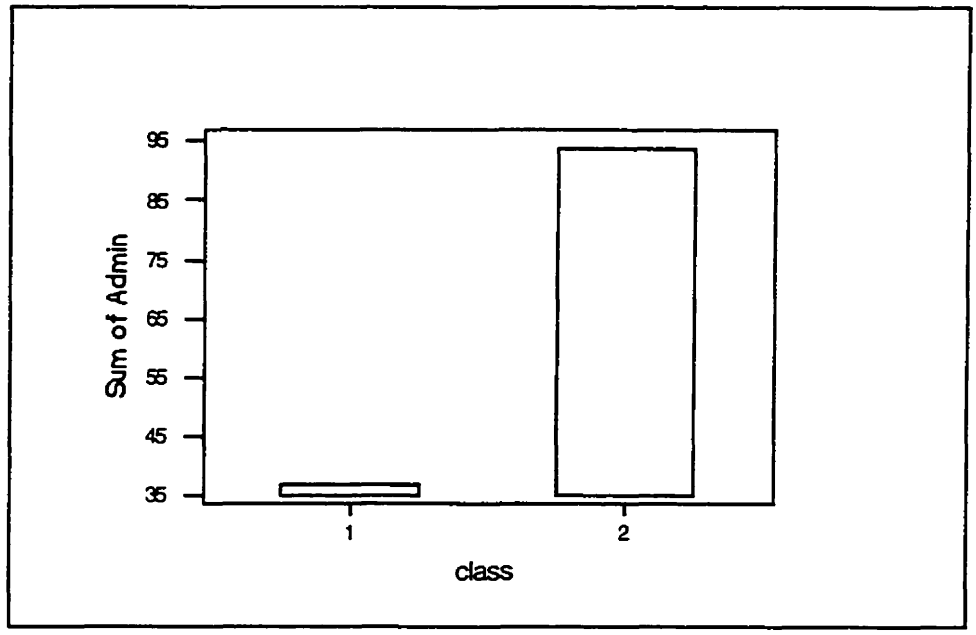

Figure 1: Comparison Between Conventional and Cooperative Groups Based on Online Student Messages in Administration During Treatment where 1 is the Conventional Group and 2 is the Cooperative Group.

Conducting a one-way t-test in the direction of higher activity in the cooperative group yields a statistically significant difference between the two groups with respect to online activity in Administration after treatment began.

Table 2

Comparison Between Cooperative and Control Groups on Online Activity in Administration During Treatment

Class	N	Mean	StDev	SE Mean
control	18	2.06	2.98	0.70
experimental	20	4.70	5.57	1.2

In the pre-experimental interval, no statistically significant results were found between the control group (M=2.78) and the experimental group (M=4.15).

The overall difference found in activity in administration after the treatment began was further analyzed to explore in which time-frames differences had occurred. For March 1 to 18, after treatment began, a one-way t-test indicated that the control group (M=1.17, SD=1.50) tended to participate significantly less in administration than did the experimental group (M=2.95, SD=3.95). During the interval between March 19th and April 14th, there was a significant difference between the control group (M= 0.50, SD=0.924) and the experimental group (M=1.50, SD=1.79. During the interval from April 15th on, an interval that was the last week of the online environment, the control group had a higher mean (M=0.389, SD = 0.979) than the experimental group (M=0.250, SD=0.550), but not statistically so.

Student-Instructor Ratio: The above analysis was limited to student messages and did not include instructor messages. The difference in online activity was observed by the researcher and the instructor who took part in both groups. The instructor of the experimental group felt overworked, and the results indicate that considerable more work was demanded on the part of the instructor. Looking only at messages from March 1 on (once treatment began), students in the control group left thirty-seven messages, and instructors left fifty-nine. In the experimental group, students left ninety-four messages, and instructors left one hundred and five. The ratio of student-instructor interaction in 'Admin' was quite similar.

Pub. Analyses were conducted on the volume of activity in the social, informal conference named Pub. In the pre-experimental phase, the control and experimental groups did not differ significantly (M=0.67, SD = 1.03; M=0.80, SD=1.47, respectively). The chart below illustrates the obvious nature of the difference after treatment began in terms of the total number of student messages in pub.

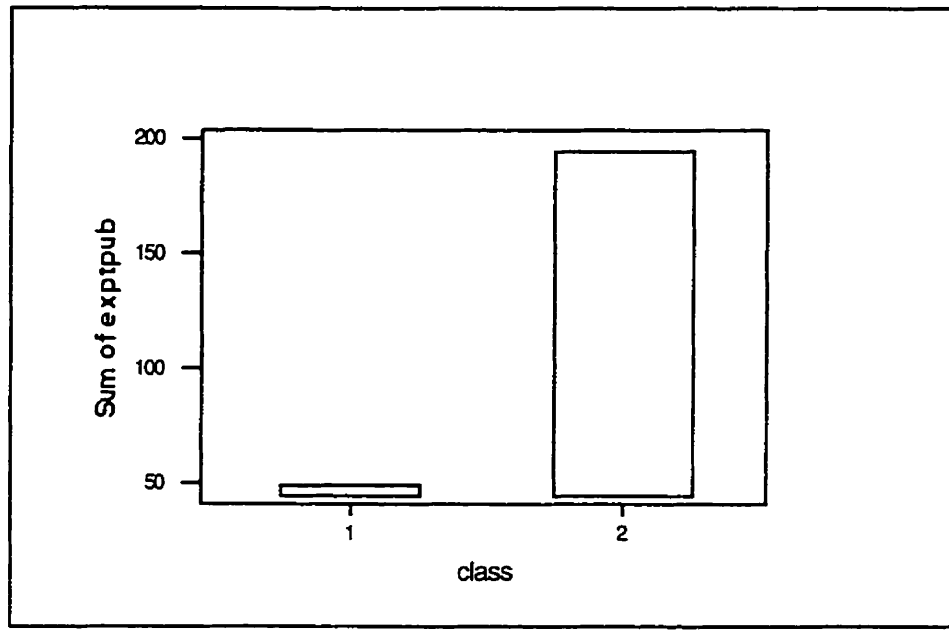

Figure 2: Comparison Between Control and Cooperative Group Based on Student Messages in Pub where 1 is the Control Group and 2 is the Cooperative Group

The control group appeared to be less active in Pub than did the experimental groups (means are below). Conducting a one-way t-test in the direction of higher activity in the cooperative group yields a statistically significant difference between the two groups with respect to online activity in Pub.

Table 3

Comparison Between Cooperative and Control Groups on Online Activity in Pub During Treatment

class	N	Mean	StDev	SE Mean
control	18	2.67	4.31	1.0
experimental	20	9.7	10.9	2.4

The control and experimental groups' activity in pub was statistically different during the interval between March 1st and March 18th ($\underline{M}$=1.39, $\underline{SD}$=2.09, $\underline{M}$=5.15, $\underline{SD}$=7.25, respectively). Similarly, in the time interval between March 19th and April 15th, the control

group tended to participate in pub significantly less often than the experimental group (M=1.11, SD=2.17, M=4.10, SD=4.44, respectively). In the period following April 15th, there were no statistically significant differences between the control group (M=0.167, SD=0.38) and the experimental group (M=0.45, SD=0.945).

Effect of Small-group Structure on Perceived Benefits, Satisfaction, and Attitudes to Online Learning

The analysis of the pre-questionnaire and post-questionnaire was done following the three categories measured in the post-questionnaire:

1) reported benefits: quality of work as a result of the medium used; confidence about online learning; personal ability to work online; effort;

2) satisfaction: course evaluation; computer conferencing evaluation; attitudes to online learning: attitudes about learning online in the future; comparison to traditional courses; and attitudes toward computers;

3) learning experience: involvement in virtual class; group cohesion and responsibility for one another.

The post-course and pre-course questionnaire were analyzed following normal procedures. Participants who did not fill out either one or the other questionnaire were left out of these analyses. For students who had left out a few questions, mean or modal replacement was used. Only the pre-test and post-test measures of attitude toward computers could be analyzed taking into account the participants' pre-course state. All others were analyzed with simple t-tests to compare the control and experimental groups. Both composite factors and each item were analyzed.

Table 4

Comparison Between Cooperative and Control Groups on Student Satisfaction, Reported Benefits and Learning Experience

Outcome	Experimental M	Experimental SD	Control M	Control SD	
personal ability to work online	6.18	1.70	6.07	1.97	ns
confidence about learning online	19.12	3.79	20.00	4.38	ns
quality of work as a result of medium used	17.71	3.44	17.40	2.80	ns
overall student satisfaction with course	35.87	4.60	36.09	4.85	ns
satisfaction with small-group activities	10.13	2.85	10.18	2.35	ns
attitudes toward small-group activities	6.00	1.58	6.26	2.02	ns
comparison between online learning and traditional course	23.24	2.54	24.27	3.37	ns
attitudes about learning online in the future	9.35	1.17	9.27	2.12	ns
group versus individual learning experience	3.176	0.8333	2.64	1.08	ns
involvement in the virtual classroom	10.00	1.84	10.86	2.36	ns
group cohesion	15.12	3.72	14.33	3.54	ns

Student attitudes about computers. Student attitudes toward computers were measured on nine items taken from Hiltz (1994). They were measured both on the pre- and post questionnaires. The descriptive statistics are displayed in Table 18.

Table 5

Participants' Attitudes Toward Computers Before and After Course

Variable	N	N*	Mean	Median	StDev	SEMean
Attitudes before Course	35	3	25.17	27.00	6.75	1.14
Attitudes After Course	31	7	28.61	28.00	5.77	1.04

A description of the scores for pre-course and post-course attitudes according to the condition (cooperative versus conventional) is displayed in Table 6.

Table 6

Comparison Between Cooperative and Control Groups on Attitudes Toward Computers Before and After Course

	Class	N	N*	Mean	Median	StDev	SEMean
Pre-Attitude	Control	17	1	23.88	22.00	8.21	1.99
	Experimental	18	2	26.39	27.50	4.94	1.16
Post-Attitude	Control	15	3	27.87	26.00	6.25	1.62
	Experimental	16	4	29.31	28.00	5.38	1.34

A comparison between the two groups on their post-course attitude about computers was done. Dichotomous variables were created for pre-course and post-course attitudes. In each case, students below the median of all participants were placed into one group (1), and students above into another group (2). Doing this permitted the running of a MANOVA, although due to unequal cell sizes the General Linear Model was used. Pre-course attitudes, class and the interaction between the two were entered into the model. Post-course attitudes was the outcome variable. The analysis of variance is displayed in Table 7. No statistically significant results were found.

Table 7

Analysis of Variance for Post-Course Attitudes Based on Class and Pre-Course Attitudes

Source	DF	Seq SS	Adj SS	Adj MS	F	P
Class	1	0.0946	0.0757	0.0757	0.30	0.587
Pre-course attitudes	1	0.2014	0.2015	0.2015	0.81	0.378
Interaction of Class and Pre-course attitudes	1	0.0002	0.0002	0.0002	0.00	0.977
Error	25	6.2556	6.2556	0.2502		
Total	28	6.5517				

Effort. The experimental group tended to report expending more effort on the course overall, as measured by self-reported time on course as well as estimated difficulty of course.

Table 8

Comparison Between Cooperative and Control Groups on Self-reported Effort in Course

class	N	Mean	StDev	SE Mean
control	15	5.67	1.23	0.32
experimental	16	6.63	1.67	0.42

Exploring this further, it was found that there were statistically significant differences between the control and experimental groups with respect to self-reported total time working on the course. The means are displayed in Table 9.

Table 9

Comparison Between Cooperative and Control Groups on Reported Total Time Spent on Course

class	N	Mean	StDev	SE Mean
control	15	2.600	0.737	0.19
experimental	17	3.294	0.772	0.19

However, there were no differences between the experimental and control groups with respect to course difficulty, (M=3.07, SD=0.799 versus M=3.37, SD=1.15).

With respect to online effort, a one-way t-test for online effort (incorporating both estimated effort and the level of difficulty of the online activities) did not reveal significant differences between the control (M=6.533, SD=0.990) and the experimental groups (M=6.941, SD=0.899). With respect to difficulty of the online work as compared to other

work in the course, there were no differences between the control and experimental groups (M=2.0, SD=0.756 versus M=1.765, SD=0.562).

Effect of Small-group Structure on Achievement

Achievement in the course was measured by the final grade, which was broken down into five sub-components: 1) final exam (25%); 2) computer conferencing participation (15%); 3) online debate (15%); 4) design project (25%); and 5) internet project (20%). One-way t-tests in the direction of the cooperative group indicated that there were no statistically significant differences between the groups with respect to achievement on any one component of the course, nor on the final grade overall (Table 10).

Table 10

Comparison Between Cooperative and Control Groups on Grades

Graded Activity	Experimental M	Control M	
Internet project (pre-experimental)	16.90	17.22	ns
Online participation	23.70	23.06	ns
Debate activity	11.60	11.22	ns
Design project	21.17	20.94	ns
Final exam	71.57	72.9	ns
Final grade	80.92	80.70	ns

Supplemental analyses

Interaction with Individual Student Characteristics

Preliminary analyses were conducted to investigate the possibility that the effect of cooperative structuring on outcome measures depends on individual student characteristics. The following characteristics were considered: cumulative GPA, CC activity prior to treatment, prior attitudes, prior affective measures (expectations about CC system), expected time on course, and equipment access.

These preliminary analyses were conducted as follows. First, the data was cleaned, and mean or modal replacement was done where appropriate. Second, a median split on all students was done on the score. Participants were labeled either high or low. Third, a MANOVA using a General Linear Model was conducted. The variables entered were the dichotomized individual student characteristic (i.e. cumulative GPA, the treatment variable (cooperative versus conventional), and the interaction between the two. Several outcome measures were investigated. From preliminary analyses, it seemed that the sample sizes were too small to conduct such an investigation properly, and no more analyses were run.

Relationship between Online Activity and Other Outcome Variables

The structured activities class did not have the affective effects I was looking for, nor did students in the structured activities class report higher group or class cohesiveness in the post-course questionnaire. Furthermore, there were no differences between the groups with respect to achievement. Yet, student use was effected. Another analysis would ideally be conducted to investigate the relationship between online activity, post-test beliefs and attitudes, and post-test achievement. Unfortunately, the sample size is too small to make such an investigation worthwhile.

Summary of Results

The results indicate that the cooperative learning structures had an impact on student use of the computer conferencing. Students in the experimental condition tended to engage

in statistically significantly more online activity in ungraded online work (in Administration and in Pub) but not in the graded components (the design activity and the debate activity).

Furthermore, students in the cooperative group reported spending significantly more time on the course overall. A composite variable, overall course effort, indicated that the students in the experimental group tended to exert more effort overall with respect to the course, finding it more difficult and working harder at it. These results indicate differences in the groups related to the category of benefits, since effort is linked to learning. Yet there were no differences between the groups with respect to achievement in the course. Furthermore, the groups did not differ with respect to student satisfaction. No statistically significant affective differences were found.

This study indicates that the cooperative structure of the small-group activities affected student online activity for voluntary non-graded work, but did not influence their satisfaction nor their grades.

Meta-Context Management Strategies

There were several critical incidents that the researcher noted. These were checked with the moderators, who added two incidents that the researcher had not included. These were analyzed in terms of good and poor meta-context management strategy use in the online environment. How the incident reflects Burge's (1994) list of meta-context management strategy use was considered. Each of these critical incidents is described in detail below. Student names were re-coded to permit the use of names whilst protecting the confidentiality of the participants.

Personally, I found it frustrating to watch poor dynamics between group members. Although I had moderated DE online groups the year before for this same course, most of my moderating experiences have been in the mixed CSCL mode. Although I have dealt with some problems concerning low participation, I had never watched so helplessly as students failed to repair the misunderstandings between them. The failure of moderator

interventions to catalyze communication between team members in conflict was extremely frustrating. The problem of non-participants was more readily addressed than the problem of students who logged in inconsistently. I shall refer to these students as 'irregulars.' The problem of non- and irregular participants upset all of the instructors and myself. These feelings may play a role in my interpretation of the critical incidents, and readers should be aware of this.

Summary of Results Relevant to Meta-context Management Strategies

The brief analysis of critical incidents in the online environment revealed both good and poor use of meta-context management strategies, as displayed in Tables 11 and 12.

Table 11

Good Application of Meta-context Management Strategies

Good Application of Meta-context Management Strategies
1) acceptance of non-participation
2) graceful new member entry
3) clarifying ambiguity related to task
4) encouraging participation

Table 12

Failure to Use Meta-context Management Strategies

Failure to Use Meta-Context Management Strategies
1) failure to gracefully withdraw
2) failure to apply cognitive synchronicity
3) not dealing well with non- and irregular participants: i.e. exerting undue pressure
4) failure to resolve or even address conflict
5) failure to respond to messages that demand reflection and quick response
6) failure to negotiate shared level of intimacy

These are discussed in detail below. Most of the meta-context management strategies noted in this study were also identified by Burge (1994), or represent special cases of strategies she highlighted. As did Burge, I found that some of the critical incidents reflected the need of inclusion identified in Schutz (1966).

Good Meta-Context Management Strategy Use

Good meta-context management strategy use was noted in four main cases. A short discussion of each one follows.

Acceptance of Non-participation

In the first small group online activity — the Internet feedback activity — three female students and one male student were assigned to a group. This group was incredibly productive in terms of online messages. The three female students were incredibly prolific, whereas the male was inactive. These group members were reassigned to other groups for the rest of the online activities. Of all the students in the course, these were the only ones to complain of the reassignment. The group members were not pleased, and one of them — Kaya — wrote several messages about it to the moderators.

In contrast, another of the group members (Sara) entered a new group, which turned out to be fairly dysfunctional in one sense. Only two members (she and Beatrice) were active and regular group members. Nicole did not participate until the debate activity. This could have created a great deal of frustration and Beatrice did report in the group reflection form regret that they had no other active team members. However, the two members left provided each other with feedback and engaged actively in the activity, with no outward signs of undue frustration. It might have been even more frustrating for Sara, who had experienced such a successful group activity. Yet she coped well with the change. These two students exhibited the ability to cope with the non-participation of group members. This could be seen as a special case of resolving conflict, but I believe such a strategy should be added to Burge's list: "acceptance of non-participation."

Graceful New Member Entry

The same group described above received a new member (Leo) for the final online activity. Leo had been completely inactive online until the final online activity (the debate), and had not previously been in their group. He entered the group very smoothly. His initial message was a brief smooth introduction:

> Dear: Louisa, Sara, and Nicole,
>
> I'm sure your all wondering who the heck I am and what I am doing in your group. Hopefully this liitle letter will answer some of your questions and make it easier for you to take me seriously....
>
> Looking forward to hearing from you and reading your positions.
>
> Bye for now,
> Leo
> (Online message, winter, 1996).

Louisa responded to this message as follows:

> Welcome Leo:

> As you will soon discover, this is truly a great way of learning - although I may be forced to argue otherwise in our class debate. I speak for everyone in
> the group when I say, welcome to our group and may you enjoy the learning
> process :)
> (Online message, winter, 1996).

Nicole, who was a member of their group for the design activity but simply did not participate, did not introduce herself to the group nor make mention of her previous absence. This highlighted Leo's good strategy use.

Clarifying Ambiguity in Online Communication

There was confusion in a few groups with respect to the debate activity. The debate activity had two sides -- against or for the virtual university -- but four different perspectives on learning. Students were assigned both a perspective on learning and a side (for or against the virtual university). Some students believed they needed to attack all the other perspectives in the group. In one group, this was cleared up by a student writing in reply to an attack on his position by someone on his side:

> Hi Karen,
> as I understand the "Virtual University" debate rules, you and I are FOR the
> virtual university, and are not suppose to be commenting on each others opening statements.
>
> You can check the debate rules yourself in the adminstration folder.
>
> On your side,
> Quinton
> (Online message, winter 1996).

Quinton's strategy was to resolve the confusion immediately. This strategy might be referred to as "resolving conflict" but I believe it represents an example of a case that merits its own category as a strategy: "clarifying ambiguity." This ambiguity can arise in the

online environment from confusion over the task and more commonly from misinterpretation of an ambiguous message. Online messages are often ambiguous to the receiver, and this can lead to misinterpretation. In the online environments these sorts of misinterpretations, be they related to the task or a message, can create more tension than in face-to-face communication. In face-to-face contexts these types of confusions are cleared up in a few quick exchanges between the receiver and sender of a message. In the online environment, there is a delay between receipt of each explanation. Consequently, clearing up a confusion can take undue effort. The sender, if he or she notes a misinterpretation, should clarify it immediately so that the actual intent of his or her message is clarified to the receiver before more entangled confusions accumulate from the first one.

Encouraging Participation

Another noteworthy incident was when Heather actually tracked down three of her reticent team members in the Pub (the social environment online). This student in the cooperative group left her reluctant team members messages in Pub begging them to join in. This strategy was successful. This is an example of encouraging participation.

> HELP!!!!!!!!!
>
> Three members of debate group missing.
>
> Geneviève, last seen in the pub earlier today, has, umm, well, I'm not sure, can't
> really describe someone whom I have only met in cyberspace.
>
> Paul, last seen in the pub on the 27th of this month. Description? Um, male?
>
> John, not seen in the recent past. Don't really know what he looks like either.
>
> So, if anyone has any information regarding the where abouts of these missing
> persons, please do not hesitate to contact debate-stoppers at the above address. A reward would have been offered but I am but a poor student....
>
> (Online message, March 30, 1996)

Heather left another message in the pub, letting everyone know how her strategy was working:

> I hereby rescind my APB on John. He has been found and is doing as well as can be expected...as for the other group members.....
> (Online message, April 1, 1996)

Literally two minutes later, she left yet another message:

> WOW!!!!!!!! NOW I CAN STOP TALKING TO MYSELF!!
>
> I FOUND THE THIRD PERSON WHO WAS MISSING. 2 DOWN, ONE TO GO.....(maybe I
> should invest in a new career as a private investigator??)
>
> The APB on Geneviève is now officially retracted....
> (Online message, April 1, 1996).

Eleven minutes later Geneviève wrote into Pub:

> Hi,
>
> What are you doing following me, I was just cheeking my messages before I
> start writing the Kick Off mesage!, and there you are!
> Well now that you found me, I quess I should start typing.
>
> Geneviève
> (Online message, April 1, 1996).

The novelty of this situation was that Heather actually tracked down the team members, as a student in a face-to-face context might find a fellow team member in a café and ask where she/he had been. In an online environment, the non-participants generally do not login. In contrast, the irregular students often do login, yet do not participate in the assigned online activity. It can be hard to know whether or not one's missing team member is actually out there or not. Many students appear to feel that if they do not leave messages, they do not exist. In this case, the team members had in fact been leaving messages in the Pub, and therefore were clearly online.

Encouraging students who are logging in but are not actively participating in small-group activities can be successful. Some students are logging in, but are rather quiet, and one can encourage them to participate. I speculate that by encouraging the cooperative group members to play roles of "encouraging participation," the kind of encouragement exhibited by Heather is more likely to occur.

The above were four critical situations in which groups faced potential difficulties and averted them with the application of good strategies. There were other examples of good strategy use, but they were not applied in the context of critical incidents.

Poor Meta-Context Management Strategies

Failure to Gracefully Withdraw

Not one student appeared to gracefully withdraw in order to reflect on the online activity. Nor did students exhibit graceful re-entry, except in the case of Leo as described above. Perhaps students did not feel the right to disentangle themselves from the online environment in order to sit back and think. As one student (John) wrote in the final evaluation: "felt liked I was forced to input comments in order to remain an 'on-line' buddy." This same student wrote "Online debate was great but difficult timing and deadlines." Students may feel undue pressure to constantly communicate, since the online environment never closes. Hiltz (1993) recommends some activities with definite begin and end dates in order to help students coordinate their online activity. The learning environment in this study was intended to be a constant virtual classroom. Perhaps this increased the pressure on students to login and constantly keep up with all conversations.

Failure to Analyze Cognitive Synchronicity

Burge (1994) refers to the strategy of analyzing the cognitive synchronicity of the discussion after being inactive. In this study, several students did not respect the end dates associated with activities. Several messages were out of synch with the flow of dialogue in

class discussions as well as in the small-groups. This demonstrates poor strategy use. These students seemed unaware of the temporality associated with the flow of dialogue.

Some moderators like to leave conferences open to encourage students to continue discussion and dialogue (Harsim, Hiltz, Teles, & Turoff, 1995). On one hand, one wishes to encourage dialogue; on the other hand, one wishes to encourage a healthy coordination of online activity that does not confuse students with a lack of temporality. This certainly is a tension worthy of consideration.

This failure to analyze cognitive synchronicity was exemplified in one of the cooperative groups. Kaya, one of the students who had been in the very productive feedback group, was reassigned into another group. This new group was dysfunctional in the following sense: of four group members, only three were active, and one of these was irregular in logging on, making it very difficult to coordinate working with him (Tony). He would come into the activities very late, with no explanation, and just enter into the activity ignoring the fact that it was already almost over. He exhibited poor strategies by not negotiating his personal goals with the group goals. He would go so far as to come in and leave a message promising to come in, and then not come back until after the activity was officially over.

Not Coping Well with Irregular Participants

With respect to the group discussed above, of the two active team members, the one who had been in a functional group was very frustrated. Kaya expressed this to the other members of the group. At points she tried to encourage Tony to participate, but her efforts did not work:

> Hi Catherine and Tony,
>
> Hey guys, we're missing you here. I'm sure your very busy with your finals anf papers, but we need you too!!!
>
> Please let us know what's happening with you,
>
> Kaya

(Online message, winter, 1996).

Tony did not respond positively. Perhaps Kaya was exerting undue pressure on him, by stressing her need for him to participate without leaving room for him to excuse himself from engaging in the activity. Had she left room for him to explain his position without criticism, he might have at least communicated to the other group members the reasons why he was not actively participating. It is not clear, however, if any efforts on her part would have worked. Finally, the two active students became entirely fed up when he entered the debate activity the day it was supposed to end with no explanation as to his previous whereabouts. His message presumed that his teammates were still willing to engage in the debate, yet he made no explanation for his absence.

The response of the two women seemed to be to exclude him from the group:

> Wow
> what took so long. Kaya and I were preparing to do our closing statements and all of a sudden you are here. Oh well!
>
> XXXXXX [reply to his attack]
>
> Well, who knows if you will have time to respond, but don't wait too long, it is not really fair for Kaya and I. We have done quite a bit of work already and don't feel that all of a sudden we should be rushed into making comments. By the way, if you don't mind my asking, how rough has your semester bee? I do hope you are getting by o.k
> Bea
> (Online message, winter, 1996).

Kaya left a similar message:

> Hey Tony,
>
> I agree with with Beatrice, you should've participated earlier, but better late than never. If you really want to get something out of this activity, I suggest you join in for the rest.
>
> ....
>
> I know you've been very busy, but this course will probably kill your

GPA. We are all busy, believe me, but I feel bad for you for not trying harder. Maybe you'll do better on the final?

Let us know if we can help,
Kaya
(Online message, winter, 1996).

Although both express some concern over Tony, they come across as condescending and unforgiving. Needless to say, both these women were frustrated. None of the moderators intervened, hoping that Tony would respond. Ironically, he did not return to the debate until several days later, and never replied to either of these messages. In the final evaluations, both Kaya and Beatrice made suggestions for changing the course that related to solving the problem of non-participants and irregular participants:

"Small group activities should have more students. This is to avoid having students disadvnataged when others don't participate."
(Kaya, final evaluation)

"More emphasis (% grade) on participation."
(Beatrice, final evaluation)

Failure to Resolve Conflict

The completion of the narrative above demonstrates yet another failure to use good strategies. Tony never returned and the history function showed that he never read the messages. He placed a message into this conference several days after the activity was over, completely ignoring the entire situation that had transpired between them. In the group reflection form, Tony wrote that one of the negative aspects of the group work was that "Some people participated more than others. Those who had the time to spare could monopolilze the server." He also stated that in the next small group activity he engaged in he would try to participate more actively, but he did not attribute the problems in his group to his own failure to participate regularly. Rather, he felt that the other team members were responsible.

Tony also made a comment online in class discussions referring to the amount of superficial discussion that he had to wade through in dealing with the online environment.

The other students ignored his comment, which was made rather subtly. Tony failed to apply the strategy of providing his insights. The students who ignored the comment also exhibited poor strategy. He was expressing, however obliquely, a conflict between him and members of the class. No one chose to address the issue he raised. It is not clear whether the students simply did not notice the criticism or whether they chose to ignore it. I speculate that it is quite possible they deliberately avoided dealing with the conflict. In a distance online environment, it appears easier to avoid resolving conflict than in face-to-face contexts. Another online critical incident readily illustrates this point.

Students in a group that was fairly productive encountered a difficulty. One student, Geneviève, asked another, Heather, for feedback. This request for help was replied to with arguer, Heather pointing out that it was difficult to provide feedback when Geneviève had not provided the draft version of her project online. In fact, Geneviève had posted her draft online and she sent a message to clarify the situation. Heather never replied to this message. A moderator intervened, posting a message to clarify that, in fact, Geneviève had posted her draft and that Heather had in fact seen it (the history function indicated that she had read the message). Neither Heather nor Geneviève ever replied to the moderator message clarifying what had occurred, nor refer to the contentious issue again. Heather provided Geneviève with feedback without referring to the misunderstanding. This is referred to as a "pass" in a discourse analysis of misunderstandings. They did not wish to resolve the conflict. They did not wish to enter into a meta-communication. It had all started with a mistake made by one of the students, but neither student wished to actually resolve it by clarifying the misunderstanding. The students continued to work together during the debate activity with no outward signs of difficulties.

Another interesting critical incident reflected this unwillingness to discuss conflict. In the non- cooperative group's Pub, Quinton raised an issue related to dissection of a frog. This message caused an outcry against him for showing cruelty to animals. A moderator

attempted to intervene, and create some resolution of the conflict, but no one replied to this message, including Quinton. This critical incident was left unresolved.

This sort of unwillingness to discuss group dynamics problems was also reflected in the response to the group reflection forms. Although students demonstrated a willingness to reflect on the group dynamics by filling in the group reflection forms, they did not reply to the summary supplied by the moderators. Consequently, they did not discuss with their team members how to improve their group dynamics.

I speculate that this would not be true to the same extent in a mixed CSCL delivery mode. As a moderator in mixed CSCL mode, I have generally found that students wished to resolve these kinds of online misunderstandings in the face-to-face context, but not online. Although I have witnessed exceptions where students ignored the tensions existing in the online environment when they met face-to-face, generally most students resolve or at least address online group dynamic problems in the face-to-face context. A factor of the online environment may be this ability to ignore conflict more readily that in face-to-face contexts. This may have a negative impact on the group. However, one can imagine situations where associates who did not get along very well might work better in an environment that renders it easy to avoid resolving conflict (Schmid, R., personal communication, spring 1996).

Putting Aside Messages that Demand Reflection for Quick Reply

Although the history function indicated that Heather had in fact read the message, this function can be misleading. Merely because someone has opened a message does not indicate that he/she has read it. Due to the asynchronous nature of online discourse, users may open messages without actually reading them. In the process of navigating through the online environment, an important strategy is to archive messages for later reply. Some messages demand thought and time. Often experienced users will "skim" the online environment, opening many messages for quick perusal, and then later return to those that demand reflection.

This strategy is hinted at in Burge's strategies, but not encompassed by them. This is not the same as archiving messages during a period of graceful withdrawal. Rather, this is an archiving of 'to-do' messages, those demanding reflection but that need to be attended to shortly. Heather did not absent herself during this activity; she was a continual online presence. She simply forgot to return to the message. This kind of situation will be improved with more sophisticated design. Systems should be developed to include a special way to flag a message as needing rapid reply. In the FirstClass system, the best one can easily do is to "unread" the message, which makes the red flag reappear. But that can be useless for students who selectively read based on the subject header.

Failure to Negotiate Shared Level of Intimacy

Another incident worthy of note is that the experimental moderator reported that one male student called her and discussed his lack of participation. He said his team members (all female) were too personal, and they did not even know each other. An example of the kind of personal interaction his team members were engaging in is as follows:

> HI guys! How are you? Kaya - One day goes by that I couldn't log in!!!! Wow - I love you guys! I want to come on everyday to hear your remarks!
> I'm here Kaya! I had a very long day yesterday with the toddlers at the day care. I really wanted to log in, but before I knew it - I was sound asleep! How are you feeling Kaya? [personal remark removed to protect participant's identity] How about you heather?
> - are your kids letting you work on the project? I'm at school now - I came straight from work. I wanted to do my work at the library.
>
> Kaya, it looks like you know what to do - I'm so proud of you! Thanks
> for the tips - both of you! I'm also hoping to finish my project before the weekend. By the way, is there a time limit as to when the education office closes? Or do we just drop it in a mail box? For those who bring it on monday
> - is there a deadline? A specific time?
>
> Anyways - I'm having a great time! I never loved being on the computer so often! I miss it when I'm not on it!
>
> Good luck!
> Sara
> (Online message, January 30, 1996).

These other team members did not appear to realize that they had alienated him. In their boisterous enthusiastic creation of an online group, they left him out somehow. The fact that the student did not attempt to express his feelings to his group members was poor strategy, since he never resolved the conflict, and in fact hid the conflict from them.

The other members of the team also demonstrated ineffective strategy use, showing how well-intentioned personal gestures can be off-putting in an online environment. Due to the lack of social cues, one cannot judge the effect of one's tone and level of formality on the receiver. Therefore, in an online environment, one needs to be cautious in expressing one's emotions and being personal. Establishing intimacy online can be easier, perhaps due to the feeling of anonymity. But not all people respond to strangers on airplanes. In a face-to-face context, one can more easily test out the development of intimacy, by watching the reactions of the other. In online environments, thwarted intimacy might never appear as such. In this case, the student was rejecting the emotional advances of his team members, but they were entirely unaware of his rejection. Consequently, they never established an acceptable level of intimacy with him.

Summary of Results Relevant to Online Strategies and Interpersonal Dynamics

The brief analysis of critical incidents in the online environment revealed the following appropriate use of meta-context management strategies: 1) acceptance of non-participation; 2) graceful new member entry; 3) clarifying ambiguity related to task; and 4) encouraging participation. It also revealed six online strategies that participants failed to apply: 1) failure to gracefully withdraw; 2) failure to apply cognitive synchronicity; 3) not dealing well with non- and irregular participants: i.e. exerting undue pressure; 4) failure to resolve or even address conflict; 5) failure to respond to messages that demand reflection and quick response; and 6) failure to negotiate shared level of intimacy.

CHAPTER FIVE: DISCUSSION

This chapter consists of four components. First, a discussion of the results focuses on implications for practice. Second, suggestions for future research are made. Third, weaknesses of the study are discussed that limit the manner in which these results should be interpreted. This discussion leads to further practical suggestions for implementing small-group activities in online DE environments.

Discussion

The Effect of Cooperative Techniques on Online Activity, Achievement and Satisfaction

This study aims to ameliorate the design of online small-group activities. The variable manipulated was the design of the small-group activities. The effect of "cooperative" small-group activities as compared to "conventional" small-group activities is investigated. The cooperative group's activities involved four aspects that differed from the control group: 1) Students explicitly reflected on group productivity; 2) Student responsibilities to group maintenance and productivity were made explicit and students were assigned group maintenance roles that were rotated through group members; 3) Each student in the cooperative condition was assigned a learning partner within their team for the second small-group activity; and 4) Some sub-deadlines were imposed during the debate activity to improve online group coordination of activity. This study considered the effect of the design of online small-group activities on online activity, student satisfaction, and achievement. These fall within three broad factors of student acceptance of CMC systems: student satisfaction, benefits and student use (Hiltz, Kerr, and Johnson, 1985; Hiltz, 1994). Research suggests that these factors may only be moderately interrelated.

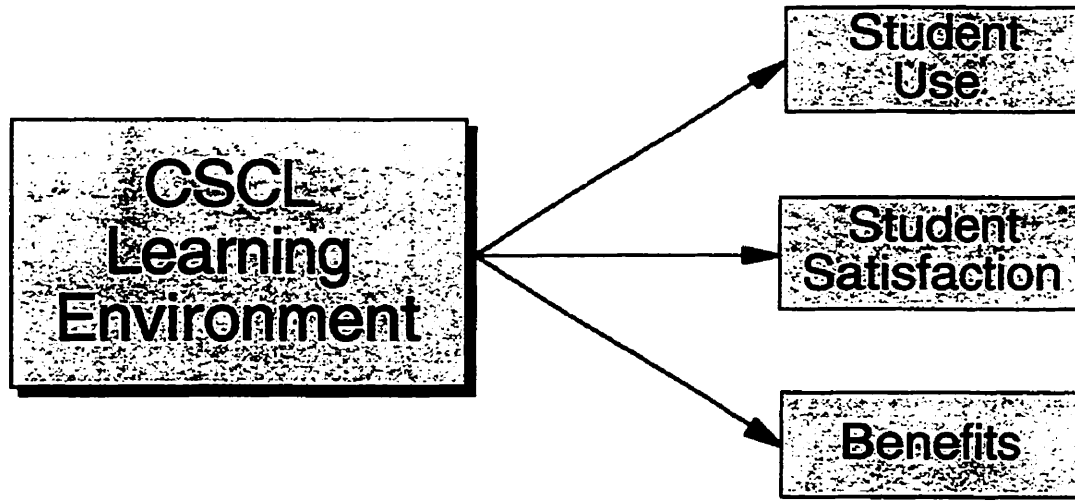

Figure 3: Three Aspects of Student Acceptance of the CSCL Learning Environment: Student Use, Student Satisfaction and Benefits

As well, data related to online learning strategies were collected and analyzed, providing another perspective on the processes involved in the small group interactions. This is discussed below.

It had been hypothesized that students in the structured activities course would be more satisfied with the course overall, particularly with the online activity, and would have better attitudes about online learning. However, the results of the questionnaire did not reveal such differences. Generally speaking, students in the cooperative group did not appear any more satisfied with the learning experience than did students in the conventional group.

Although no affective differences were found, student online activity differed between the two groups. The original hypothesis was that students in the cooperative condition would be more active online. This effect was expected especially in the small-group activities, where the treatment was directly applied. Contrary to the original hypothesis, the experimental group did not tend to be more active in the online small-group activities, nor in any of the graded online work. Rather, they tended to be more active in ungraded components of the online environment. Specifically, the students in the

experimental group asked more course-related questions to the instructors in 'Admin' and engaged in more interaction in 'Pub'.

Social activity in Pub may positively influence a student's learning experience. Social activity in DE may foster informal learning, which has been cited as important in studies in both the workplace and in the educational contexts. On the other hand, students may be wasting their time in idle chatter in the Pub.

The increase in course-related questions to the instructors may indicate that the students were more engaged in the learning. On the other hand, it may indicate that the students were more dependent on the instructors than were those in the other section. The similar pattern of increased communication in Pub leads me to believe that the increase in course-related questions is more likely attributable to a higher engagement in the course than to an increased dependence on the instructors.

This interpretation seems strong given that students in the cooperative group reported spending significantly more time on the course as a whole. Considered together, the increased activity in 'Admin' and the higher reported time on the course suggest that the students in the cooperative group were more engaged in the learning.

However, no differences in achievement on the final exam were found. Furthermore, no differences in achievement on the online activities nor the project work were revealed. It appears then that the students worked harder, but did not learn more. These results do not support the original hypotheses.

Research indicates a relationship between time on task and learning. One possibility is that the additional learning may have been informal and situated, and so not captured in the grades. The final exam largely consisted of multiple-choice questions drawn from a standardized database. It may not have reflected higher-order learning abilities. In fact, for this reason, this exam is no longer being used in this course. On the other hand, students may have thought they spent more time on the course, when in reality they were wasting time idly chit-chatting in pub and asking the instructors questions.

Practical Implications

The immediate practical implications of this study are to provide a possible method by which a DE undergraduate instructor can increase online social activity and instructor-student answer and questions. This has immediate practical implications for undergraduate DE online instructors who are finding low online participation to be problematic. Furthermore, this study provides a method to increase student time on task. Instructors who wish to implement similar types of techniques into online activities should be prepared for the potential increase in their own workload.

Theoretical Implications

As to theoretical implications, I had originally hypothesized that the cooperative learning techniques would lead to increased activity, but was worried on the basis of adult learning principles that they might de-motivate the learners. The results indicate that the cooperative techniques may have motivated the students to participate more in ungraded activities than they would have otherwise.

Online Learning Strategies and Interpersonal Dynamics

The brief analysis of critical incidents in the online environment revealed the following appropriate use of meta-context management strategies: 1) acceptance of non-participation; 2) graceful new member entry; 3) clarifying ambiguity related to task; and 4) encouraging participation. It also revealed six online strategies that participants failed to apply: 1) failure to gracefully withdraw; 2) failure to apply cognitive synchronicity; 3) not dealing well with non- and irregular participants: i.e. exerting undue pressure; 4) failure to resolve or even address conflict; 5) failure to respond to messages that demand reflection and quick response; and 6) failure to negotiate shared level of intimacy.

Practical Implications

My personal experiences and some of those reported in the literature (for example, Gunawardena, 1992; McConnell, 1989) suggest that it is currently very difficult to conduct DE small-group work/learning. The results of the analysis of critical incidents may have

some practical implications for instructors of DE online small-group work. Firstly, the brief analysis of the critical incidents may help researchers and instructors better understand online interpersonal problems and potential solutions.

As well, the analysis does suggest some ways to improve interpersonal dynamics in online small-groups. It may be helpful for each member of a group to discuss at the beginning of the group activity: 1) when he/she can login; and 2) time constraints that may affect his/her involvement. Then students should establish: 1) a balance between personal goals and group goals; and 2) group expectations with respect to regularity and rate of login.

Furthermore, the study suggests that students have difficulties addressing or resolving conflict online. Perhaps at the beginning of group activities, students should discuss what would upset them in a group setting (O'Donnell, A., personal communication, fall 1996). This may encourage students to address conflict when it arises.

Theoretical Implications

This study suggests that Burge's concept of meta-context management strategies is useful to understand interaction in the online environment. Also, it suggests that Burge's (1994) list of meta-context management strategies could be improved with the addition of four strategies, three of which are special cases of strategies she identified:

1) Graceful new member entry, referring to the graceful entry of a new member into a previously existing group. This is a special case of graceful entry.

2) Clarifying ambiguities related to task or messages.

3) Coping gracefully with non-participation i.e. not exerting undue pressure. This could be seen as a special case of resolving conflict, but I believe such a strategy should be added to Burge's list.

4) Negotiating shared level of intimacy. This is a special case of negotiating group and individual goals.

Suggestions for Future Research

These results suggested that future research might profitably investigate: social/informal learning and CSCL; instructor workload associated with increased student engagement in learning; motivational aspects of online distance learning; and training in online learning strategies to improve interpersonal dynamics.

Social/Informal learning and CSCL

The results of this study focus one's attention on the social informal aspect of online learning. Although one could consider Pub activity to be unrelated to learning, in fact, online social activity may be a very important factor in utilizing CSCL. Research in this area might be of particular significance to instructors in pure DE contexts.

Researchers (Brown & Duguid, 1991; Sproull & Kiesler, 1991) in the workplace have suggested that informal communication may be an important aspect of the impact of computer mediated technologies on an organization and on society. Proponents of situated learning, including Brown & Duguid have argued that computer-mediated technologies could potentially help enculturate workers into the community of practice through narratives and informal communication.

Researchers have suggested that computer-mediated technologies may decrease the social isolation of DE learners. University students acquire many skills and applied knowledge outside of the classroom through informal interaction with other students and faculty within the academic community of practice. Some researchers have argued that extra-curricular student life can be more powerful than the formal curriculum in the education of students (Horowitz, 1987; Axelrod, 1990; Moffat, 1987, 1991). This can be true even at larger urban campuses (Moffat, 1991; Horowitz, 1987). Utilizing computer-mediated technologies to create social environments may be a powerful aspect of its influence on learning at a distance (Cuneo et al, 1996, page 31).

Increased social activity and student-instructor interactions may be of more significance to learners enrolled in a university setting where face-to-face contact is not

common. It is important to consider the differential importance of Pub and Administration in a distance education delivery mode as compared to a virtually extended face-to-face classroom.

Instructor Workload

This study raises the issue of instructor workload. The effect of an increase in online activity on instructor workload must be considered since current implementations of CSCL are already instructor intensive and, in this sense, may be impractical. One aim of the more structured activities had been to reduce instructor workload by placing more responsibility for group productivity on the students. Neither the students nor the instructors were used to the cooperative structures introduced, and thus both instructor and student time was spent in learning how to teach and work together cooperatively. I speculate that students and moderators engaged in the more structured mode of CSCL might habituate themselves to the learning environment. However, even with experience, the increase in online activity presents an additional workload to both the student and the moderators. Research should explore the development of better resources for instructors of CSCL. Sophisticated design might successfully decrease teacher workload (Cuneo et al, 1996).

Motivational Aspects of Online Distance Learning

I had hypothesized that cooperative structuring of small-group activities would be beneficial, but was concerned on the basis of adult learning principles that it might be de-motivating (Velayo & McKeachie, 1994). The results suggest that, in fact, motivation unrelated to external rewards was operating at a higher level in the cooperative group. The cooperative techniques did not significantly affect the students' engagement in graded online work, but only in ungraded online work. Research (Velayo & McKeachie) suggests that intrinsic motivation is correlated to success in an online distance environment, but that extrinsic is not. They suggest the importance of continuing research in this area in order to detect students who will be at-risk in an online distance environment. Drawing partially on the study under discussion, Abrami & Bures are currently investigating student willingness

to use CMC as a learning tool. In particular, the study will investigate the relationship of students' orientations toward learning (learning and performance).

Training in Online Learning Strategies

Even the brief analysis of critical incidents demonstrates the usefulness of Burge's conception of meta-context management strategies, and indicates the importance of further research in this area. In particular, moderators might benefit from training in online learning strategies, particularly the meta-context management strategies that appear to reflect unique aspects of the online environment. They themselves may need some guidance in the new environment. More importantly, an understanding of online strategies as applied in small-groups might provide them with assistance in helping students avoid or deal with group dynamic problems.

With respect to training students in using meta-context management strategies, research should be done in this area. Some students seem to have an easy time working in groups. Training in working in groups adds to students' workloads. However, if the instructor is going to impose his/her own grouping on students, it seems only appropriate to provide some training in teamwork skills. This would seem even more important in a foreign online environment, especially a purely online one where students cannot enter the refuge of the familiar face-to-face context to establish group cohesion or fix group dynamic problems.

Strengths and Weaknesses of the Study

Analysis of Critical Incidents

In the analysis of critical incidents, I attempted to triangulate my results by making reference to group reflection forms and the final evaluations. In this way I provided multiple different sources expressing the same sentiments. Furthermore, the original categories of meta-context management strategies were grounded in the literature. I merely appropriated those categories in order to analyze these incidents, and added to the list that

Burge (1994) began. The critical incidents were all linked to strategies delineated by Burge (1994), although some seemed to merit their own categories. The results fit with similar reports in the literature (for example: Harasim, 1983; Burge, 1994; Eastmond, 1994). They were also checked with two experienced CMC instructors, and no surprises were noted. This seems to suggest that this method was useful and quite efficient compared to Burge's (1994).

This technique was attempted in the hopes that it would elucidate some insights with regard to the online environment, without taking an inordinate amount of researcher time. CMC researchers commonly report online messages in a haphazard way. Here, the original categories were grounded in the literature, and only critical incidents were discussed. This focused the researcher's attention on a subset of a vast number of online messages. The richness of online messages should not be lost in CSCL research. This approach was an attempt to find an efficient way to analyze online messages in a more structured fashion than seen in the majority of CMC case studies.

However, the qualitative analysis of the critical incidents related to meta-context management strategies was not thorough. Burge's (1994) approach was much more thorough, careful and time-consuming. The use of critical incidents, rather than interviews, rendered these analyses more subjective since I could have failed to note critical incidents not supporting my views and beliefs concerning the online environment. Similarly, the moderators may have noticed only those events that most closely matched their beliefs and values with respect to the online environment. These analyses would have been much stronger if I had followed Burge's (1994) approach. Time limitations demanded a more efficient method be taken here. Even within this design, interviews with those involved in the incidents would have strengthened the results. Again, time constraints played a determining role in deciding that this was not realistic.

Strengths of Experimental Design

Experimenter bias

Attempts were made to limit experimenter bias. I attempted to avoid influencing the moderators toward one outcome or another, indicating that there were hypotheses in both directions. I limited my interaction with the subjects. I was present for the orientation workshops in order to request participation and administer a survey, as well as to train the students on the use of the computer conferencing system. Near the end, however, I joined in for the debate activity in both conferences since one of the instructors was out of town. This was unfortunate.

Contamination

There were four workshops including people from both the treatment and non-treatment conditions. The workshop was held for two main reasons: research (Davie, 1989; Hiltz, 1994) indicates that a face-to-face workshop is helpful to familiarize students to the computer-conferencing system and may decrease the attrition rate; second, return rate of surveys sent to distance education students may be potentially low and will be higher if a face-to-face workshop is held (Hiltz, 1994). Furthermore, a request for participation may be more readily received when it is done in person (Borg & Gall, 1989). The workshop, however, was potentially confounding. First, the participants met the researcher, and second, the participants met each other, including students from different sections. The decision to not divide the sections for the workshops, thus avoiding possible contamination effects by introducing the students in different treatments to one another, was made for two main reasons: first, students enrolled in this course may have enrolled in a DE course due to time constraints, and thus it is crucial to provide several different times to maximize the number of attendees; second, the two sections did not meet again face-to-face until the final exam, so it was deemed unlikely that the students would maintain links to one another through the single workshop. The mixing of the students was a risk, but it did ensure that

experimenter bias did not alter the method of introduction of the computer-conferencing system nor the course during the orientation workshop.

Hawthorne Effect

Care was taken to avoid mentioning the research. The instructors were advised to avoid any mention of the research, and to leave all those aspects up to the researcher. No requests for questionnaires were made by the researcher online to the shared conferences. The research, as far as I know, was never brought up by the instructors.

Students were not informed that there were differences between the two sections. This deception was explained in the application to the Department of Education's Ethics' Committee, and was allowed. It was hoped that if students were to notice the differences between the two sections, they would believe that the differences reflected instructor differences rather than experimental manipulation.

Not a single student mentioned the research online. Furthermore, none of them raised the issue of the differences between the two groups. This was surprising given that some of the students who knew each other were in different sections. However, the differences were not enormous, and could easily have reflected different instructional approaches. The Hawthorne effect is not believed to have played a role nor influenced the data in any significant way.

Moderators

There were three moderators in this course. Two of them moderated one section each, while the other moderator worked in both sections. Although the differences between the moderators in two sections was unfortunate, it was a strength of the design that one of the moderators worked in both groups, creating some consistency in tone. In an attempt to maximize equivalency between the different moderators, except differences as intended by the treatment, care was taken to instruct the moderators to behave in similar ways (Appendix C). Precise specifications for the experimental treatment were written. Data on the moderators' behaviour were collected and analyzed to determine the congruence

between behavior and treatment specifications as the experiment proceeded. Unfortunately, my observations indicated that the two different moderators had different styles, but the differences were too subtle to readily fix. The one moderator in common, however, may well have balanced the moderator differences. In analyzing the results, the differences found between the groups with respect to online activity occurred only after treatment was implemented. However, it remains possible that the treatment interacted with the different moderator style of the cooperative instructor, which is a threat to external validity.

Grading

A strength of the design was that one instructor graded all the internet projects, another graded all the design projects, and each instructor graded a different part of the final. This created consistency in the grades. A weakness was that two different moderators graded the debate activity.

Weaknesses in Experimental Design

Measures

A significant weakness of the design was the measures. The pre- and post-course questionnaires were developed by the researcher. I lack the skills to develop these measures. Although I made efforts to base the questions on previously designed questions, this may have been a mistake in that the questions did not necessarily look at the precise outcomes. The development of appropriate measures to evaluate CC environments is of crucial significance in the field (Hiltz, 1994). Hiltz did develop an evaluation of CC environments; unfortunately, it is not focused on small-group work. This study demanded a measure focused specifically on small-group learning as well the overall CMC environment. Ideally, research networks such as EvNet will be able to develop such questionnaires as part of network research (Boyd, G, personal communication).

Also, the final exam consisted partially of standardized questions from a database reflecting the textbook. The questions used were chosen as reflective of each of the modules covered in the course. However, all of the instructors felt that these questions did

not test the intended learning outcomes of the course. Although it was standardized, it was inappropriate to the context of this course. The other half of the exam was developed by one of the instructors, an expert in distance education, and consisted of short-answer questions and a long essay question. This part of the exam was more in line with the learning outcomes of the course. Nonetheless, even the short-answer questions were so specific that they probably reflected more whether the students could remember a certain article than whether they had really reflected on the issues introduced in the course.

Ill-defined Treatment

The original vision of the treatment was ill-conceived. Although the assignment of student moderator roles and the use of group reflection forms were techniques well-grounded in the literature, it would have been better to investigate each of them separately. The treatment was originally defined in such a way that one could only conclude that it is the combination of the playing of student moderator roles and the filling out of group reflection forms that caused the results. It is unclear if only doing one or the other would render the same results.

Not only was the original vision ill-conceived, the treatment was also modified during the implementation of the experimental manipulation, further confounding the results. Two additions were made. With hindsight, it is clear that this was a grave error. These additions were in alignment with the original aspects of the treatment (the use of group reflection forms and students playing moderator roles). However, the addition of these two changes even further confounded the results.

Processes Unclear

The most overriding weakness is that the treatment itself may not have worked in the intended way. It is rather surprising that the cooperative group did not report higher group productivity, a greater sense of cohesiveness with their team members nor a higher sense of involvement in the virtual classroom. Furthermore, the sections did not differ in rating the course on a scale of "group" to "individual" experience. These results certainly raise the

question: Were they really "cooperating" in any intended sense, or did they just fill out group reflection forms and play moderator roles without really cooperating with each other any more? Although it is clear that the treatment affected certain outcomes, it is not clear if it had the intended effect; that is, the processes that the students engaged in were not necessarily as intended by the research design. This may reflect problems in implementation of the treatment.

Group Reflection Forms. There were difficulties related to implementing the Group Reflection Forms. Although students returned these forms online without difficulties, the students did not engage in conversation regarding them. Not one single student responded to the instructor messages synthesizing each group's ideas about the group dynamics. This appears to reflect difficulties engendered in an online environment with negotiating and resolving conflicts. In a mixed CSCL delivery mode, it would be best for the groups to fill out the group reflection forms online, and then later discuss the group response face-to-face. But within the DE environment, this is impossible. It is unclear if the Group Reflection Forms had the intended effects. Perhaps more moderator intervention was needed to induce students to discuss the results. The group reflection forms were disappointing since they did not catalyze any discussion amongst team members.

Student Moderator Roles. In playing student moderator roles, it was noted that some students appeared more suited to take on certain roles than others, and that assigning them to specific roles might therefore be inappropriate. The most significant problem, however, was that irregular participants could not be relied on to play their roles. One student wrote a message asking if she was allowed to encourage participation, since their group's "Encourager" had not yet logged in. This irony did not escape us. She was informed to go ahead and take on those responsibilities, but this incident does indicate some of the unique problems in the online environment in assigning student moderator roles. Furthermore, not one of the students successfully played the role of Online Communicator. This suggests

that student moderators should not be assigned that function, except perhaps with special training.

These problems in implementing the treatment reflect aspects of the online environment that render it difficult to conduct online small-group activities in a DE context. There were problems in both sections of the course in implementing these online activities. The two most significant problems were: 1) assignment of students to groups; and 2) participation -- non-participants and 'irregulars.' The next section discusses these problems in detail and suggests some possible solutions.

Problems Encountered in Conducting Small-group Online DE Work

Researchers in computer-supported collaborative learning environments are faced with a challenging task. The design of these environments is in its infancy. Evidently, conducting research within a poorly designed environment creates confounds in interpreting the results. The onus is on the researcher to provide practical advice to other researchers and developers with respect to the design of these novel learning environments. For this reason, this study concludes with a description of some significant problems encountered in conducting online group-work in this study and some practical suggestions for incorporating online small-group activities into a distance education course. Lacking the fallback of face-to-face interaction, DE instructors and students face an even more challenging task to conduct online small-group work. The suggestions should be read as within the DE context, but may be helpful to researchers/instructors utilizing mixed CSCL delivery mode.

There were difficulties in implementing the collaborative learning, in particular: 1) assignment of students to groups; and 2) team members who were essentially inactive, including both 'non-participants' and 'irregulars.'

Assigning Groups

One group of students resented being broken up, and a few asked to be placed in groups with their friends. Based on the pedagogy supporting instructor assignment, these requests were turned down, with an explanation concerning the pedagogy underlying this instructional practice.

Based on prior research in cooperative learning and in CSCL, it was decided to assign students to groups that were heterogeneous with respect to achievement. In a DE learning environment Lundgren-Cayrol (1996) compared groups where they chose their own partners to groups where they were assigned, and found that students wasted time in the process of choosing group members. Some of the cooperative literature indicates benefits of instructor assignment. Students were therefore assigned to groups on the basis of GPA. Groups were composed generally of two high and two low GPA students. Given the number of inactive participants, however, this breakdown did not work out as well as expected. Many "low" achievers did not in fact participate.

Given prior research, it seems best to assign students to online groups in a distance online environment where students are generally unknown to one another. However, it is not clear that GPA is the best method. The basis of assigning groups in an online environment should be further investigated.

Most of the problems that appeared in group dynamics seemed due to differences in number of logins and regularity of logins as well as different expectations of effort and quality. One instructor suggested that students should be assigned to groups based on sequence of who comes on the system and leaves their initial message in an activity. However, this method might not actually reflect the regularity and online activity of a student. Some irregular students placed a message early in the activity, and then just did not come back in for a week and a half, until near the end of the activity.

Another method would be to assign students to groups part-way through the semester, on the basis of previous online activity. It might not be best to place the most

active people together, but rather to strike a balance. However, having very irregular people placed together might be best, and they might in fact be satisfied with the low productivity of their group.

Another possibility is to assign groups on the basis of different teamwork skills. Future research might attempt to establish online teamwork skills and assign group members based on this. In this study, student moderator tasks were divided into four roles. Perhaps group members could be assigned on the basis of those roles. In any case, future research should investigate the assignment of students to groups in DE online environments.

Participation

There were many difficulties with the participation of students, and the regularity of others. Students who do not participate are known as non-participants. There are also students who are inconsistent in logging in, whom I refer to as "irregulars." Irregulars are difficult to deal with because it is not possible to simply consider them not members of the group. People who never come online are considered "non-participants" and can be shuffled into "non-participant groups." But irregular students do come online, and participate occasionally in the activities.

In cooperative learning in a face-to-face context, students who actually never show up for class are not common. In online environments, students who do not participate in an activity are not actually "skipping class." It is a problem one may well encounter even in a mixed CSCL mode, much less in an entirely DE environment. "Skipping" an online activity may have numerous negative effects on the group.

The students in online teams with inactive team members suffered because they could not communicate with them nor benefit from their feedback. For example, in the design feedback activity, some groups were reduced to two members as a result of inactive team members. This meant that students would only get feedback from one team member, and some of these students were resentful, as discussed previously in this study. Students who

were actively involved felt 'ripped off' by non-participants. Others took it more philosophically.

Positive interdependence existed in both sections of the course, but students in the non-cooperative group did not seem as frustrated as those in the cooperative group. Actually, results on the post-course questionnaire indicated that the mean of the control group with respect to frustration with inactive members was slightly higher than the mean of the experimental group. This was surprising as the number of complaints regarding non-participants was higher from the cooperative group, which had frustrated both instructors involved in the cooperative section. The higher level of open complaints may have reflected the greater emphasis on the benefits of groupwork, and the increased responsibility on the students to reach out to their non-participating team members (through playing the moderator roles, and having that explanation provided to them). Students in the cooperative group may have felt more open about expressing their frustrations.

Non-participants and especially irregular students were such a severe problem that we not only FirstClassed each of the non- and 'low' participation students, we also sent them each the FirstClass message in the mail along with their Internet projects. Furthermore, each of the non-participants was called. This was to encourage their participation for the Design activity and the final debate, which was worth 15% of their mark.

For the design activity, I created one group in each section for "inactive" students -- these were students we did not believe would actually participate, non-official drop-outs. None of these students ended up participating until the final debate activity worth 15%. This indicated that we could tell at some point in the semester which students would and would not participate. In this study, students who did not participate in the first three online activities were not assigned to groups subsequently. However, results indicate that no student who failed to engage in the first two online activities actually engaged in any more activities until the end of the semester when the debate (worth 15%) occurred. Consequently, this study suggests that students who do not participate in the first two

online activities should not be assigned to active groups. The 'irregulars' pose a greater challenge than do the non-participants. They may come in very early, and then never show up again. One cannot easily identify them as irregular participants.

Possible reasons for non-participants. Based on research on social dilemma and diminished productivity in performance groups, Shepperd (1993) delineates three types of solutions to diminished productivity:

1) Increase the benefits associated with contributing, thereby affecting value component of behaving; 2) Increase the perceived contingency between contributing and achieving the collective good, thereby affecting the expectancy component of behaving; and; 3)) remove disincentives to contribution, indirectly affecting the value component of contributing.

I will discuss each of these types of solutions in the context of the difficulties encountered in this study with non and irregular participation.

In this particular case, the external motivation for engaging in the online activities, except for the debate activity, may have been too low for some participants. Although 15% of the grade is a considerable portion, it encompassed several online activities. It was labeled a 'participation grade' in order to reduce the pressure in the course. The 15% was not connected to any one of the 4 online activities other than the debate, which constituted 15% all by itself. We thought students would feel less anxious because if they did withdraw from activity for a couple of weeks, they could make it up by engaging very actively in the following few weeks. The 15% participation mark creates more latitude for the students with respect to their participation. If they fail to participate actively in one activity, they can "make up" for it on another one. One unanticipated result may have been that the students did not feel the need to consistently login or participate, thinking that sporadic activity would suffice. Also, the benefits of contributing might have seemed more ambiguous. Perhaps this situation helped contribute to slow entrance into the online environment. It might be better to have specific grades associated with each activity. Also,

clarifying to students the benefit of these online activities to their own individual learning might help.

A second possibility is that some students viewed their contribution to the group as dispensable since the other members could create an active learning situation without his/her efforts. We attached no grade to a group product. Although a group product does exist, namely the record of the group dialogue, students may not have been aware that non-participants and irregulars do affect it. Every participant did not need to engage in the activity for the group to have an overall successful learning activity. The contingency between an individual's contributions and the collective good was not strong. This may have de-motivated some students from participating. In this sense the non-participants could be considered a special case of free-riders (Olson, 1965). The free-rider effect refers to situations when personal efforts are perceived as dispensable, leading individuals to reduce their contributions. Generally, it is assumed that individuals decrease their efforts because they can reap the benefits regardless. In this specific class of free-riders, the individual cannot reap the benefits — there were no group grades, so inactive students were not actually taking advantage of the effort of their team members; by not participating, they lost marks. It would be interesting to investigate the effects of both a group grade and an individual grade. Finally, tasks that demand the abilities and skills of each member of the group might decrease this online free-rider effect.

A third possible explanation of the problems with participation is that the benefits of participating did not outweigh the disadvantages. Students who did not participate in the online environment but did submit individual work may have been struggling with the deadlines of groupwork. If one's team members had already handed in their assignments, then they would not want to provide feedback. Since the DE mode generally attracts students looking for a type of flexibility not afforded by face-to-face courses, it may be that participation in online activity demands too much coordination with other people. Another possibility is that access issues were seen as too large of a disadvantage. This may be what

actually de-motivated the students from participating. Different types of motivation should be investigated in an online environment, as in Velayo & McKeachie (1994).

Practical Suggestions to Implement Online Small-group Work

Based on this study and other reported cases in the literature, I would recommend the following in implementing small-group activities into DE online undergraduate courses:

1) Consider the assignment of students to groups. Possible suggestions are to base assignment on teamwork styles or on amount and consistency of online participation. Perhaps grouping 'irregular' students together would help.

2) After first online activity, assess students' participation. Note the non-participants, and suggest that they drop the course or get online immediately. Note the 'irregular' and low participants, and discuss what the problem is. This demands time resources, but it may well be worth this front-end work to avoid the problems later in the semester where fellow group members are frustrated with these low and irregular participants. These students may just need a reminder of their responsibilities to their group, or they may in fact be having difficulties. Perhaps provision of some online strategies to the irregular participants will assist them.

3) Reassess students' online participation after the first two online activities. Students who do not participate in the first two online activities should not be assigned to active groups. They should be assigned to 'non-participant' groups. If any of these individuals becomes active, they should be reassigned to an active group.

4) Inform students clearly of the demands of groupwork in terms of coordinating their activity. This should be in the course description so that traditional DE students do not receive an unfair shock. A disclaimer should be included in the course description, "Although this is a DE course, students are expected to engage in groupwork (online) with their peers and to participate regularly in an online classroom."

5) Analyze the reasons for non and irregular participation, and attempt to change the online environment so as to motivate the students to participate actively online.

6) Make students aware of link between learning and engaging in the online activity.

7) Make the benefits outweigh the costs as much as possible.

8) Design activities that demand the skills and input of each team member.

Summary

This study's objective is to improve the design of small-group online activities in computer-supported collaborative learning (CSCL) distance education (DE) environments. Participants were volunteers drawn from an undergraduate education course, $n=38$. Drawing on cooperative learning techniques, students in one section filled in group reflection forms and played assigned student moderator roles in online small-group activities. The level of significance is $p<0.05$. The students in the cooperative condition tended to be more active in ungraded online activity. Specifically, they tended to engage in more instructor-student interaction and informal, social student-student interaction. They also reported spending significantly more time on the course. However, they did not tend to achieve better grades in the course. Nor were there any statistically significant affective differences between the two groups. This study suggest methods by which a DE undergraduate online instructor can increase students' online social activity and instructor-student interactions. This has practical implications for those DE undergraduate instructors troubled by low online participation.

The study also includes a different perspective of the small-group activities, focusing on interpersonal dynamics. An analysis of critical incidents between group members, identifying good or poor use of online strategies, revealed the following appropriate use of meta-context management strategies: 1) acceptance of non-participation; 2) graceful new member entry; 3) clarifying ambiguity related to task; and 4) encouraging participation. It also revealed six online strategies that participants failed to apply: 1) failure to gracefully

withdraw; 2) failure to apply cognitive synchronicity; 3) not dealing well with non- and irregular participants: i.e. exerting undue pressure; 4) failure to resolve or even address conflict; 5) failure to respond to messages that demand reflection and quick response; and 6) failure to negotiate shared level of intimacy.

The results suggest that four strategies should be added to Burge's (1994) list: 1) Graceful new member entry; 2) Clarifying ambiguities related to task; 3) Coping gracefully with non-participation; and 4) Negotiating shared level of intimacy.

The study concludes with practical suggestions for implementing online small-group work in a distance context. This study investigates the design of small-group online activities, which is arguably more critical in online environments than in face-to-face ones (Harasim, 1993). Engaging in groupwork online presents its own challenges to the students and moderators. It is even more challenging in the pure DE delivery mode than in the CSCL/face-to-face combined delivery mode.

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Second CC Small-Group Activity 305:
Student Moderator Tasks

For the purpose of the small-group activities, you have all been assigned into a group. You are all responsible for the smooth functioning of the group. Each of you will be assigned a student moderator role in order to help the group successfully achieve the task. Later in the debate activity, these roles will be rotated; each of you will be playing a different moderator role during the debate.

There are four different roles for the feedback activity. These are explained below.

Student Moderator Tasks Appropriate to Feedback Activities

Student Role	***Tasks***
Student One: **Encourager**	• prompting
Student Two: **Task Oriented**	• remedy problems in short term agenda (are we reaching our goals etc.) • explain when you feel that comments are irrelevant to the task.
Student Three: **Content Clarifier**	• ask for clarification of content.
Student Four: **Online Communicator**	• step in when there are interpersonal problems (usually caused by failure to keep to norms of online behavior)

Encourager

Your role is to encourage participation. If someone is not logging in, or participating actively in the activity, then you should prompt them to take part (either through individual mail or in your project conference.) If they do choose to participate, then it is your job to recognize that participation.

Example: "Glad you could join us, Michel-Charles!"

Task-Oriented

Your role is to make sure the group accomplishes the task. You should keep track of the tasks and sub-tasks, and make sure every member of the group is on top of it.

Example: if one of the members of your group does not respond to the feedback provided, you should step in and say "Hey, we're running a little behind here. We've accomplished x, y and z, but we still need to finish q and r....." or something along those lines.

Content-Clarifier

Your job is to make sure the content is clear. If you cannot understand someone's point, and find it unclear, then you should ask for clarification. Often in online communication misunderstandings build due to an ambiguous statement at some point along the way.

Example: "I'm not sure what you mean by "....." Could you explain further?"

Online Communicator

Your job is to make sure that the interpersonal dynamics run smoothly in the group. Often misunderstandings crop up in the online environment due to failure to keep to the online norms of behavior that the group is generally following. Step in, and explain to the participants what you think may have caused the problem, and how it grew. Remind everyone of specific user guidelines, as have been provided to you.

Example, failure to use a ;-) when making a joke may lead to misunderstandings — it is your job to straighten those problems out.

The students in the experimental cooperative condition filled in group reflection forms twice. The first group reflection form is included below to assist the reader in understanding the nature of the treatment. The group reflection form was slightly modified for the purpose of the debate activity, since it was the last small-group activity.

Appendix B
Group Reflection Form and Instructions to Participants

Hi everyone. Please take the time to fill out a couple of forms, First Class style. These forms are about the groupwork that you are engaging in.

The individual responses RE: each group will be synthesized. We will report the overall general results to the group, thus providing feedback to the group as a whole. The goal is to help you all work together better throughout the semester and especially in the debate...

The easiest way to fill out this questionnaire is via FirstClass. Follow these directions, and you will have no problems.

To Fill Out Form:
Step One: On the palette, choose the FWD icon to forward this message.

Step Two: Place your instructor's name in the To: heading.

Step Three: Fill out the form. It may seem odd, but it will actually work rather simply.

All the questions in the first part of the questionnaire follow a format of a statement that you can strongly disagree, disagree, neutral, agree, or strongly agree with. To choose one option, place the pointer immediately before your choice. Type in an X.
e.g.:
1. Sub-tasks (summaries or drafts of work, feedback, replies to feedback) were done on time.
__strongly disagree __disagree __neutral x__agree __strongly agree

This answer indicates that I agree with the statement.

The second part of the questionnaire is short-answer. To answer these questions, just place the pointer right after the "Answer" spot, and start typing.....
e.g.
4. What will be different next time your group works together?
ANSWER:afse;aflkjs;ekjfa;slekjfa;slekjf;lasjkef;laskjfl;askjefl;asjkfel;asjefl;ajsel;fijasel;fjasl;iefjasl;ejfa;lseijfl;saejf;lesajfl;aseijfl;as

Step 4: Once you are finished, just press send on the palette....And off it goes.

Amazing, but it works!!!!
TIA.....

Feedback Groupwork Reflection

I Group Productivity
1. Sub-tasks (summaries or drafts of work, feedback, replies to feedback) were done on time.
__strongly disagree __disagree __neutral __agree __strongly agree

2. Everyone participated adequately.
__strongly disagree __disagree __neutral __agree __strongly agree

3. The feedback your partners provided was useful to you.
__strongly disagree __disagree __neutral __agree __strongly agree

4. The feedback you provided your partners was useful to them.
__strongly disagree __disagree __neutral __agree __strongly agree

5. Disagreements (i.e. contradictory advice) were discussed and resolved.
__strongly disagree __disagree __neutral __agree __strongly agree

II Group Dynamics
1. All members were included in group activities.
__strongly disagree __disagree __neutral __agree __strongly agree

2. There were positive feelings among the group members.
__strongly disagree __disagree __neutral __agree __strongly agree

3. Members of the group were checking in often enough.
__strongly disagree __disagree __neutral __agree __strongly agree

4. The group created a supportive atmosphere.
__strongly disagree __disagree __neutral __agree __strongly agree

III Overall Evaluation of the Group Work
1. What was good about the group work?
ANSWER:

2. What was negative about the group work?
ANSWER:

3. What did the group learn as a whole?
ANSWER:

4. What will be different next time your group works together?
ANSWER:

5. Finally, to improve group dynamics and productivity for the next group activity, please set 3 personal goals to improve your own cooperative skills.
ANSWER:

After the students in the groups had returned these forms online, the student responses were synthesized the responses and a message was placed online from the instructor. An example is as follows:

> Hi Louisa and Sara,
> Well, it's time to respond to your group reflection forms. I know that now you are working in a group of four so it is different, but you probably want to know what kind of feedback we can provide through the forms.

You both felt very similarly about the group work you did together - and happy about it too! That leaves me suffering from the politeness syndrome (that's when people are very very polite when providing feedback, but don't say anything critical so the feedback isn't very helpful.....)

Only one thing I noticed that might help your group: why don't you let each other know when you are going to be logging in? That way, people don't get that strange anxiety of wondering when their partners are coming in.....

TIFN,

Take care,
XXXX
(Online moderator message)

Moderator Instructions EDUC 305

Moderation does not consist of teaching the content of the course.
It consists of facilitating interaction.

The single most important thing about moderation is creating an atmosphere that encourages people to log in not just to satisfy the requirements, but to engage in interaction voluntarily with the other participants. One of the premises of the design of this CC environment is that we should encourage the participants to engage in the CC Village as human beings:

No one could teach a moderator the specifics of how to create a congenial learning atmosphere - each of you has or will develop your own style, and should do it your own way as much as possible.

But some guidelines will help ....

1. At the beginning, provide encouragement and emotional support to the new participants in the CC Village. Empathize with people's difficulties with the new system. Provide lots of technical help and encouragement. Recognize people's contributions and encourage participation by responding to those who are participating. Write both individual messages and group messages to encourage people to participate.

2. Model appropriate user-behaviour. So make mistakes when you type, don't edit all the time (i.e. include sentences that you would say even though you wouldn't write them), cop a casual yet not too casual tone, be personal but not inappropriately so, tell people when you log on, use online symbols and expressions i.e. BTW = By the way, etc. (SEE the user guidelines.)

3. Interact in Pub, not just the required places. Act human; don't act like you are in a classroom all the time. The group discussions are like a classroom, the pub is like Upstairs, and Info & Admin is like classroom task announcements, etc. Have fun, interact as a person, this will encourage the participants to engage in that same way in the conference.

4. Keep your interaction in the small-group activities minimal, except if things actually go wrong such as lack of participation, deadlines not being respected, interpersonal problems that demand moderator intervention etc.

5. The whole-class discussions have the goal to encourage higher-level cognitive thinking. The moderator should pose a question to prompt reaction etc. (these should be negotiated by the moderators and myself such that the same discussion theme is posed in each conference). The moderator should encourage divergent thinking, conversation etc. The moderator should also summarize the state of the discussion and find unifying threads in participants' comments both mid-week and at the end of the activity.

Feenberg's (1993) typology of moderator functions serves as a useful guide for general moderator functions:

Typology of Functions Performed by Moderator	
Contextualizing	*Setting Norms*: A communication model should be selected to establish tacit expectations about conference behaviour and to suggest rules of behavior. *Setting Agenda:* The moderator controls the order and flow of discussion topics, and generally shares part or all of the agenda with participants at the outset. *Opening Discussion:* Carefully designed opening comments should announce the theme of discussion, and identify any shared experiences or symbols which can clarify content and purpose.
Monitoring Functions	***Recognition:*** The moderator refers explicitly to the participants to assure them that their contribution is valued and welcome, or to correct any misapprehension *Prompting*: To solicit comments from participants, either publicly or through private mail messages; might be formalised as 'assignments' in some conferences.
Meta Functions	***Meta-commenting:*** To remedy problems in context, norms or agenda, clarity, irrelevance, and information overload. *Weaving*: To summarise the state of the discussion and to find unifying threads in participants' comments; it encourages these participants and implicitly prompts them to pursue their ideas.

Contextualizing Functions

Setting Norms: I will send to you guidelines for the users, that you can place into your respective conferences. Later, we can add to these guidelines with more sophisticated suggestions, but for the moment, let's keep it simple. That will essentially set the norms. The explanation of the purpose of each conference also helps (See Welcome to CC Village.)

Setting Agenda: This will consist first of placing assignment messages online (explanations of the activity etc.) I will write these "assignment messages" to maintain consistency.

Then, based on the activity in the conference, you will send messages that give a certain flow to the conversation (i.e. if you see a message that moves the conversation to an interesting place, put in some message building on that idea, and moving it to where you want it to be....)

Opening Discussion: This will largely consist of the first messages that go into a conference. This will not be done in the small-group activities, where the students will be assigned tasks such that they provide the initial opening discussion messages. But it will be needed in the whole-group discussions. I think these should be the same in the two

conferences, but I would rather that the moderators designed these together (with my assistance), as this is very content specific and is better done by the tutors.

Monitoring Functions

These two functions of recognition and prompting will be especially important early, even now.

Recognition: Just letting people know that you see that they are participating etc. That is commonly done publicly, but use your judgment - sometimes you want to do it privately.

Prompting: If you wish to prompt an individual to participate, it is best to do that PRIVATELY.

But if you are prompting the group, of course do it in the conference to the group.

Meta-Functions

These are probably the tasks that will take up most of your time.

Meta-commenting: When there are problems in context, norms or agenda, clarity, irrelevance, and information overload you need to step in (to a certain extent.) We need to keep moderator time low, so the most important problems are ones involving norms (what's her name in 305 last year who talked about all her personal problems at great length), agenda (when everyone is not working toward the tasks etc.), information overload. Trying to deal with problems in clarity can be really time-consuming. So don't go overboard. But if a message isn't clear, especially at the beginning, ask for clarification.

Weaving: Summarize the state of the discussion and find unifying threads in participants' comments. I see midway weaving and a final conclusion as very important moderator roles in the whole-class discussions.

Definition of Weaving: Summarize the state of the discussion and find unifying threads in participants' comments. This should be done midway, and then again at the end of the activity. I see midway weaving and a final summary as two different kinds of weaving, each with its own purposes.

Appendix D
Communication Guidelines

This appendix consists of three separate online messages sent to the students.

Message One

Hi everyone. Now that y'all have been in a CC environment for a little while, it is time to talk about online communication. Online communication and offline communication (face-to-face) are rather different. The next two messages in Administration are designed to help you learn to communicate effectively within this environment.

The first one is about guidelines for communicating in an online environment.

The second message is about different strategies you might find helpful to deal with certain ubiquitous problems in the online classroom.

On a lighter note, two funny messages about online communication have also been placed in Pub.
The first one provides some emoticons that have been developed in online communities since body gestures do not exist online. For example, ;-) is a smiley that signifies that the sender of the message is joking.

The second message provides some acronyms that have been developed in online communities, such as IMHO (In My Humble Opinion), and BTW (By the Way).

BFN,
XXX

Message Two

I Guidelines for Communicating Online

Communicating online refers to communicating via telecommunications, such as computer-conferencing systems and bulletin-board systems. Communicating online is not the same as communicating face-to-face, which has caused the evolution of online norms of behaviour that are not the same as face-to-face norms.

Different rules exist in cyberspace than in face-to-face conversation to reflect the differences in face-to-face and online communication. Appropriate modes of behaviour online are evolving. However, certain basic guidelines for electronic communication have emerged. These guidelines reflect the differences between face-to-face and online reading, writing and processing. Below is a set of guidelines to follow, which will be the base for this class.

Reading a Message
1) Read for the main ideas. People are much more informal online, so they may not have phrased their points as carefully as they would have in writing. If you disagree with someone else's point, don't nit-pick at his/her possibly ill-formed arguments. Disagree with the real point, and clarify the point of disagreement.
2) Follow the themes of conversation.

Writing Any Message

1) Place messages in appropriate conferences and topics.
Administration is for all technical questions and those related to the assignments.
Class Discussions is for discussion of the topic covered in that unit.
Pub is for social conversation and non-course related discussions.

2) Keep your own messages within the context of the current topic.

3) Keep your messages limited to one or two key ideas (length should ideally be one screen, but up to 2 is OK.) If you have 5 main ideas, write 5 messages. It really is much easier for everyone if we follow this simple guideline.

4) DON'T USE ALL CAPITALS EXCEPT FOR A WORD OR TWO OR FOR TITLES.
Reading words in all capitals is difficult even off-line, but online it is very difficult.

5) Do NOT overuse colours, bold, italics, large fonts. All of these can be used for emphasis of a word or two, or a title, but if your whole message is in a large font or uses alot of bold, or italics, it will be very difficult for others to read.

6) Most formatting tools are not available, but use those that are available. Blank lines are particularly useful to divide your ideas. You can use one blank line to signify a different point, 2 or more to signify a bigger break in thoughts (similar to a paragraph break). You can even insert a line ---------- before the beginning of a new part to signify an even bigger change.

7) Keep paragraphs short. Include one point/ paragraph.
Separate paragraphs with blank lines.

8) Use descriptive subject headers to clarify to your reader what the message is about.

9) Keep in mind the context. Except in pub, you are in a classroom. At the same time that informality is encouraged, it is important to behave appropriately within the environment. The use of words that others may find offensive is not encouraged.

10) Keep your messages as clear as possible. REMEMBER, you aren't going to be physically present to explain what you mean if the reader does not understand.

11) Don't worry about being perfectly articulate. Get the main idea across as simply as you can.

12) Don't worry about spelling and grammar so long as the meaning is clear -- this isn't a publication.

13) Use analogies and humour to enhance learning and expression, but be careful using sarcasm and even humour. Make sure your audience can tell you are joking (either insert JOKE or a winking smiley -- ;-)

Replying to a Message:

1) Reply to one key idea, or sub-point of an idea.

2) Reference each other's comments

3) This may seem trivial, but it's not -- cite people appropriately. When replying to a message, leave a blank line above and below the cited quotation and give credit. For example:

```
XXXXX said (August 31, 1995):
What is the rationale for having only peer/peer contact
in the conceptualization conferences? I would have thought
this would be the place where Gina and the T.A. could be most
helpful.
```

4) If you aren't sure what the author meant, ask for clarification before presuming to answer to what you think he/she meant.

5) If you are going to say something emotional in response to a message, that's OK. But make sure you warn your audience. At the top write EMOTIONAL, or, if you're angry, them write FLAME. This will help your audience prepare themselves.

Message Three

II Strategies for the Online Environment

Different strategies are needed to cope with the online environment than with the face-to-face environment. Since these are not yet established, users are developing their own strategies. Some strategies will work for some people, but not for others. You should feel free to experiment with approaches that work for you. You can learn different ways to facilitate effective and productive learning. We have provided some basic strategies below.

Three major problems users have identified are 1) information overload; 2) following on-line discussion threads; 3) delay in receiving feedback.

To Deal With Information Overload

1) Learn to read selectively

2) Follow the themes of conversation (see below)

3) Comment selectively — don't just participate for the sake of participating. Say something because you have something to say.

To Follow Online Discussion Threads

1) In a conferencing system, there are several different conversations being carried on, at the same time. Many users find it confusing to figure out how to follow the conversation themes. In First Class, you can use the subject headers to figure out what a message is about. Use the threading function (RE:(1) etc.) to figure out where the conversation flow is.

2) A major question new users have is whether or not to read all the comments first and then respond or to respond as they read along. Our suggestion is as follows:
if you are logging in regularly, feel free to comment without reading all the messages.
if you have not been in lately, you should read all messages before commenting since you are essentially interrupting in a conversation, and you don't really know what is being discussed unless you read all the messages.

3) Focus on one or two themes that interest you most

4) Develop new ways to mentally record and organize the discontinuous information presented on-line

5) Make notes if it helps you.

To Deal With Delay in Receiving feedback

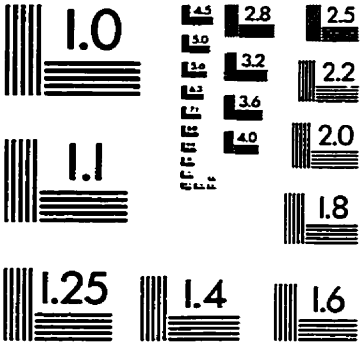
1) Encourage peers to log-on frequently.

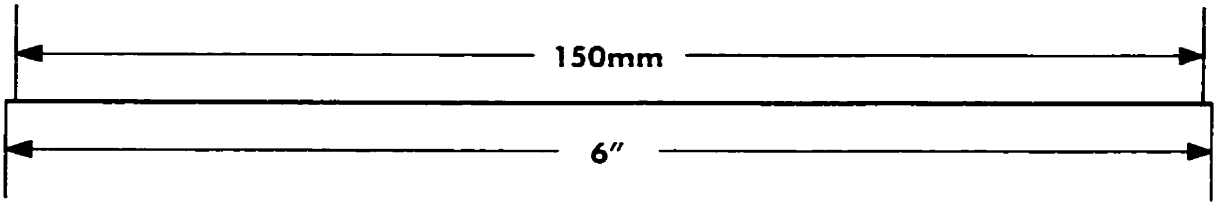
2) Encourage your peers to let you know when and how often they will be logging on.

3) Be patient, but not too patient.

4) Be aware that there are activity cycles - in other words, there are days of the week and times of the day that are more active than others, depending on people's time constraints and their access to the technology. It is important to be aware of this as this may effect when others will respond to your comments. For example, if people tend to participate more actively early to mid in the week, a message that you post on the Monday will have readers more quickly than if you post one on Wednesday.

TEST TARGET (QA-3)





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