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An Evaluation of
Carleton Hotline for Administration and Teaching
“CHAT”

by
Fatemeh Bagherian

A thesis submitted to
the Faculty of Graduate Studies and Research
in partial fulfillment of
the requirements for the degree of

Doctor of Philosophy

Carleton University
Ottawa, Ontario
5 March 1999
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Acceptance of the thesis:

"An Evaluation of the Carleton Hotline for Administration and Teaching "CHAT"

submitted by

Fatemeh Bagherian

in Partial fulfillment of the requirements for

the degree of Doctor of Philosophy

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March, 1999

Abstract

This study evaluated the use of Internet newsgroup facilities for promoting discussion among university students and their instructors. The evaluation was based on data collected from the Carleton Hotline for Administration and Teaching (CHAT), a much publicized newsgroup facility promoted for course use at Carleton University. 2,512 CHAT Course Newsgroups were monitored for discussion activity, then 40 of the most and least active discussion groups were monitored for frequency, authorship and content of messages. In addition, 265 students were surveyed about their Internet use and 20 students and 20 instructors were interviewed about their experiences with CHAT. Results show that CHAT use is at best modest, and that many messages have little to do with course content. Only 547 (22%) of the newsgroups had at least one posting, and only 164 course (6.5%) had at least 10. Fewer than 20% of the students in these 164 courses posted anything, and over 30% of these postings were unrelated to the content of their courses.

The survey and interviews indicated that most common reasons for not using the new medium have nothing to do with the technology itself, and much to do with (1) lack of time and (2) lack of interest in group discussion. Most students are either too busy with tuition-paying, part-time jobs, or are uninspired by the meager content of their course newsgroups to volunteer contributions to newsgroup discussions. Most professors lack the time to lead course newsgroup discussions and see no career-related rewards for doing so. These and other results indicate that effective use of new communication technology for education depends more on the social and organizational contexts of its users than on features of the technology itself.

Acknowledgements

I am not sufficiently able to express my gratitude toward the people who supported me during the production of this dissertation. I would like, first, extend my appreciation to my Advisor, Prof. Warren Thorngate, for his great commitment and intellectual guidance. I deeply appreciate the extra demand on his time, particularly in terms of language. I am in great debt to him for all his support and enthusiasm and also for his supportive and caring nature.

I wish to take this opportunity to also thank my special friend, Barbara Carroll, for her caring and constant encouragement. She was always there for me with her generous heart and unconditional support.

Next, I would like to acknowledge the valuable advice given by Profs. Cherry and Dillon, committee members for this work, which is much improved because of their input.

I also thank my friends and classmates for all their sincere support and encouragement, especially those in our office lab.

I would like to extend my sincere thank-you to all students and instructors whose participation in this project allowed me to complete this work.

Last, but not least, I wish to express my deeply-felt gratitude to my family, Nasser, Shafagh, Ali, and especially my mother for all their warm support and patience.

And finally, I would like to thank The Ministry of Culture and Higher Education in my country, Iran, and Carleton University, which financially supported me and gave me the opportunity to continue my education.

Table of Contents

Abstract	Page iii
Acknowledgements	iv
Table of Contents	v
 Chapter 1: Introduction	 1
Effectiveness of Education	2
Philosophies of Education	5
Theories of Learning	5
S-R Theories	
Cognitive Theories	
Communication Theories	
Similarities and Differences	
Teaching, Learning, and Technology	10
 Chapter 2: Using Computers in Higher Education	 14
History of Computer Technology	15
Computer Technology in Education	16
Computer Technology and Dialogical Teaching	18
CHAT	23
 Chapter 3: The Current Research	 27
Pilot Research	34
 Chapter 4: The Observational Studies of CHAT Course Newsgroups	 38
Study 1: General observations	38
Sample	
Course indicators	
Results of Study 1	39
Study 2: Behavioral observations of CHAT Course Newsgroups	40
Sample	
Data Collections and Procedure	
Results of Study 2	
 Chapter 5: The Surveys of Students	 59
Study 3: Student Questionnaire Method	59
Respondents	
The questionnaire	
Procedure	
Resultsof Study 3	61

Study 4: Student Interview Method	75
Participants	
Interview questions	
Procedure	
Results of Study 4	77
Chapter 6: The Interview with Instructors (Study 5)	85
Participants	
Interview questions	
Procedure	
Results	87
Chapter 7: Discussion	102
References	120
Appendix 1: Questionnaire	133
Appendix 1a: Pilot Study Questionnaire	136
Appendix 2a: Interview Questions for Active Instructors	137
Appendix 2b: Interview Questions for Active Students	138
Appendix 2c: Interview Questions for Inactive Instructors	139
Appendix 2d: Interview Questions for Inactive Students	140
Appendix 3: Recruiting Participants	141
Appendix 4: Debriefing	142
Appendix 5: Statement of Informed Consent	143

CHAPTER 1: Introduction

This dissertation evaluated how computer communication is used for teaching courses at Carleton University. The assessment, based on course newsgroups residing on the Carleton Hotline for Administration and Teaching (CHAT), investigated the relation between potential benefits of CHAT for university education and actual benefits that accrued from current CHAT usage. It also gathered opinions from CHAT users about how CHAT can be improved for education.

I begin my dissertation by examining the concept of effective education and by reviewing some of the philosophical debates about learning, education and the links between the two. The review focuses on teaching-learning style and how computer communication technology might contribute to facilitate learning. Second, I focus on the use of technology in higher education, particularly computer communication, by reviewing its history and its effects. The strengths and weaknesses of computer technology in promoting effective education are critically examined through a review of the literature. Next, I describe CHAT and its potential as a tool for university education. This is followed by a discussion of my proposed evaluation of CHAT and the importance of this evaluation. The discussion attempts to justify the need for an evaluation of computer communication technology in education and is guided by the results of two pilot studies of CHAT. Finally, two complementary methods of assessing the effectiveness of CHAT for university education are presented: (1) behavioral observations, and (2) questionnaire and interview.

Computer technology and communication are used in public relations claims of

many North American universities to suggest high quality of university education. Many of these universities take great pride in promoting their latest computer facilities and innovations (see, for example, three web sites: <http://darking.uoregon.edu/>; <http://www.cde.sfu.ca/>; <http://www.cvn.colombia.edu/>; EDUCOM, 1994). However, none report data to support their claims that their new technologies will increase the effectiveness of their teaching or the quality of education (Boettcher, 1994). How effective are these technologies for improving the effectiveness and quality of university education? There are few studies that address how educational technology, particularly computer communication, improves education at the university level. For example, the Carleton Hotline for Administration and Teaching (CHAT) has been used at Carleton University since September 1993, but there has been no publicly available evaluation of its effectiveness. How can its effectiveness be assessed?

Effectiveness of Education

Although a wide range of literature discusses the effectiveness of education (see for example, Dewey, 1975; Eurich-Fulcer & Schofield, 1995; Freire, 1970; Hargreaves, 1994; Johnson & Johnson, 1997; Mercer, 1995; Novak & Tyler, 1977; Pelikan, 1992; Whitehead, 1957), there is no clear definition of its meaning. According to the literature, education is generally effective if it: 1) improves performance, 2) teaches new skills, 3) increases knowledge or information, 4) provides communication and interactions among people to exchange and share their knowledge or information, or 5) increases awareness (Bruner, 1996; Gill, 1993; Gulley, 1960; Laurillard, 1993; Freire, 1970). Definitions of effective education vary according to level of education as well. For example, there are

several different definitions of effective education for pre-school, primary school, high school, adult, and university students (Gill, 1993; Naegele, 1974; Piaget, 1926; Silcock, 1993; Wood, 1988). According to the literature, one definition of effective education at university suggests that education should help students to analyze ideas and concepts through discussions and communication (Gill, 1993), thus confusing means and ends. Such confusion reflects the many philosophies surrounding various definitions of education, regarding its nature, its values, and its purpose.

Philosophies of Education

Philosophies that justify different meanings, values or purposes of education have been debated at least since Socrates (Bruner, 1996; Freire, 1970; Mercer, 1995; Shotter, 1995). One major debate addresses the meaning of education: Is education the transfer of knowledge or the construction of knowledge? Another debate addresses the values of education such as how education can empower people socially, economically, or politically. Still another philosophical debate addresses the goals of education, for example, the goal of enlightenment versus the goal of practical skills. Among such philosophical complexity, a few general themes can be seen. Two of them I wish to emphasize are the pragmatic and the intellectual approaches to education that emerged from major debates about the purposes of education (Dewey, 1975; Gill, 1993; Hargreaves, 1994). Pragmatic and intellectual orientations to education have led to different styles and forms of teaching and thus are appropriate issues for the present study.

Pragmatic education is designed to improve practical skills and performance

through practical exercises (Dewey, 1975). Pragmatic education, also called practical arts, demands a "hands-on" approach to learning mainly through physical involvement such as observing and touching the subject matter to be taught. According to the pragmatic approach, the purpose of education is to provide training for employment (Dewey, 1975; Gill, 1993). Thus, education is a means and should train people to become experts in different professions needed by society.

In contrast, intellectual education focuses on the analysis and synthesis of ideas (Gill, 1993; Novak & Tyler, 1977). This philosophy emphasizes the humanitarian goals of education. Education is seen as the means to enlightenment and understanding, as an end in itself. Consequently, people should receive education because of the joy of discovery and learning. The approach encourages thinking and debating ideas and events from different points of view. Such education will assist people to increase their tolerance for others and to improve their understanding of themselves, others, and their environment. The understanding is assumed to result in a happier and more peaceful life.

Educational systems are affected by these philosophies of education. Since universities began in West about 900 years ago, they have been greatly influenced by the intellectual approach to education (Brennan, 1986). However, in this century most universities have seen the increasing influence of the pragmatic education philosophy. Universities teach liberal arts and consider learning a joyful activity, but they also train students for professional skills such as medicine, law, agriculture and engineering. Many seek a resolution of the two philosophies by requiring students to sample both, for example, by requiring engineering students to take a few courses in the humanities and

social sciences. Few, however, require humanities students to take courses in engineering.

Other philosophical debates about the meaning and value of education also affect educational institutions to some extent, whether the orientation of the institution is pragmatic or intellectual. The debates usually affect the curriculum by influencing decisions about the content of courses. But they do not address how the content should best be delivered or how the education system should work. Debate about the means of education are found primarily in educational psychology. Psychologists have contributed much to the development and introduction of learning theories and practices in educational institutions (Bruner, 1996; Grazia & Sohn, 1964; Gill, 1993; Novak & Tyler, 1977). It is worthwhile to review them briefly here.

Theories of Learning

In the past 100 years psychologists have proposed many different theories and models of learning (see Dewey, 1975; Estes, 1970; Freire, 1970; Gill, 1993; Johnson & Johnson, 1997; Kibby, 1984; Levin & Allen, 1976; Mercer, 1995; Wells, 1981; Zimmerman & Schunk, 1989; Tough, 1971). Most of them can be classified into three general categories: Stimuli-Response (S-R) Theories, Cognitive Theories, and Communication or Group Learning Theories. As it is expected in any scientific community, there are degrees of agreement and disagreement among psychologists about these theories (Bandura, 1977; Bower & Hilgard, 1981; Mercer, 1995; Novak & Tyler, 1977; Tolman, 1958). Many of the disagreements concern fundamental principles, for example, definitions of the stimulus and feedback in learning (Powers, 1978). Other

disagreements concern the interpretation of theoretical principles (e.g., the role of reinforcement) (Collier, Minton, Reynolds, 1991; Harre & Secord, 1972; Leahey, 1994; Secord, 1982; Wertheimer, 1972). Even so, these theories have been used to direct or to justify much work in education. In the following section, stimulus-response (S-R), cognitive, and communication theories are briefly reviewed in order to investigate their contribution to education.

S-R Theories. This class of theories became the defining orientation of the behavioristic approach to psychology (Hilgard & Bower, 1981; Zimmerman & Schunk, 1989). According to S-R theories, learning occurs as a result of reinforcement (punishment and reward) (Bower & Hilgard, 1981; Estes, 1970). Proponents of S-R theories assume that humans learn by first responding to stimuli in their environment then receiving feedback about the consequences of their response. Some source of motivation or drive is first needed in order to stimulate first respond. There are disagreements about the nature of feedback. Some theorists argue that the feedback must be related to the motivation, and it must reduce drive for learning to occur (Hull, 1943). Others argue that feedback serving to inform the learner is sufficient for learning to occur. All assume, however, that feedback of some kind is necessary for learning, and thus for the kind of learning called education. And all assume that the faster and clearer the feedback, the quicker learning will occur. Perhaps because of its roots in the United States and its emphasis on behaviour rather than thought, S-R theories are associated more with pragmatic philosophies of education than with the intellectual philosophies.

Cognitive Theories. Though cognitive theories of learning can be traced back to

the time of Aristotle, modern versions emerged from the cognitive revolution of the late 1950s in the United States as an alternative to behavioral psychology (Kibby, 1984; Leahey, 1994; Levin & Allen, 1976). These theories are based on the belief that in order to understand learning we must understand the mental processes that allow learning to occur. Early cognitive theories differed from their S-R rivals over the role of simple observation in learning (e.g., see Tolman, 1958). In contrast to S-R theorists, cognitive theorists believe that responses are not necessary for learning - - that organisms, especially people, can learn as much by watching as by doing or by trial and error (Bower & Hilgard, 1981; Collier, Minton, Reynolds, 1991). Some rewards can facilitate learning by increasing attention, but they are not necessary for learning to occur. Learning is based on attention and thought. Thus, feedback is important, but is neither necessary nor sufficient for learning. Much feedback lies beyond the cognitive capacity of learners to comprehend. As a result, effective education should be a step by step process, where each step is based on previous knowledge a learner has. This prescription is similar to the S-R theorists principles of successive approximation and shaping. However, few S-R theorists admit to anything called knowledge, as least to knowledge as conceived by cognitive theorists.

Many of the differences between behaviorist S-R theories and cognitive theories can be traced to the kind of learning they emphasize. As the two names imply, behaviorist theories have focussed on behaviour, especially motor movements, while cognitive theories have focussed on mental processes. As a result, S-R theories seem useful to educators seeking to improve skills in musical performance, sports, laboratory

technique or the building trades. Cognitive theories, on the other hand, seem useful to educators who seek to improve students' understanding of evolutionary theory, political philosophy, or strategic management.

Communication Theories. A third approach to learning views learning as an outcome of communication (Bruner, 1996; Mercer, 1995; Shotter, 1995). The communication approach assumes that people learn through their interaction with each other in the context of their culture and environment. During their interaction, people often construct knowledge as they exchange information; knowledge develops in the form of shared meanings (beliefs, values and explanations) that are constructed to make sense of the information exchanged (Bruner, 1996; Gulley, 1960; Wells, 1981). In many situations the construction is not equal; some people play a larger role than others. So it is with teachers and students. Teachers traditionally share their views along with the facts they communicate to their students. A teacher's beliefs and values influence what and how a teacher chooses to teach (curriculum and pedagogy). In addition, the teacher's explanations of the information imparted give students knowledge of how information "fits together" such as the causes and reasons and about what changes over time. To impart this information and knowledge, a teacher must learn what a student knows and does not know, then negotiate a communication strategy with the student to suit their common understandings. This often occurs in a dialogue between teacher and student that allows the teacher to adjust his/her comments and questions according to the student's previous responses. The best known form of this dialog was reported by Plato about 2,500 years ago. Variations have been discussed at length by Vygotsky (1986), and

more recently by Bruner (1996). Some stress the importance of emotion for learning in the dialogue (e.g., Bruner, 1996; Teevan & Birney, 1964), including excitement, curiosity, laughter, anger and aesthetic pleasure. Because of its emphasis on knowledge and understanding, communication theories are mainly associated with the intellectual philosophy of education.

Similarities and Differences. The three types of learning theories: S-R, cognitive and communication, are similar in addressing how learning occurs and how it could be effective. All of them address learning and its efficiency, although from different perspectives. Each has been incorporated, to a greater or lesser extent, into modern education systems. Yet they all are also similar in their inadequacy to encompass all aspects of learning.

The strength of each theory depends on what aspects of learning are addressed. Intelligence, motivation, emotion, attention, previous knowledge, feedback, reinforcement and communication are among the factors necessary for learning to occur. S-R theories focus on motivation, motor behaviour and reinforcement but overlook cognition, emotion and communication. Cognitive theories address attention and mental processes but ignore motivation and communication. Both kinds of theories emphasize individualistic aspects of learning and overlook social aspects. Communication theories, in contrast, address the social aspects of learning through teacher-student dialog and group processes, but address only vaguely issues of motivation, reinforcement, attention or mental mechanisms. It can also be concluded that S-R and cognitive theories assume that learning occurs through transformation of knowledge whereas communication

theories assume that learning occurs through construction of knowledge.

It seems reasonable to assume that a general education must make use of ideas and suggestions from all learning theories, simply because no one theory addresses all the facets of a general education. Most good teachers know this instinctively. If we watch good teachers, we can see examples of their utilization of S-R theories, cognitive theories, and communication theories and how they switch from one to another according to the students they are teaching, the topic of instruction, and the time and facilities available.

Teaching, Learning, and Technology

As the philosophies of teaching and the theories of learning have multiplied, so too has the number of teaching methods and styles (Brown & Alkins, 1991; Bruner, 1973; Hargreaves, 1994; Postman & Weingartner, 1969; Rogers, 1983). Ancient methods of apprenticeship, Socratic dialog and lecture, have been supplemented by methods such as seminars, discussion groups, laboratories, field placements and programmed instruction. Many styles have been developed within each method such that hundreds of different combinations are now possible.

The variety of these techniques presents teachers with an increasingly difficult question: Which teaching method is the best? The question is difficult because so many criteria can be used when evaluating the benefits and costs of any method. As noted above, many of these criteria are related to the topic, students, teacher, time and facilities. For example, is the teacher teaching students to sew or to develop a post-modern critique of advertising? Are the students literate or illiterate? In grade school or a Ph.D programme? Motivated by curiosity or by a desire for a good job? What are the teacher's

habits and preferences for teaching styles? How many students must be taught? How much time do students and the teacher have? What facilities are available for their education?

Many of these questions can be reduced to one: What is the most effective teaching method? A strong case can be made for one of the oldest, the Socratic Method. This method, well illustrated in Plato's dialogues (Hamilton, 1951), seems to have the capability of satisfying all teaching requirements of S-R theories, cognitive theories, and communication theories (Grazia & Sohn, 1964; Hamilton, 1951; Laurillard, 1993; Novak & Tyler, 1977). In its idealized form, the Socratic method brings together one student with one skilled teacher for several hours of educational dialogue. Socratic teaching is then the result of a series of questions that a teacher asks a learner and according to the student's answers, the teacher asks other questions. The dialogue ends when the student learns a concept. The skilled teacher can use the method to give immediate feedback, to sustain motivation (S-R theories), to ask questions according to the student's background knowledge (cognitive theories), and consequently to establish effective communication and interaction with the student (communication theories) thus satisfying the requirements of good teaching suggested by all learning theories.

However, Socratic method has been criticized regarding its authoritarian style (Laurillard, 1993). Less authoritarian versions of Socratic teaching have been practiced as a better and more humanitarian style under the names of participatory education, discussion groups, tutorials, etc. In this paper, the main feature of Socratic teaching under investigation is these more modern dialogical approaches.

Unfortunately, the Socratic method or dialogical method suffers from two practical limitations. First, it requires skilled teachers to be used effectively, and skilled teachers are in short supply. Second, it requires a large investment in the teacher's attention and time. As with music teaching, a skilled teacher may spend 2-3 hours per week alone with each student; consequently, in a 40-hour week, no more than 20 students could be taught. Similarly, a classical apprenticeship requires a large investment of the master's time and the use of his/her tools, in order to train new masters. These investments severely limit the number of apprentices who can be trained. More generally, the dialogical method -- a well-respected method of "intellectual apprenticeship" -- requires a large investment of time and attention from both student and teacher, as well as great teaching skills. Again, these investments and skills may be in short supply, thus limiting the number of students who can be educated by the dialogical method or the amount of education that any number can have. In general, it is often impossible to utilize the most effective teaching methods for any combination of topics and students because the methods require more skill, time, or facilities than the teacher has.

In order to overcome the logistic limitations of teaching (time, space, and facilities), teachers have long attempted to invent or to adapt technology to serve the means and ends of education. Examples include a chalkboard for teachers and slates for students, books, cheap paper and workbooks, films, overheads, and computers. But as these technologies have been developed to serve the means and ends of education, so too have the means and perhaps the ends of education sometimes been adapted to serve the

characteristics or limitations of the technology. Most old technology has favoured the lecture (e.g., chalkboards, overheads, film clips, slides, audiotapes, etc.). Most computer technology, focussed on “one student, one computer” allocations has also favoured S-R and cognitive approaches to learning while overlooking the communication approaches. CHAT promises to correct this limitation by its emphasis on facilitating student/teacher and student/student dialogues.

CHAPTER 2: Using Computers in Higher Education

The history of employing technology to facilitate learning closely follows the history of civilization. In all historical eras, educators have used technology no matter what their philosophical or theoretical orientation. Whenever a new technology is born, educators seem to seek an educational use for it (Anderson, 1996; Barker & Yeates, 1985; Farrell, Johnson & Lopez, in press; Grazia & Sohn, 1964; Heermann, 1988). So it is not surprising that computer technology has raised many hopes for improving education. However, the use of computer technology in education might also be resisted - as has been the case in the introduction of any new medium, including writing which was opposed in the beginning in favour of oral system of education (Carey, 1991). There is usually a tendency, at least at the beginning of the arrival of a new technology, to stay with traditional education approaches for reasons such as pedagogical values, professional insecurity, fear of losing a job, or time and cost demands associated new technology training (Carey, 1991; Jaffee, 1998; Johnstone, 1991; Noble, 1998; Young, 1998). In addition, there are doubts and ambiguities about the positive effects and usefulness of the arrival of any new technology in education, leading some educators and teachers to take a cautious approach to the new technology. All these concerns have surrounded the usefulness of computer technologies in education, including university education. There are many studies and arguments alternatively advising great benefits or disadvantages of computers in education (e.g., see Boettcher, 1994; Clarke, 1985; Kulik, Kulik & Cohen, 1980; Mcquillan, 1994; Nakajima, 1994; Perkins, Schwartz, West, & Wiske, 1995).

The development of computers has stimulated educators to raise their pedagogical expectations faster than any other technology of the past generation (Caporalet, 1984; Hartley, 1972; Kulik et al, 1980;). Among the different computer technologies, computer communication has stimulated perhaps the highest expectations for improvement of education (Althaus, 1997; Kiesler, 1997). In order to understand the development and implications of computer technology for education, I will briefly review the history of computer technology and computer communication, note their relation to learning theories and illustrate their application to education by showing how they are used to emulate the classical Socratic teaching method or the more modern version of it: dialogical method. I will then give a brief history of the Carleton Hotline for Administration and Teaching (CHAT) and its claimed potential for university education.

History of Computer Technology

Computer technology was perfected during the 1950s. However, the idea of making a computing machine to perform mathematical calculations can be traced to the 17th century when Gunter and Pascal developed their analog device and digital calculating machine in 1620 and 1642 respectively (see <http://tqd.advanced.org/3342/history/>). With the exception of Babbage's models for a "differential engine", the idea of an automated calculating machine remained hypothetical until the 1930s when the first analog computer and then digital computer were built. Ideas about computer memory that could be modified by computer programs were not implemented until the mid-1940s with the development of Mark 1 at the University of Pennsylvania and of ENIAC at Harvard University. The rapid development of

computers, however, is attributed to the interest of the U.S. National Defense Research Committee (King, Grinter & Pickering, 1997). Computer communication began in the mid-1960s with the invention of the modem; only then did it become possible to send electronic mail via computer (Kiesler, 1997).

The growth of electronic mail in the 1970s stimulated the development of the Internet (Anderson, 1997; King, et al., 1997; Ma, 1996). Development of graphical interfaces allowed people to perform jobs using computers with minimal computer expertise (Ashenhurst, 1973; Carroll, 1973; Davis, 1997; EDUCOM, 1973/1977/1979; Futorn, Schofield & Eurich-Fulcer, 1995; Hall, 1973; Shute & Gawlick-Grendell, 1994). When these interfaces were incorporated into browsers for files available on the Internet in the early 1990s, the World Wide Web was born.

Computer Technology in Education

University researchers were closely involved in projects to develop computer technology, and were among the first groups to use computer technology and computer communication (EDUCOM, 1973/1977; Kiesler, 1997). It is therefore not surprising that attempts were made to use these new technologies for education. A major manifestation of computer technology can be seen in the development of computer assisted instruction (CAI) used in schools and universities.

Among the first generation of computer programmes for education was a system called PLATO, inspired by S-R theories and associated with the Skinnerian philosophy of learning by small steps via programmed instruction (Hiltz & Turoff, 1981; Grazia & Sohn, 1964; Hall, 1973; Kiesler, 1997). PLATO claimed to teach students scientific and

technical concepts, such as those in mathematics or electronics, via the computer. The programme presented information and examples in text and graphic formats (screen by screen) usually asking students questions that could be answered using the computer keyboard and scored immediately on the computer. Feedback could be given to students immediately, and different screens could be displayed depending on the correctness of a student's previous answer.

PLATO generated high hopes for the future of computer technology in education by promising high quality mass teaching of students, each linked to a giant PLATO computer at school or at home. PLATO promised one-to-one tutoring for each student, like Plato himself (Hiltz & Turoff, 1981; Moore, 1988; Suppes & Morningstar, 1972). Omar Moore's (1977) subsequent development of a computer assisted instruction (CAI) programme that helped to teach three- and four-year old children how to read and write led many educators to hope that we would soon remove illiteracy among the disadvantaged and decrease the educational gap between rich and poor (Hiltz & Turoff, 1981).

Unfortunately, the results of research on the effectiveness of PLATO and other CAI programmes have been, at best, ambiguous. Research on the use of CAI in the 1960s and 70s showed that CAI had a positive effect on learning. For example, students who worked with CAI received on average an equal or better mark than those who did not use CAI (Adams, 1969; Grazia & Sohn, 1964; Suppes & Morningstar, 1972). However, research on the effectiveness of CAI during the 1980s and 1990s was less positive (Barnard & Sandberg, 1988; Dalton & Hannafin, 1988; Goetzfried & Hannafin,

1985). Among other results, this research demonstrated that CAI is helpful for self-motivated students but not helpful for those who needed external rewards to learn (Bass, 1972; Hativa, 1988). It also re-emphasized the important role of teachers for those students who use CAI programmes. When teachers are available for additional supervision, the programmes are more effective largely because the teacher can provide better encouragement and reward for students, and thus sustain their motivation for CAI work (Suppes & Morningstar, 1972).

Computer Technology and Dialogical Teaching

PLATO and its first-generation variants (e.g., PILOT, a small version of PLATO for Apple 2 computers) were created according to S-R theories of learning. As mentioned above, the computer programmes written for PLATO systematically asked students questions, then provided immediate feedback on the computer screen (Ramo, 1964). This aspect of programmed instruction was often likened to the ideals of Socratic teaching or the modern version of it - - dialogical teaching (Grazia & Sohn, 1964) because, in his dialogues, Socrates emphasized student-teacher interaction and quick feedback.

The analogy between PLATO and dialogical teaching has been shaky at best. A dialogical oriented teacher formulates his/her questions and replies to students according to logical implications and fallacies of their statements. Often, these implications and fallacies are subtle and complex, requiring the teacher to draw on a large body of his/her accumulated knowledge. Programmed instruction has not yet been able to duplicate such a knowledge base or to approximate the mental processes of a teacher in formulating

his/her replies. A great limitation of programmed instruction has been its mechanical approach. Though not necessary, most programmed instruction presents the same material and asks the same questions of all students. The few CAI programmes that do vary the order or level of material have none of the sophistication of a dialogical teaching, and they are extremely difficult and expensive to develop. Efficient teaching, it seems, requires good communication between teacher and student. Programmed instruction has not yet been able to meet this requirement.

Cognitive theories stimulated a second generation of CAI which focussed on teaching logical thinking and problem solving skills. Perhaps the best known manifestation of cognitive theories in CAI is the programming language called LOGO (Papert, 1980/1993) which is still taught in high schools. Its use in schools is justified by the belief that when students learn to write computer programmes they learn how to think logically and solve problems, and that these programming skills will generalize to many other problems that students will encounter in their lives. This is similar to the claim that learning mathematics or Latin will strengthen the mind for future challenges. There is, however, no strong research evidence to support the claim that mental skills learned in one discipline will generalize to others.

Cognitive theories also emphasize the central role of attention in learning, and have recently been used to justify the development of multimedia educational materials. These materials rely on graphics, animation and sound for focussing and sustaining attention on information to be learned. Many of the materials also claim to be interactive -- the same term used for programmed instruction. However, interaction between

computer and student is typically limited to moving and clicking a mouse. Students are rarely required to answer questions, nor are they required to proceed through information in small steps. In contrast to programmed instructional materials which attempt to teach students in a linear progression, and to LOGO exercises which attempt to teach in a logical progression, most of the recent multimedia educational offerings emphasize a "nonlinear" or "alogical" style of exploratory learning by clicking hypertext links from one topic to many others. This exploratory style seems to be justified by an assumption that students somehow instinctively know which links will teach them the most for their level of education. I have found no research to support this assumption.

These two contrasting cognitive approaches to education, LOGO and multimedia, now dominate CAI but they both share at least one common limitation of the S-R and cognitive approaches: communication between student and the educational programme is quite limited. LOGO can quickly inform a student if he/she is correct or incorrect in developing a LOGO programme; if the syntax is incorrect, the programme will not run, and if the semantics of the programme are incorrect the programme will not do what the student intended. But LOGO does not tell the student why the programme will not run or does not run as intended. Although computer programmes can replace some of the functions of teachers, it seems that teachers are still central to education simply because the skilled ones can communicate effectively with their students. Thus, if CAI is to incorporate the best features of dialogical teaching, then it ought not attempt to replace teachers, but instead develop features that will facilitate dialogues between and among teachers and students. Many such features are now being developed under the general

category of computer communication. They now have the potential to facilitate dialogical teaching and overcome the limitations of CAI programmes developed only under the influence of S-R and cognitive educational theories.

Communication theories have recently been applied to guide the development of computer programmes that facilitate educational dialogues (or what is now known as group learning or collaborative learning or dialogical learning, etc.). In fact, development of computer-mediated communication has inspired educators to use this technology to support many new forms of distance education.

The expansion of colleges and universities has often contradicted claims of effective education through communication between instructors and students. The reason is that the expansion of universities usually is associated with an increase in student/faculty teaching ratios. There are many practical limitations of time, space and human resources in affording interaction between and among teachers and students. Developments in computer communication such as e-mail, newsgroups, and online chat sessions have the potential to reduce some of these limitations, especially those related to transporting people to the same place, scheduling meetings at the same time, and repeating information that each student should learn (Emery, 1979; Futoran, Schofield & Eurich-Fulcer, 1995; Johnstone, 1991; Peter, 1994; Schofield, 1994; Sproull & Faraj, 1997). By allowing teachers and students to interact with each other at different places and times, computer communication can, in principle, simulate a dialogue as well as face-to-face communication and motivate students more effectively than traditional CAI (Suppes & Morningstar, 1972). Indeed, computer communication has the potential to

transform traditional universities from local to global institutions because it allows the exchange of information among students and teachers not only across the university but also around the world (Carnevale & Probst, 1997; Johnstone, 1991; Laurillard, 1993; Weedman, 1991).

Yet there are limitations to group learning via computer communication as well. Though the medium solves many problems of scheduling, it rarely reduces the time and attention needed to teach or to learn. If more students are attracted to learn via computer communication, who will teach them? All of the dilemmas of expanded classes remain. Attention is a finite resource (Thorngate, 1990/1997; Whittaker & Sidner, 1997). Teachers do not have unlimited time to teach and students do not have unlimited time to learn. Many of them are slow typists. And many do not have access to the newest communication technology. So it is impractical to expect that computer communication will allow more one-to-one dialogues between students and teachers than will face-to-face interaction. In addition, the degree of miscommunication and misunderstanding is significantly greater in computer communication than in a face-to-face communication (Aruhachalam & Dilla, 1995; Reid & Malinek, 1996). There are many gestures and cues in a face-to-face communication that help us understand others; without these visual cues in communication via computer, misunderstanding that can limit the effectiveness of teaching are more likely to occur (Laurillard, 1993). Even so, the potential benefits of computer communication to free teachers and learners from the constraints of time and place is a great advantage for education. These potential benefits seem to have inspired Carleton University to invest so much effort in the development of CHAT.

CHAT

What is CHAT? CHAT is the abbreviation for Carleton Hotline for Administration and Teaching. According to Carleton University, CHAT is a computer communication system that provides 'students with an easy means of communication' with professors, teaching assistants and other students using electronic mail (e-mail) and course discussion groups (newsgroups) via the Internet (Student's Guide to CHAT, 1996; see also http://chat.carleton.ca/index/original_proposal.html). Discussion groups on CHAT are called Course Newsgroups (CNs). CHAT Course Newsgroups are "locations" on the Internet that provide a place for instructors and students to post publicly their comments, questions, and responses for all others to read. Carleton University emphasizes the benefit of CHAT as an efficient strategy to save time and money by implementing computer communication and to make undergraduate students ready for graduate study by being involved in dialogical learning through course newsgroup discussions (http://chat.carleton.ca/index/original_proposal.html). CHAT also allows users to access Internet services such as gopher, ftp and the World Wide Web. Each Carleton University student is given a CHAT account as part of his/her registration package, though not all students use the account they have.

Students can access CHAT from several computer labs on campus or from home via a modem, and can post messages to any one of over 2,500 Course Newsgroups (one for each course and section offered at Carleton) or to any of the 5,000 other newsgroups on and off campus. Each course newsgroup is created by Computing Services staff at the beginning of a university term. Instructors and students are free to post whatever they

want to discuss in a course newsgroup, and the material remains posted for the duration of the course. Typically, instructors or teaching assistants post course materials, questions and comments, and students read and respond to them. Students also respond to each other's questions and comments.

CHAT terminology. There are several terms that most CHAT users learn. Those used in this dissertation, along with their definitions, are presented below:

Posting: A message sent to a newsgroup. It can be a topic or a response to a topic;

Topic: A message posted to begin discussion on a CHAT Course Newsgroup;

Reply: A message posted to comment on or respond to a topic;

Course Newsgroup materials: Course outlines, announcements, assignments, grades, etc. posted by instructors or teaching assistants for students' information; they are usually posted as topics;

Course Newsgroup discussions: Questions and comments about the course posted either as topics or responses by instructors, teaching assistants and students for discussion.

CHAT is an educational technology that seems to be adaptable to most theories of education, including many aspects of S-R and cognitive theories. For example, CHAT allows teachers and teaching assistants to provide the kind of rapid feedback prescribed by S-R theories. The Web facilities within CHAT allow distribution of programming exercises and teaching materials prescribed by cognitive theories. And CHAT's e-mail and Course Newsgroups facilities are well designed for group or dialogical learning. All

of these features give CHAT the potential to enhance university education (Althaus, 1997) by offering more of the advantages of dialogical education to more students across time and space.

There are now over 2,500 Course Newsgroups on CHAT. There is no doubt that, in theory, CHAT offers many opportunities for increasing the quantity, perhaps even the quality, of professor-student and student-student interaction through e-mail and Course Newsgroups. There is also little doubt that, in theory, this increase can enhance some aspects of education. But what is doubtless in theory is not necessarily confirmed in practice. In the Winter Term of 1997 fewer than 30% of all courses at Carleton had any course newsgroup discussions. Most of the discussions accumulated fewer than five postings over the 12-week term; many were postings unrelated to the content of the course (e.g., advertisements for roommates). These and similar statistics strongly indicate that CHAT has not yet reached its potential. One of the primary purposes of my dissertation was to learn why it has not, and to determine what can be done to improve the use and educational effectiveness of CHAT.

When computer and communication technology began to be used in schools and universities, many people, including parents and educators, thought it would be a revolutionary solution to many problems of education (Hiltz & Turoff, 1981). The technology seemed so promising to motivate students and to facilitate learning that parents could dream of having a Socratic teacher as a tutor for his or her child (Hiltz & Turoff, 1981). Now the technology is present in most educational systems, but the dream has not yet been fulfilled. Traditional teaching and learning are still dominant in schools

and universities (Kiesler, 1997), and CHAT is far from dominating Carleton University educational activities. There are probably many reasons for the limited use of CHAT for education. Students and teachers may not have the necessary equipment. There may be lack of student and instructor awareness of CHAT's availability or how to set it up. Training may be insufficient (Davis, 1997). There may be insufficient time for students and professors to explore more of the educational potential of CHAT (Thorngate, 1997). There may also be technical problems associated with CHAT access. Many might believe that CHAT will diminish the quality of education and thus oppose using it (Carey, 1991). Finally students and professors may simply not know how to use the new medium effectively (Emberley & Newel, 1994). It was considered important, therefore, to evaluate which of these and other possibilities have prevented greater adoption and more effective use of CHAT.

CHAPTER 3: The Current Research

The current research attempted to assess the uses of the Carleton Hotline for Administration and Teaching (CHAT). Included were studies of the frequency and types of CHAT use among students, professors and teaching assistants, of the frequency and nature of course discussions on CHAT, and of students and instructors' opinions about CHAT, its facilities and how they may be improved. The intent of this research was to clear up some of the ambiguity surrounding the effectiveness of computer technology, with a focus on computer communication in education (Mcquillan, 1994). I gave special attention to an assessment of the extent to which the potential benefits of CHAT have been realized, and the reasons for failures to realize those potential benefits. The results shed light on the extent to which technological, organizational and social factors influence CHAT use, and provide practical suggestions for improving the quantity and quality of CHAT interaction.

A search of the literature uncovered only one study which evaluated the educational aspects of computer communication at the university level (Althaus, 1997). There are, however, several studies of computer communication in grade and high schools and on the Internet that address non-educational uses (for reviews see Bresler, 1990; Hall, 1996; Herring, 1996; Hiltz & Turoff, 1981; Jones, 1995; Kerr & Hiltz, 1982; Kiesler, 1997; Latchem, Williamson & Henderson, 1993). Included are studies of linguistics, gender and cultural differences, pornography, and social dynamics, as well as comparisons between face-to-face and computer communication in global and local situations from both academic and recreational perspectives (Binik, Cantor, Ochs, &

Meana, 1997; Carroll, 1989; Collot & Belmore, Herring, 1996; Condon & Cech, 1996; King, Grinter, & Pickering, 1997; Korenman & Wyatt, 1996; Mehta & Plaza, 1997; Sproull & Faraj, 1997; Straus, 1996; Yates, 1996). Most of these studies used observational and case study methods (see for example, Collot & Belmore, 1996; Condon & Cech, 1996; Hall, 1996; Korenman & Wyatt, 1996; Ma, 1996; Werry, 1996; Yates, 1996). A few of these studies are relevant to my proposed research.

Studies of the use of computer mediated communication on group decision making show interesting differences in comparison with face-to-face decision making. Carroll (1989), for example, showed that when university students were asked to meet face-to-face or via computer in order to recommend changes to the university library policy, their recommendations were similar but the procedures were different for the two media. Students who met via computer were more likely to distribute their comments and suggestions evenly among themselves; that is, there was less domination of one or two individuals than there was in the face-to-face groups. In a study of university students, Condon and Cech (1996) compared face-face discussion with computer-mediated discussion in dyad groups making decisions about simple tasks such as planning social events or budgeting a trip. Their results showed that computer communication provided more efficient interaction (based on the proportion of suggestion messages), whereas face-to-face communication provided more detailed discussion of suggestions when making a group decision. Korenman and Wyatt's (1996) study of the group dynamics of computer communication on a women's studies course confirmed these findings. For example, similar to Carroll (1989), Korenman and Wyatt

(1996) found that computer communication encouraged a more equal spread of interaction. Participants in the computer mediated discussions felt more freedom from boundaries such as status, social, organizational, and geographical concerns than in a face-to-face communication.

Althaus (1997) compared the effect of computer discussions with face-to-face discussions on students' academic performance in an undergraduate sociology course. His goal was to see if students' participation in a computer discussion would help them learn better. One-hundred, thirty-four students in face-to-face discussion groups were invited to participate in computer mediated discussion groups. Participants were male and female students across all school years although the majority were first year students. The overall results showed that 40% of the students did not try computer discussions, 30% participated occasionally, and 30% participated regularly and posted a message at least once a week. Those who participated regularly in computer discussion groups received higher marks than those who did not. No mention was made of the possibility of active participants self-selecting on the basis of motivation or previous academic performance. Althaus' study did not report any differences in gender or school year but it did reveal the effect of prior computer experience in participation in computer discussion groups.

There are several studies of the use of computer communication in elementary and high schools in the United States (for example, see Feldmann & Fish, 1991; Ma, 1996; Reinking & Rickman, 1990; Schofield, Davidson, Stocks, & Futoran, 1997; Schofield, 1994). Many of these studies report that many students have examined the World Wide

Web at school as early as grade three. There are now many school projects that allow students in grades four, five and six to write short essays based on web content or to develop web pages and post them on their local Internet server. Some grade seven and eight students are currently using e-mail to exchange and discuss news and stories with classmates in countries such as England, Sweden, and Singapore. A few students exchange e-mail with pen pals in other countries in order to improve their foreign languages. In some High Schools, students publish a newspaper on the World Wide Web or publish their school projects on the Internet.

Unfortunately, this research does little more than report new uses of the Internet in schools. Few studies provide statistics on how many students use Internet facilities or how often; most of the results are limited to testimonials by a few teachers and students active in each Internet project. Even fewer studies attempt to investigate or analyze the possible effects of using the Internet on education. We still do not know, for example, if messages written to pen pals in a foreign language are any more effective in learning the language than more traditional practices or discussions. Even so, the number of reports of computer communication uses in schools strongly indicates that teachers are interested in exploring its potential as an educational tool, and that the time has come for more focused evaluations of the strengths and weaknesses, successes and failures of the medium in school and in university settings. CHAT provides an almost ideal laboratory to conduct some of these evaluations.

Because of the paucity of studies evaluating the use and effectiveness of computer communication for university education, it seemed reasonable to begin with a critical

examination of some common assumptions, claims and hopes about the medium.

Althaus (1997), Gagne (1977), and Johnson and Johnson (1997) have argued that the existence of a new channel of communication can itself motivate social interaction and that social interaction can in turn potentially facilitate learning through discussion and dialogue. Many of those who promote use of the Internet for education or who promote CHAT for teaching at Carleton University refer to the potential of these media to facilitate learning through such discussion.

There are two important terms used in these claims: potential and facilitate. Unfortunately, the terms are quite vague. Does "potential" mean that the medium would be sufficient for improving education, necessary for improving education, necessary and sufficient for improving education, or neither necessary nor sufficient but simply desirable? In different terms, does computer communication add some measurable improvement to education, like a Main Effect or Interaction, or does it only add one ingredient to perhaps 3, 23, or 103 ingredients which all must be present for an improvement to occur? And what is meant by "facilitate"? If computer communication facilitates learning, how does it occur? By simply providing more information more conveniently to students? By allowing better or faster feedback? By increasing their motivation to learn? Perhaps most importantly, what do we mean by learning and its improvement? Does it mean learning faster? Learning more? Does it mean learning facts, or skills, or concepts? Or does it mean increasing our understanding or learning to produce new knowledge as well as to consume the old? In short, what criteria should we use to evaluate the benefits of computer communication for university education?

Many of these questions have plagued educational researchers for decades, and clear answers to them have not yet appeared. As a result, experiments to assess the educational effects of computer communication are likely to produce ambiguous results. We could, for example, ask some students to use CHAT and ask some students not to, then compare their course grades. They may, of course, self select for motivation or talent, or they may not do what we ask of them. Even if they were equated and did what we asked, they may learn much more from CHAT course newsgroup discussions or other discussions than their course exams would assess.

Despite the ambiguities of claims about potential and facilitation, a few facts can be clearly stated. First, if students do not use computer communication, they will not be exposed to its potential facilitating benefits. It is therefore as important to determine how many students are not using the medium and why as it is to discover how many are using it and what its effects may be. There are many possible reasons for university students not to use computer communication as part of their education. Some are logistic: the students may not have a computer or a computer account or may not know how to login and use it. Other reasons are organizational or contextual: professors may not organize or encourage use of the medium for education, or students may simply have too many other things to do (Moffatt, 1989). Still others are social: some students may feel intimidated to post messages in a public forum read by a professor, or may become irritated by the "flamings" of a few active participants. Still others are motivational: many students may see little reason to read or to post messages in course newsgroups if they are not given course credit for the effort; others may simply find the postings of their professors, TAs

or fellow students very boring or uneducational. All such factors could discourage students from using computer communication in their courses, even if it was provided. In this way the medium is no different from the traditional lecture or discussion group. If students do not attend them, they will not learn from them.

Even if students do use computer communication facilities such as newsgroup discussions available for education, there is no guarantee that the medium will educate them. Media do not educate, it is only the content provided via media in a timely fashion that can. A second obvious fact about the educational potential of computer communication is that it cannot educate unless it delivers effective educational content. There are two main sources of this content for students: professors and students themselves. It is thus worthwhile to examine the content of computer communication messages to determine their sources and to estimate their quality and relevance to teaching the topics of a course.

Casual observation of CHAT course newsgroups suggests that much of their content is either of poor quality or has little relevance to the course topics. Many professors post very little of relevance to their courses on CHAT; perhaps only a course outline and copies of lecture notes. Many students who post messages for discussion quickly wander from the course topic, often turning the newsgroup into a gossip session or forum of opinions and complaints about university, jobs or their life situation. It may be that such topics help to connect students with each other, and thus possibly to increase their contact and motivation in a course, which may in turn, lead them to learn more of the course material. But the causal connection between communication activity and

learning seems indirect at best.

Indeed, as we list more of the requirements necessary for computer communication to be effective or useful in education, it is not clear whether the medium could ever be effective. So many things could go wrong, from lack of computers to boring content. One of the major purposes of the current research, therefore, is to document such possible failures. The second major purpose of this thesis is to look for examples of success and examine them in close detail. Though successes may be relative and few in number, a study of successful CHAT course newsgroups can tell us much about what works and why. Are newsgroups for smaller classes more active than those for larger classes? Can course newsgroups be active without regular contributions from professors and teaching assistants? Are there certain types of newsgroup messages that lead to much discussion? If so, what are they? These are a few of the questions that can be asked by comparing the characteristics of successful newsgroups (active and on topic) with the others.

There are at least two ways to learn what makes an effective course newsgroup. One way is to undertake detailed content analyses of the newsgroup messages looking for both content and for the group dynamics they reveal. The second way is to survey students and professors associated with successful newsgroups to learn what they like and dislike about their group, why they think it works, and what else might be done to improve it. The present research included both of these methodologies.

Pilot Research

In order to obtain a better idea of how CHAT course newsgroup was being used

and what were students' experiences with it, I conducted two pilot studies. The first pilot study gathered statistics on course newsgroups and the second surveyed a small sample of students about their experience with one particular CHAT course newsgroup.

In the first pilot study, I monitored the frequency of contributions to 563 CHAT course newsgroups that had been established at the request of the course professors during the Fall Term of 1996. Most notably, only 50% of these groups had at least one posted message; the rest had none. Of the 50% with at least one message, 88% had between 1 and 50 postings; 70% had less than 10. The remaining 12% had between 100 and 600 postings. These preliminary results indicated that 50% of the course newsgroups failed to meet one necessary condition realizing the potential benefits associated with computer mediated discussions activity. At the other extreme, a few groups are extremely active. This wide variation suggests that one of the necessary conditions for increasing the quantity of interactions can be met. My proposed research examined what makes the active groups different than the others. It also examined the content of the active groups to determine how many students contributed to it, and to estimate how much of their discussion was in some way related to the topic of their course.

In the second pilot study, I asked 40 students in a Winter Term 1997 section of Introduction to Social Psychology to complete a one-page questionnaire about their use of the course newsgroup set up for the course. The questionnaire included items about use of CHAT accounts for e-mail and for course newsgroups, about their frequency of writing and reading course newsgroup messages, and about their suggestions for improving CHAT (see Appendix 1a).

The results showed that 20% of the 40 students had never used their CHAT account. Sixty percent had a computer and modem that allowed them CHAT access from home; the remaining 40% could access CHAT only at school. Twenty-eight percent of the students used their CHAT account every day, 34% used it two or three times a week, 31% used it a few times a month. On average, 40% of the students' time allocated for CHAT was spent on reading/sending e-mail messages. Fifty percent of the students never read the newsgroup for their Social Psychology course; 90% never posted a message on the newsgroup. According to their ratings, the most important feature of CHAT was to obtain course outlines and materials (41%), second, to exchange of e-mail with friends and professors (35%), third, to participate in course newsgroup discussions (30%), fourth, to contact TAs, fifth, to exchange e-mail with classmates, and last to use library catalogues and to browse the Internet.

These results reinforced the suggestion that the benefits of CHAT course newsgroup discussions may rarely be realized simply because most students do not yet read or participate in them. One reason may be inconvenience; 40% could access CHAT only by coming to school. Another may be competition for time; less than 30% of the respondents used their CHAT account at least once a day. The results also suggest that much discussion between students and professors may be undertaken in private e-mail rather than in a public course newsgroup. It is, of course, unethical to monitor these private exchanges. If interviews with students and professors indicate that private e-mail is the preferred medium of discussion, it will be important to learn the causes and consequences. Informal discussions with Carleton professors indicate that many are now

swamped by private e-mail messages from students -- some receive more than 10 a day. To answer each of them can take far more time than a professor has, thus prompting them either to ignore most of the messages or to encourage students to help each other through a public CHAT newsgroup. Results from the current research may be helpful for guiding professors in providing proper encouragement.

As expected, the two pilot studies raised many more questions than they answered. But they do indicate that it is possible to understand many of the factors that influence CHAT use by observation and survey methodologies. Consequently, these methodologies were employed in a series of five related studies. Study 1 examined the frequency of contributions to CHAT discussions in a representative sample of newsgroups during the 1997/98 academic year. It also examined some possible predictors of frequency, including class size, class level (1st - 4th year), and course topics. Study 2 compared samples of the most active and of minimally active CHAT course newsgroups to determine how their content, structure, dynamics and participants might account for their difference in participation rates. Studies 3 and 4 surveyed students by questionnaire and interview and Study 5 interviewed instructors (professors and sessional lecturers) from active and inactive course newsgroups to assess their experiences and opinions about the newsgroups, and to gather their suggestions about improving CHAT for university education.

CHAPTER 4: Two Observational Studies of CHAT Course Newsgroups

Study 1: General Observation of CHAT Use

In order to determine the frequency of CHAT activity across disciplines and school years, Study 1 examined a sample of CHAT Course Newsgroups over a 12-week period (one Term). The purpose of Study 1 was to provide a statistical profile of CHAT Course Newsgroup (CN) use, and to determine the rate of Newsgroup activity across disciplines and course years (1st, 2nd, 3rd and 4th). These statistical profiles were used to select 40 active CHAT Course Newsgroups for more intensive observation in Study 2.

Sample. In August 1997, Computing and Communication Services began a new policy for the establishment of CHAT Course Newsgroups: As of 1 September 1997, each Carleton University course would be automatically given its own CHAT Course Newsgroup. The postings would remain on each newsgroup for the 12 weeks of a one-term course or the 24 weeks of a two-term course. The postings would be automatically deleted by the end of August each year. This policy created 2,512 Course Newsgroups in the 1997-98 academic year. More than half of these Course Newsgroups were for Fall Term or Fall/Winter Term courses and the remaining were for Winter Term courses. I followed the progress of all 2,512 courses during the Fall Term, September – December 1997. I counted new messages on these CHAT Course Newsgroups every four weeks. As a result, by the end of the 12 week term, I had three sets of observations and a large data base of message counts to be used for the selection of 40 course newsgroups for more intensive analysis in Study 2.

Course and Message indicators. For each course in my sample, I first recorded the course title (content) and the course year (1st – 4th and graduate). I then counted the

number of new topics and the number of new replies posted for each course. From these data, rates of postings, topics and replies could be calculated for each course from the beginning of the course to the end; these indicators could then be related to each other and to the year and topic of the course.

I should note that the posting rates of topics and replies are not perfect indicators of CHAT Course Newsgroups activity. My informal observation of previous CHAT Course Newsgroups revealed that some course newsgroups have a high rate of topic postings but few replies; in these, students post their own opinions and ideas but do not respond to one another's opinions or ideas. Thus, there are many postings but few responses and consequently little interaction. In addition, some course newsgroups with a high rate of interaction mostly contain postings unrelated to the course content. For example, in the Introduction to Computer Programming (course number 91.105) Course Newsgroup, about 150 topics were posted in a contest among students to see who would post the last posting! Despite these limitations, the rate of postings and responses provided rough indicators of Course Newsgroups activity.

Results

Perhaps the most interesting finding of this observational study was that 78% of the 2,512 course newsgroups had no postings at all. Of the 547 newsgroups with at least one posting, 70% (383 courses) had fewer than 10 postings, 21% (114 courses) had between 10 and 39 postings, and only 9% (50 courses) had 40 or more postings. This, if we assume a newsgroup to be minimally active only if it accumulates at least 10 postings in a 12-week term, then only 6.5% of the 2,512 courses were active.

Of the 547 newsgroups with at least one posting 40% were first year courses, 30% second year, 18% third year, 8% fourth year, and 4% graduate courses. These proportions over-represent first and second year course offerings (with 12% and 13% of all courses offered) and under-represent the rest (22% 3rd year, 23% 4th year and 30% graduate courses). The 547 newsgroups came from the four faculties of Carleton University: 31% came from Arts, 42% from Social Sciences, 18% from Science and 9% from Engineering. These proportions parallel those of all courses offered at Carleton: 32% from Arts, 35% from Social Sciences, 18% from Science and 12% from Engineering.

During the 12 weeks of the Fall Term 1997 a total of 13,851 messages were posted in the 547 active newsgroups: 6,441 topics and 7,410 replies, or about 1.15 replies per topic. Of these, 4,374 messages (31.6% of the total) were posted in the first 4 weeks of the term: 2,404 topics and 1,970 replies (0.82 replies per topic). Another 4,362 (31.5%) were posted in during weeks 5-9: 1,948 topics and 2,414 replies (1.24 replies per topic). During weeks 9-12 the remaining 5,115 postings (36.9%) were added: 2,053 topics and 3,062 replies (1.49 replies per topic). There was, it seems, a slight increase in the rate of posting as the term progressed. In addition, the number of replies per topic increased steadily as the term progressed.

Study 2: Behavioral Observation of CHAT Course Newsgroups

Study 2 was designed to examine in more detail the content and group dynamics of CHAT Course Newsgroups. The primary purpose of this study was to search for reasons why some CHAT Course Newsgroups are more active than others. Included in

the search were analyses of the relationship between class size, gender, year, Faculty and student postings, and between instructor postings, course requirements and student postings. In addition, I examined the trajectory of course newsgroup discussions, noting, for example, how many follow-up postings were made to each topic and how many questions were asked and answered. Finally, I examined the content of the discussions to estimate what proportion were related to the content of their courses.

Sample. Because of the difficulty of analyzing all 13,851 messages generated in 547 course newsgroups for the Fall of 1997, I decided to analyze in detail a more manageable sample of 40 courses with at least minimal newsgroup activity. Twenty of the 40 courses were selected at random from the 50 with the highest number of postings (40 or more postings). The remaining 20 were selected at random from the 114 courses with 10-39 postings. I excluded all 383 courses with 1 to 9 postings simply because there was so little content to analyze.

Data collection and procedure. In addition to the indicators calculated from Study 1, each of the 40 Course Newsgroups was examined and categorized for the following:

1. the number of students posting in each course (males and females)
2. the number of student postings (topics + replies)
3. the number of instructor postings (topics + replies)
4. the number of topics and replies to each topic
5. the length of each posting (in lines)
6. the length of time to reply to each topic
7. content of messages (questions, comments, relevance to course content, etc.)

8. style of writing (personal, factual, humorous, etc.)

I decided to add an analysis of style because I noticed that certain styles of a discussion seemed to stimulate more responses than the others. For example, if a topic on a course newsgroup contained a personal statement, a greeting, and an invitation to students for discussion of the course, then the probability of receiving a response seemed to be higher than when there was no personal statement or greeting. It was, however, difficult to classify the style of the discussions. I chose to categorize them as personal or impersonal. When, for example, a message contained phrases such as "hello everybody" or "welcome to the course discussion", I coded the message as personal. When the message did not contain such phrases, I coded it as impersonal. When a message had both, I classified it according to which content, personal or impersonal, appeared to dominate. Thus, the general theme of a posting was analyzed for dominance of personal or impersonal style of writing.

It was often possible to determine a few demographic characteristics of students who posted messages. I gathered this information through standard course listings of student enrollments which contain the name, faculty, and year of each student. Most first names revealed the sex of a student. When the name was ambiguous (e.g., Pat) I excluded it from relevant analyses.

Results

Student participation in newsgroups. I began my analyses by counting heads – more specifically, by examining how many male and female students in each course posted at least one message (a topic or a reply), and how many messages they posted. I

also counted the number of postings from instructors by combining both professors and teaching assistants into the instructor category. Both groups represent the teacher role, but data from each were scarce; combining them gave me a larger statistical sample. The results are shown in Table 1a.

It can be seen from the second column of Table 1a that a wide variety of departments and faculties are represented in the sample. Activity, it seems, was not concentrated in any University Faculty or Year. Fifteen of the 40 courses (37.5%) were from the Faculty of Arts, 14 from Social Sciences (35%), 10 from Science (25%) and only one from Engineering (2.5%). Although Engineering was not well represented in the 40 courses shown in Table 1a, the Faculty proportions were in keeping with those from all 2,512 university courses with CHAT newsgroups: 32% Arts, 35% Social Sciences, 21% Science and 12% Engineering.

There were, however, significant variations in the proportions according to University Year. The sample of 40 courses in Table 1a contained 20 1st Year courses (50%), eleven 2nd Year courses (27.5%), seven 3rd Year courses (17.5%), one 4th Year course (2.5%) and one graduate course (2.5%). These proportions are significantly different (Chi square (4) = 72.4, $p < .001$) than those of all 2,512 courses from which the sample came: 1st Year = 12%, 2nd Year = 13%, 3rd Year = 22%, 4th Year = 23% and Graduate = 30%. First and 2nd Year courses were much more common, and the 3rd and 4th Year and graduate courses much less common, in the 40 active courses shown in Table 1a.

Table 1a.

Number of students who posted and the number of their postings (courses ordered by count of total postings = students + instructors)

# course name	total enrolment	% M/F	posting: Graded? Encouraged ? Neither?	total posters	% posters M/F	student postings	instructor postings
1 english/1/A	112	70/30	G	105	70/30	4146	1
2 journalism/1/A	212	32/68	N	41	41/59	453	0
3 law/4/SS	16	40/60	G	15	40/60	247	17
4 philosophy/1/A	135	66/34	na	11	73/27	200	0
5 economics/1/SS	101	49/51	E	9	67/33	163	0
6 journalism/2/A	105	35/65	N	36	36/64	148	2
7 can studies/3/A	23	41/59	G	18	39/61	119	9
8 philosophy/1/A	100	41/59	N	16	44/56	105	0
9 industr design/2/E	26	70/30	G	15	73/27	98	2
10 sociology/2/SS	36	28/72	G	30	33/67	81	4
11 computer sci/2/Sc	91	70/30	na	13	85/15	83	0
12 psychology/1/SS	644	45/55	E	19	58/42	71	0
13 film/3/A	42	41/59	E	5	60/40	68	2
14 polisci/1/SS	133	58/42	E	16	31/69	66	0
15 linguistics/Grad/A	10	10/90	E	9	0/100	52	12
16 statistics/2/SS	27	68/32	na	11	55/45	51	0
17 math/2/Sc	115	70/30	na	15	67/33	46	0
18 biology/1/Sc	181	41/59	E	16	31/69	21	25
19 chemistry/1/Sc	207	79/21	N	20	90/10	29	14
20 sociology/1/SS	368	36/64	na	16	31/69	34	6
21 interdis soc sci/1/SS	26	24/76	E	24	25/75	35	1
22 english/1/A	60	40/60	na	12	42/58	16	3
23 interdis sci/1/Sc	91	46/54	N	5	60/40	13	1
24 business/2/SS	57	49/51	na	5	60/40	6	7
25 history/1/A	105	36/64	N	9	33/67	13	0
26 english/3/A	36	41/59	na	4	25/75	13	0
27 com lit/3/A	7	14/86	na	0	0	0	12
28 religion/2/A	265	30/70	N	7	86/14	12	0
29 computer sci/1/Sc	136	45/55	na	6	67/33	11	1
30 poli sci/3/SS	25	4/96	na	5	20/80	7	5
31 environ sci/1/Sc	18	29/71	N	0	0	0	10
32 chemistry/3/Sc	19	60/40	na	0	0	0	11
33 psychology/2/SS	68	46/54	na	5	80/20	11	0
34 math/1/Sc	65	71/29	N	3	67/33	11	0
35 social work/1/SS	109	28/72	na	4	25/75	5	6
36 film studies/2/A	25	56/44	E	6	100/0	8	3
37 law/1/SS	299	49/51	na	7	43/57	10	0
38 business/1/SS	94	60/40	N	5	80/20	7	3
39 philosophy/2/A	17	65/35	na	5	80/20	10	0
40 psychology/3/SS	50	28/72	na	2	50/50	2	8

What might account for the significantly higher proportions of the 1st and 2nd Year courses among those with the most postings? One obvious possibility is course enrolment. First and 2nd Year courses are generally much larger than the more advanced courses; if class size were correlated with the number of postings, then size would account for a larger proportion of first and second Year courses. Interestingly, however, there was no significant correlation between the total enrolment and the number of student postings ($r(38) = +0.005$, $p > .10$), nor was there a significant correlation between total enrolment and the number of postings per student in each class ($r(38) = -.06$, $p > .10$). Something other than class size appears to account for the variation in course newsgroup activity.

Perhaps the most interesting finding derived from Table 1a is that few students contributed to the course newsgroups. Of the total of 4,256 students enrolled in the 40 courses, only 550 (13%) posted anything. Together, these 550 students contributed 6,471 messages, or just under 12 messages per student. This average is, of course, distorted by the course #1 (English); its 105 active students contributed 64% of all postings. Why was it so active? Course #1 was a writing skill course for engineering students. The course instructor, who was conducting research on group learning, required her students to post daily messages about their experiences in their other courses and to share their information and opinions of the courses with other students. Students received 10% of their course mark for the quantity of this activity. The average number of postings for the 445 students in the remaining courses (#2 – #40) was 5.2 messages.

In order to determine if proportionally more males or females posted messages, I conducted a paired t-test between the percent of males and females in the 40 courses and the percent of posters who were male and female (see Table 1a). On average, 46% of the students in the 40 courses were male, 54% female. Of the 37 courses with at least one student posting, 53% of the posters were male, 47% female. Thus, males were slightly over-represented in the postings. The difference was significant, $t(35) = 2.48$, $p < .02$. The small difference may reflect a residual sex bias of the newsgroup as a "male" medium.

In order to explore what might account for variations in student posting activity, I first correlated the total enrolment in the 40 courses with the number of students who posted at least one message (Table 1a). The correlation was not significant, $r(38) = .11$, $p > .10$. Class size does not account for posting activity. There was, however, a significant negative correlation between the total enrolment and the percent of students who posted, $r(38) = -.40$, $p < .01$. As course enrolment increased, the percentage of students who contributed to the course newsgroup decreased. This may reflect a common observation that the number of students who ask questions during a lecture remains small even in large classes, so the proportion of students who ask questions decreases with class size. It is also possible, however, that because almost all the large classes are introductory, the students in them may have less experience with newsgroups than do the more senior students, and thus be more reluctant to post messages.

My exploration of the possible influences on student participation next led me to consider whether students would follow their instructors' example. Is there a relation

between the number of instructor postings and the proportion of students who post in their course newsgroups? In order to find out, I correlated the number of instructor postings in the 40 courses (Table 1a) with the percentage of students who posted at least once. The correlation was insignificant, $r(38) = +0.14$, $p > .10$. I also correlated the number of instructor postings with the number of student postings across the 40 courses and with the number of postings per active student. Here too, the correlations were insignificant, $r(38) = -0.10$, $p > .10$ and $r(38) = -0.08$, $p > .10$ respectively. In sum, there was no evidence from my data that instructors influence students by the number of their postings.

My later interviews with students and instructors (see Chapter 5 & 6) suggested another reason why students in some courses post more messages than others: Rewards and/or punishments. I learned in the interviews that some instructors required their students to post messages on the course newsgroup and graded them for it, as did the instructor of course #1 mentioned above. Other instructors gave regular verbal encouragement to their students to post but did not grade them for their postings. And others neither encouraged students to post nor graded them for their postings. Though it was the summer after the end of the newsgroup courses, I managed to obtain grading and encouragement information from 23 of the 40 instructors. Five of the 23 graded their students for their postings, eight provided verbal encouragement, and 10 provided neither. The effects on student participation were striking. As derived from Table 1a, in the five graded courses, an average of 81% of students posted at least one message. In the eight courses with verbal encouragement only, an average of 31% of the students posted at

least one message. And in the 10 other courses, an average of only 11% of the students posted. An one-way ANOVA showed the differences to be significant, $F(2, 20) = 14.4$, $p < .001$.

The low proportion of students who posted in the 10 newsgroups without encouragement and without a grade indicates that course newsgroups do not run on student initiative alone. The increase in participation rates result both from encouragement and especially from grading strongly suggests that such benefits are needed. Curiously, however, though the rewards of encouragement and grades strongly affect the proportion of students who post, they do not seem to affect the total number of their postings ($F(2, 20) = 2.2$, $p > .13$) or the number of postings per active student ($F(2, 20) = 2.8$, $p > .08$).

Topics and replies. The results reported above focus on the number of students and instructors who posted and the number of their postings. More can be learned from examining how many of their postings were topics and replies. An active newsgroup discussion would likely generate many replies per topic, indicating that students were engaging in a dialogue about the topic. In contrast, a newsgroup with many topics and no replies would indicate that students were engaging in several monologues. How many topics and replies were posted and who posted them? Table 1b shows a summary of the relevant data.

Several more interesting results are revealed in Table 1b. In total, there were 2,453 topics and 4,018 replies posted by students in the 40 courses, an average of 1.64 replies per topic. Instructors posted a total of 129 topics and 36 replies or 0.3 replies per

Table 1b.

Number of topics and replies posted by students and instructors in the 40 course newsgroups

course #	student topics	% topics M/F	student replies	% replies M/F	instructor topics	instructor replies
1	1411	60/40	2735	64/36	0	1
2	171	41/59	282	51/49	0	0
3	95	24/76	152	30/70	10	7
4	82	89/11	118	85/15	0	0
5	102	96/4	61	85/15	0	0
6	36	36/64	112	43/57	0	2
7	76	50/50	43	38/62	6	3
8	30	38/62	75	50/50	0	0
9	80	72/28	18	80/20	2	0
10	54	43/57	27	37/63	3	1
11	33	96/4	50	92/8	0	0
12	38	71/29	33	47/53	0	0
13	20	82/18	48	69/31	2	0
14	18	27/73	48	43/57	0	0
15	29	0/100	23	0/100	10	2
16	17	25/75	34	53/47	0	0
17	12	75/25	34	61/39	0	0
18	15	54/46	6	33/67	20	5
19	24	81/19	5	83/17	14	0
20	16	32/68	18	23/77	2	4
21	0	0	35	34/66	1	0
22	12	50/50	4	50/50	3	0
23	8	45/55	5	50/50	1	0
24	6	60/40	0	0	6	1
25	6	17/83	7	33/67	0	0
26	2	50/50	11	40/60	0	0
27	0	0	0	0	11	1
28	8	88/12	4	75/25	0	0
29	7	86/14	4	75/25	1	0
30	4	25/75	3	33/67	4	1
31	0	0	0	0	6	4
32	0	0	0	0	11	0
33	9	83/17	2	50/50	0	0
34	2	100/0	9	56/44	0	0
35	5	60/40	0	0	6	0
36	4	100/0	4	100/0	2	1
37	7	50/50	3	50/50	0	0
38	6	83/17	1	50/50	3	0
39	6	100/0	4	67/33	0	0
40	2	50/50	0	0	5	3

topic. These results suggest that students are more likely to engage in newsgroup dialogues than are instructors.

In keeping with the slight over-representation of males as posters noted above, males posted more topics (58% on average) and more replies (54%) than expected by the male proportions in the 40 courses (46% on average), $t(36) = 3.22$, $p < .005$ and $t(34) = 2.53$, $p < .02$ respectively. Though males comprised 53% of the students who posted, they comprised a significantly higher 59% of the topic postings on average, $t(35) = 2.49$, $p < .02$. However, the replies written by males (54%) and females (46%) were in keeping with the proportion of males (53%) and females (47%) who posted, $t(34) = 0.64$, $p > .5$. I had previously reported that grading and encouragement increased the number of students who posted but did not increase their average number of postings or the average number of postings per active student. But do grading and encouragement have differential effects on topics and replies? To answer this question, I conducted an analysis of variance to examine how grading and encouragement might affect the number of student topics posted and the percent of student topics; the reply analyses would mirror these. There was a marginally significant relation between (1) grading and encouragement and (2) number of topic postings, $F(2, 20) = 2.6$, $p < .09$, and no significant relation between (1) grading and encouragement and (2) percent of student postings that were topics, $F(2, 20) = .5$, $p > .6$. Whatever effect grading and encouragement does have on newsgroup postings seems to spread itself evenly over topics and replies.

Not surprisingly, the number of topics posted by students in the 40 courses was highly correlated with the number of student replies, $r(38) = +.99$. However, the relationship was weaker for instructors, $r(38) = +0.55$. There was no reliable correlation between the number of topics posted by instructors and the number of student replies ($r(38) = -.13, p > .10$), nor was there a reliable correlation between the number of topics posted by students and the number of instructor replies, $r(38) = +0.03, p > .10$. These results suggest that instructors are not reliable participants in course newsgroups, that students and instructors do not engage in much dialogue, and that most newsgroup dialogues (topics + replies) occur only among students.

How active were these dialogues? What topics did students discuss and how did they discuss them? The average number of replies to a topic hides more information than it reveals. As I coded the data I noticed that some topics had many replies and others had none; some replies came within minutes of posting a topic and some took several days; some postings were only a few words and some were several paragraphs. The content of topics and replies varied widely as well. In order to investigate the distribution of replies to each topic, the length of postings, the length of time to reply, the content and the writing style of the messages, I analyzed a sample of topics and replies represented in Tables 1a and 1b. Because the 6,471 student postings and 165 instructor postings in the 40 newsgroups were too numerous to analyze exhaustively, I decided to sample at random a more manageable 25% of the 2,572 topics from these postings, and to follow the thread of discussion in their replies. As a result, I analyzed in detail a random sample of 628 topics as well all of their 740 replies (total postings = $628 + 740 = 1,368$). The

sample contained the postings of 262 male and 258 female students, 15 male and 12 female instructors. I began analyzing the sample of 628 topics and their 740 replies by counting the number of topics that stimulated no reply, that stimulated at least one reply, at least two replies, etc. I also recorded who posted the first, second, third, etc. reply: male student, female student or instructor. Table 2 shows the results.

Table 2.

Percentage of the 628 sampled topics receiving at least 1, 2, 3, ... 12 replies

Topics receiving at least:	Percent of topics	Percent of 1 st , 2 nd , ... 12 th replies posted by:		
		Male students	Female students	Instructor
One reply	41%	48%	46%	6%
Two replies	24	50	45	5
Three replies	17	49	47	4
Four replies	9	53	47	0
Five replies	8	53	43	4
Six replies	6	58	42	0
Seven replies	4	40	60	0
Eight replies	2	64	36	0
Nine replies	2	62	38	0
Ten replies	1	12	88	0
Eleven replies	1	43	57	0
Twelve replies	0.5	75	0	25
Topics receiving no reply	59%			

Perhaps the most striking result shown in Table 2 is almost 3 in 5 of the 628 sampled topics received no reply. Dialogues stimulated by the remaining 40% of the topics were relatively short. As calculated from Table 2, 17% of all 628 topics received only one reply, 7% received only two replies, and the percentage receiving further replies continued to drop in a progression similar to Zipf's Law. The percentage of replies written by male and female students tended to parallel their proportions in the sample

(48% male, 52% female). And, as noted previously, instructors posted very few replies.

Length of postings. The 628 topic postings averaged 13.1 lines per topic. The average length of the 740 replies was 8.2 lines. In order to determine if there were differences in length of topics, a 2 x 2 ANOVA was performed, with gender and role (male and female students, male and female instructors) as the independent variables and length of topic as the dependent variable. The 27 instructors who posted at least one topic posted longer topics ($M = 24.0$ lines per topic) than did students ($M = 10.7$ lines per topic), $F(1, 624) = 32.12, p < .01$. Females posted longer topics ($M = 15.3$ lines per topic) than did males ($M = 11.1$ lines per topic), $F(1, 624) = 8.42, p < .01$. There was no significant gender by role interaction, $F(1, 624) = 1.3, p = .25$. A similar ANOVA was performed to examine length differences in first replies but the results showed no significant main effects of role and gender or interaction ($F(1, 253) = .11, p = .89$; $F(1, 253) = .01, p = .93$; $F(1, 253) = 0, p > .1$ respectively). Analyses of the length of replies beyond the first showed similar insignificant differences.

Length of time to reply. How long did a student or instructor wait to receive a reply when posting a topic on a course newsgroup? There was a large variation in the length of time to reply to the topics ranging from a few minutes to 73 days. Of the 740 replies to the 628 topics, 82% were posted within a day, 13% were posted within a week, and 5% were posted after a week. The results suggest that newsgroup dialogues are difficult to sustain longer than about 7 days.

Content of the messages. What were students and instructors discussing in their postings? In order to obtain some picture of the content, I read and classified each of the

1,368 postings from the sample summarized in Table 2 into four categories according to its dominant theme. The four content categories were:

1. Course content: messages posted by students and instructors directly related to the content of the course were classified in this category. Examples include discussions of lecture topics or assigned readings (e.g., What do you think about Milgram's study of obedience the prof. discussed in class today? George, I think the professor wants us to compare the theories of inflation more than to give examples), course outlines and reading assignments, criteria for grading essays, or samples of exam questions.
2. Procedural questions and answers: all the operational and administrative questions and answers such as the time or the location of exam and requests regarding how to do or to prepare the course work were classified as an procedural request (e.g., When is mid-term exam? Who has the answer to problem #2? Does anyone have notes for lecture 6?)
3. Humour: any non-serious messages including jokes and teasing that were not related to course material were classified as humour (e.g., Our class is too hot! Let's talk about our Prof.'s necktie!).
4. Other: miscellaneous comments which included anything that could not be included in the other 3 categories were categorized as other (e.g., "this is a test" message; greetings; book sales).

I gave a sample of 50 postings to my advisor for classification in the 4 categories in order to assess our inter-judge reliability. The results showed 88% agreement in our classifications which I considered high enough to proceed. Table 3 shows the

distribution of the type of contents for topics and replies. In this table all postings (628 topics and 740 replies) are included.

Table 3.

Percent of topics and replies in five content categories.

		Percent in Content Category			
Message:	N =	Course content	Procedural	Humour	Other
Topic	628	49%	27%	8%	16%
1 st Reply	264	34	39	15	12
2 nd Reply	151	45	19	20	16
3 rd Reply	111	48	15	21	16
4 th Reply	57	56	7	17	20
5 th Reply	50	60	6	19	15
6 th Reply	36	55	10	18	17
Reply 7-12	71	72	2	14	12

Table 3 indicates that about half (48%) of all topics and replies concerned the content of the course. The results indicate that as a newsgroup discussion continues, with multiple replies to a topic, the proportion of course content increases while the proportion of procedural content decreases. These results support the idea that procedural discussions are, almost by definition, short-lived, and that a discussion can be sustained only if it focuses on course content.

As I counted the number of procedural messages, I kept an informal count of the number of them written as questions and written as answers. Not surprisingly, 92% of the procedural messages posted as topics were questions, and 87% of the replies were answers to questions. However, not all questions received answers -- 28% of the procedural questions received no reply. Perhaps some of these received a private reply by e-mail. If not, it suggests that just over 1/4 of all procedural questions were ignored.

I should also note that 25 of the 40 courses in Table 3 had no humorous content at all, but three courses had an average of 76% humorous content. The newsgroups of these three high-humour courses were all voluntary; the instructor neither required nor monitored their content. Six students in one of the three high-humour courses (Journalism) were also taking another of the three high-humour courses (History). These six students contributed almost all of the humorous content of the two courses. The observation illustrates how a small group of students can influence the content of newsgroup discussions, sometimes "capturing" the newsgroup for their own uses.

Writing style. While reading the messages, I noticed that they varied in the style of expression. Some messages were quite personal, filled with "I" and "you", words of greeting and encouragement, and self-revelation. Other messages were strictly business, containing only course material with no personal expressions, greetings or encouragement. An examples of a message with a personal writing style is the following:

"Hello students in 49.210 section C. I was thinking of a topic for this week discussion and thought that the conformity theory would be a related topic for our discussion. Now imagine you are in exam room and half of the class are exchanging information about one exam question when the proctor is gone. You have already written the answer you believe is correct but is different from your classmates answer. You might or might not change your answer. Comment on both situation from theory of conformity perspective?"

A message with an impersonal style is the following:

"The 2nd assignment of week 7 for the course 95.105 are in chapter 4 and 6, the exercise section on pages 112 and 143. In case of difficulty running the programme, Chapter 3 and 5 will be useful. The convenient language to write the assignment is Pascal although basic could do the same job"

About 30% of the messages had a predominantly personal style. Many examples of this writing style were found in students' messages in journalism courses; indeed,

about 80% of their messages were personal expressions and unrelated to course material. For example: “What happened to our prof. He did not come to class last week but I saw him in a shopping mall.”; “hey Frank, I saw you running to math class, what do you do in math class?!”; “hey guys, how are you doing? I am just sick of school. Why am I here?” About 28% of the messages were entirely course related with no personal expressions. Examples are science courses (e.g., chemistry) where 70% of their course newsgroup messages were related to assignments or reading chapters without any engagement in conversation. The remaining 42% of messages had a mix of personal expressions and discussions of course material. Course newsgroups in sociology and law provided many good examples of this mixed writing style where students were more likely to engage in course discussions with personal views. The mixed style was usually initiated by instructors then adopted by students, suggesting that instructors are influential in setting the tone of student postings. About 20% of the 176 topics with no personal expression received at least one reply, whereas about 54% of the 452 messages with either mixed or predominantly personal expression in their writing style received at least one reply. This result suggests that a personal style of writing is better for stimulating discussion.

The overall results of Study 1 and Study 2 suggest that course newsgroups are not widely used for course discussions. Only a small minority of the 2,512 courses use the medium regularly for student and instructor communication. Even a smaller minority used the medium for exchanging messages related to the course material. There may be several reasons for this infrequent use, including lack of recognition (e.g., grades) for posting, lack of time, or lack of interesting content or personal style. We know little of

students' and instructors' reactions to the newsgroups or their opinions about the newsgroups. The following survey and interview studies attempted to learn more of their reactions.

CHAPTER 5: Surveys of Students

Though the observations of CHAT activities reported in Studies 1 and 2 gave some indication of the use of the medium and factors that might influence its use, many questions remained. I wanted to learn more about how CHAT fit, or did not fit, into other student activities. I also wanted to learn more about why students did or did not use CHAT and its facilities such as course newsgroups, their opinions of the medium, and their suggestions for improving it. To learn about students' opinions of CHAT, I constructed a questionnaire and used it to survey students from several undergraduate courses. I also interviewed 21 students, 11 of whom were active participants in newsgroup discussions and 10 of whom never participated in newsgroup discussions, to learn more about their reasons for participating or not.

Study 3: Student Questionnaire Methods

Respondents

Two-hundred sixty-five undergraduate students from Carleton University participated in this survey, 130 males and 134 females (one did not report his/her gender). The average age of respondents was 23.5 years (mode = 21; range = 19 to 55 years). Sixty percent of the participants were aged between 19 and 22 years.

The questionnaire

The questionnaire (see Appendix 1) asked each respondent 20 questions about the following 10 themes:

1. personal background (Survey questions 1-4)
2. access to a computer and Internet (CHAT) (questions 5-9)

3. estimated amount of time spent on CHAT (question 10a)
4. estimated amount of time to read newsgroups for the course (question 10b)
5. evaluations of CHAT facilities (questions 11 & 12)
6. estimated number of his/her postings on the newsgroups for the course surveyed (questions 13 & 14)
7. ratings of the usefulness of textbooks, lectures, course newsgroups, and other learning resources and ways to ask questions about courses (questions 15 & 20)
8. estimated number of his/her e-mail messages to professors, TAs, classmates, friends (question 16)
9. reasons for participation or non participation on CHAT CN (questions 17&18)
10. suggestions about ways to improve CHAT (question 19)

Procedure

The questionnaire was distributed by the course instructor in three classes: a second year Introduction to Social Psychology course (course 49.210) from the Department of Psychology, a second year Numerical Methods course (94.266) from the Department of Engineering, and a forth year Strategies in Management course (42.469) from the School of Business. Most students took about 15 minutes to answer the questions. The questionnaire was collected at the end of class by the instructor and forwarded to me. An Informed Consent Form and a debriefing sheet were attached to each questionnaire (see Appendices 4 and 5). Students were asked to sign the Form and return it with the questionnaire, and to keep the debriefing sheet for their own information.

Study 3: Student Questionnaire Results

Respondents background and course activities

The first part of the questionnaire obtained information about the respondents' background and their course activities. Although the questionnaire was distributed in Psychology, Engineering, and Business classes, the data revealed that students came from many more disciplines. Twenty percent were psychology majors, 33% were engineering majors and 16% were business majors. The remaining 21% were from a wide variety of majors, including 6% from law, 5% from sociology and smaller percentages from seven other departments such as music, social work, and biology. Although I selected two courses from 2nd year and one from 4th year for this survey, the students were more widely distributed. Three percent of the respondents were in 1st year of university, 47% in 2nd year, 28% in 3rd year, 21% in 4th year, and 1% in graduate school. First year students are under-represented in this sample because the survey was intended to estimate students' CHAT activities who have been in university for more than a term and have had time to explore CHAT facilities. Of the 265 respondents, 43% reported registering in 5 courses, 23% in 4 courses, 11% in 6 courses, 9% in 3 courses, 3% in 2 courses, and 6% in only one course. Of the 265 students, 52% reported taking ITV courses (courses broadcast over television cable).

The background questions also revealed that most of the students were doing more than studying for their courses. A surprising 53% of the students reported they had a job. These students reported they worked an average of 10.2 hours per week ($SD = 13.1$; range = 3 to 60 hours). This suggests that most students had more limited time to

use CHAT than one might assume from the stereotype of a full-time student.

Computer and CHAT use (Questions 5-10)

In order to learn about students' computer activities, questions 5-10 of the questionnaire asked students about the time they spent on general computer use and on using CHAT facilities. Only 7 of the 265 students, two men and five women, reported they did not use a computer. The remaining 258 students reported working with a computer on average 12.2 hours per week (range = 1 to over 50 hours per week). Two hundred and twenty, 83%, reported using a computer at home. Not surprisingly, those who used a computer at home ($N = 220$) reported spending significantly less time using the computers at school ($M = 3.2$ hours per week) than those who did not have a computer at home ($N = 38$, hours = 5.8, $t(256) = 5.29$, $p < 0.001$)

Twenty-nine students (12 males and 17 females = 11%) reported spending no time on CHAT or any other computer communication facility. Their most common reasons included lack of a computer or Internet skills, lack of interest, and fear of the medium. The remaining 236 = 89% of respondents reported spending, on average, 5.7 of hours per week using a computer for Internet communication. Fifty-five percent of these students reported spending less than 6 hours per week using the Internet; 35% reported spending between 6 to 10 hours; 10% reported spending over 10 hours per week. Less than 3% of the students reported using a commercial Internet service; 230 = 97% of students reported using CHAT alone. Sixty-five percent of the students had a modem at home. Those with a modem did reported spending marginally more time using CHAT ($N = 153$, average hours = 6.5) than those without a modem ($N = 83$, average hours = 4.0,

$t(234) = 1.88, p = 0.06$).

How did students spend their time on CHAT? Students estimated that they spent on average 2.4 hours per week on e-mail exchange, 1.9 hours on WWW, Library or other facilities, 0.7 hours on course newsgroups, 0.7 hours on other newsgroups. Thus, on average only 12.2% of estimated student time on CHAT was spent on course newsgroups. Interestingly, 24% of the 236 students who used CHAT reported spending at least some time to post on course newsgroup and 73% reported spending some time to read course newsgroups. However, the estimates of CHAT activity may be exaggerated. The proportion of students reporting that they posted (24%) was noticeably higher than the 13% of students from Study 2 who actually posted on CHAT. This suggests that actual course newsgroup readers may be proportionally lower than the reported 73%. Even so, the result suggests that CHAT attracts about 3 readers for every author, and that far more students -- perhaps half of them if we compensate for possible exaggeration -- read course newsgroup messages than post them.

The above results led me to wonder whether student backgrounds might affect students' use of CHAT. Correlations between (1) age, school year, number of courses and (2) total amount of time spent on CHAT did not reveal any significant relationships. However, there was a small but significant negative correlation between time at a job and total time of CHAT use ($r(233) = -.12, p < .05$): The more hours students spent at a job, the less time they spent on CHAT. Analyses of variance between (1) gender and job, and (2) total time using CHAT revealed only one significant difference: Those who did not have a job spent on average 7.3 hours per week on CHAT whereas students with a job

spent on average 4.1 hours per week ($F(1, 225) = 4.6, p < .05$).

The above results show that students use some facilities of CHAT more than the others (e.g., e-mail more than course newsgroups). Do students with different backgrounds spend their time on CHAT differently? For example, do males spend more time than females exchanging e-mail? Do people with jobs spend more time browsing the Web? Analyses of variance revealed some significant differences. Male students reported spending on average 2.8 hours per week browsing the Web compared to female students who spent on average 1.0 hours ($F(1, 184) = 5.07, p < .05$). In addition, those who had access to CHAT from home reported spending more time (average = 5.5 hours per week) exchanging e-mail messages than those who did not have access from home (average = 2.4 hours; $F(1, 230) = 8.54, p < .01$). Interestingly, there was no significant difference between male and female students, or between students with or without home access, in their estimated time spent exchanging e-mail messages with friends or in reading/posting on course newsgroups. These results indicate that use of some CHAT facilities are affected by gender and by convenience of access, but the effects are different for different CHAT facilities.

Evaluation of CHAT Facilities (Questions 11 – 15)

The vast majority of students found CHAT easy to use (Question 12). On a scale from 0 (very easy) to 6 (very difficult) CHAT received an average rating = 1.43; 90% of students rated it no more difficult than 3. The result testifies to the success of CHAT developers in making CHAT user friendly.

Question 11 asked students to rate the importance of each CHAT facility on a

scale from 0 (not important) to 6 (very important). The results are shown in Table 4, divided for no special reason according to sex.

As Table 4 indicates clearly, students rated CHAT Course Newsgroups the least important facility of CHAT whereas they evaluated the facility of exchanging e-mail messages to friends and access to the WWW the two most important. These importance ratings mirror students' estimates of their estimated time spent on each facility.

Table 4.

Students' Average Ratings of the Importance of CHAT Facilities.

Facility	Average rating of importance		
	Male (n = 119)	Female (n = 111)	All (N = 230)
e-mail access to students & friends	5.2	5.0	5.1
access to Web	5.1	4.4	4.7
e-mail access to professors	4.2	4.5	4.3
e-mail access to TAs	3.7	4.0	3.9
access to Course Newsgroups	3.4	4.0	3.7

Analyses of data calculated from the ratings of CHAT facilities in Table 4 revealed some significant differences according to gender and to CHAT access from home. Male students rated the facility to read discussions on CHAT Course Newsgroups significantly lower in importance than females ($F(1, 229) = 4.14, p < .05$). In contrast, female students rated access to WWW lower in importance than males ($F(1, 229) = 5.26, p < .05$). Moreover, access to CHAT from home affected students' ratings of CHAT facilities. Those who had a modem at home rated the importance of e-mail to professors and TAs higher than those who did not have a modem, $F(1, 225) = 17.58, p < .01$; $F(1, 225) = 4.27, p < .05$, respectively.

Considering students' opinions of CHAT and their rating of its different facilities (e.g., rating high the exchange of e-mail), it is reasonable to expect that students would use facilities such as e-mail more frequently than course newsgroups. The data on frequency of students' use of course newsgroups support this expectation. Only 20% (47 students) of the 235 students reported posting at least one message on their CHAT Course Newsgroups (Question 13a). This 20% reported posting on average 1.9 messages during the term ($SD = 5.5$; range = 1 to 36 postings). As noted above, there were more reported readings of course newsgroups than postings: 62% (146 of 265 students) of respondents reported reading at least one CHAT Course Newsgroups message during the term, reading an average of 16.3 messages ($SD = 25.12$; range = 1 to 100 messages).

There were no significant gender differences among students regarding the number of their reported message postings or readings on course newsgroups. Similarly, there were no significant school year differences. However, those who had a job posted significantly fewer messages ($M = 1.08$) than did those without a job ($M = 2.79$), $F(1, 233) = 5.66, p < .02$. There was also a significant interaction of gender and home access to CHAT ($F(1, 233) = 5.66, p < .02$). Male students who had access to CHAT from home reported posting more messages (average = 3.3 messages posted during the term) than did the males without access to CHAT from home (average = 0.6 messages, $t(111) = 2.1, p < .03$). In contrast, females with home access reported posting only 0.7 messages during the term, but females without home access reported posting 2.8 messages per term ($t(118) = 2.20, p < .03$). The result for males may reflect a convenience factor; I have no good explanation for the female difference.

What might account for students not posting on CHAT course newsgroups? Of the 265 respondents, 108 (41%) provided reasons for not posting (Question 13a and b). Their reasons fell into four broad categories: logistic, organizational, social and motivational.

Logistic reasons. Twenty-three of the 108 students (21%) reported that they did not have a CHAT account, did not know about the CHAT Course Newsgroups or how to access them, or did not know how to use newsgroup commands.

Organizational reasons. Twenty-one students (19%) mentioned organizational or contextual reasons for lack of participation on course newsgroups. The two most common reasons were: (1) professors did not recommend or do not post topics on course newsgroups; (2) insufficient time to read or post on course newsgroups.

Social reasons. Seventeen of the 108 students (16%) reported that they preferred **alternative** means of asking questions or making comments about their courses. Many of their comments indicated they were timid about posting topics or replies in a public forum. These students reported preferring personal contact to asking questions, to making comments about a course or to sending private e-mail messages to professors.

Motivational reasons. Forty-seven of the 108 students (44%) indicated lack of motivation to participate in course newsgroups. Twenty-eight percent of the 47 students said they were not motivated because not many students contributed to course newsgroups. Thirty-five percent reported that the discussions on the newsgroups were boring. The remaining 37% mentioned that they were too lazy to participate in CHAT discussions.

Though 119 of the 265 students (38%) reported that they never read messages in a Course Newsgroup, none of them answered the follow-up question (question 13b) asking why they did not read the messages. I was disappointed not to receive answers to this question.

In order to learn what might encourage students to post more often on their course newsgroups, I asked students to rate a series of possible encouragements (question 14) on a scale from "not encouraging" (0) to "very encouraging" (6). Students rated postings and replies from professors (average = 4.2 and 4.5 respectively) as significantly more encouraging than postings and replies from TAs (average = 3.5 and 4.2) and from fellow students (average = 3.1 and 3.4), $F(2, 205) = 44.8$, $p < .001$ for postings and $F(2, 205) = 57.5$, $p < .001$ for replies. This result supports the idea that the professors and TAs can provide more encouragement for posting than can fellow students, and suggests why course newsgroups cannot "run themselves" without instructor involvement. Interestingly, respondents consistently rated "quick replies" as more encouraging than "postings", suggesting that rapid feedback is more important than inspiration. Additional analyses revealed no significant differences according to gender, job, or home access to CHAT on students ratings of what might encourage them to use course newsgroups for posting their questions and comments.

Recall that the major purpose of offering a course newsgroup is to provide a convenient medium for students to ask questions about their courses and to discuss course material. However, the results of Study 2 and of students' importance ratings reported above suggest that students are not inclined to use newsgroups for these purposes. To

learn more about students' preferences for getting answers to questions, I asked them to rate 9 different ways of getting answers related to their courses (Question 15). Results of their ratings showed large differences. Of the 9 alternatives, the highest rated, on average, was "asking the professor during office hours" (average = 4.7); 71% of the students rated it as a 5 or 6 on the 0 (not helpful) to 6 (very helpful) scale. The office hours option was followed by "sending e-mail to professor" (4.6), and "asking professor in class " (4.5). The average rating of "posting a message on course newsgroups" (2.6) ranked 9th out of 9 on the chart, well below alternatives such as "asking other students" (4.0) and "sending e-mail to TAs" (3.7). Only 16% of the respondents rated the CHAT posting alternative as a 5 or 6 on the helpfulness scale. There were no significant differences among students in their helpfulness ratings of asking questions in class, during office hours, or posting on CHAT Course Newsgroups according to students' gender, school year, job, or home access to CHAT .

Recall that in their answers to question 10, students reported spending more time using CHAT for e-mail than using it for any other purpose. How often did they spend this time sending e-mail to instructors or fellow students? Data collected from Question 16 showed that 44% of the 265 students reported sending e-mail messages to their professors; these 117 students reported sending an average of 4.8 e-mail messages to their professors during the term. About 20% (52 students) reported sending e-mail messages to their TAs, averaging 5.9 e-mail messages to their TAs during the term. Finally, 70% (186 students) reported sending e-mail messages to their fellow students during the term; this 70% averaged 50.4 e-mail messages to their fellow students. The results indicate that

students use e-mail primarily to communicate with each other, and much less to communicate with their course instructors.

Analyses of data revealed no significant differences in any reported e-mail postings based on having a job, school year or major. There were, however, two significant gender differences. Of all 264 respondents indicating their sex, the 130 male students reported sending more e-mail messages (average = 3.2) to their professors ($F(1, 227) = 5.32, p < .05$) than did their 134 female classmates (average = 1.5). In addition, these male students reported sending more e-mail messages to friends (average = 60.0) than did the female students (average = 30.2), $F(1, 227) = 5.73, p < .05$. The results confirm those in Study 1 and 2 indicating that males are more active in computer communication than are females.

Ratings obtained in Question 11 show that students consider course newsgroups the least important facility of CHAT. However, the majority of students, 68%, reported that Course Newsgroup discussions would help them to learn (Question 17). The result is perplexing. On the surface it may indicate only that students do not consider learning help to be an important aspect of CHAT. It is also possible that students are simply being diplomatic. Recall that only 62% of students reported reading at least one CHAT posting (Question 13b) and only 20% reported posting at least one newsgroup message (Question 13a). Thus, at least $68 - 62 = 6\%$ of students believed that Course Newsgroup discussions helped them learn even though they did not report reading the discussions, and $68 - 20 = 48\%$ reported the same even though they did not post a message for discussion. Thus, indications of the importance of CHAT course newsgroups for

learning may at best reflect what students believe "in principle".

Do students who read CHAT course newsgroups show a greater tendency to indicate that the newsgroups are helpful for learning than students who read none? Of the 156 students who indicated they read at least one newsgroup posting, 76% reported they believed the newsgroups were helpful for learning. Of the 59 students who reported they did not read any newsgroup posting, only 47% indicated they believed the newsgroups were helpful for learning. The difference is highly significant, Chi Square (1) = 15.6, $p < .001$, and suggests that students who use course newsgroups find them more helpful for learning than students who do not use them.

Question 17 also asked students why they did or did not believe CHAT newsgroups to be helpful. Thirteen students reported why it is helpful and 9 reported why it is not. The most common themes for newsgroups being helpful were (1) they help group communication ($n = 6$), and (2) they are convenient for communication ($n = 5$). The most common theme for newsgroups not being helpful was that they take too much time ($n = 6$).

If course newsgroups are helpful, should instructors encourage more students to use them by assigning a grade to newsgroup contributions? Not according to the students. Only 26% agreed that they should receive marks for contributing to their newsgroup discussions (Question 18). We may assume that the other 74% would like course newsgroup contributions to be voluntary, suggesting that most students may want postings to read but do not want to be forced to contribute any postings themselves. The proportions, however, change significantly according to reported newsgroup activity.

Forty-five percent of the 55 students who reported posting at least one message also reported wanting their contributions to be graded, but only 19% of the 163 students who did not report posting wanted contributions graded, Chi Square (1) = 15.1, $p < .001$.

Thirty-percent of the 153 students who reported reading at least one newsgroup posting also reported wanting their contributions graded, but only 14% of the 62 students reporting they never read a posting also reported wanting contributions graded, Chi Square (1) = 5.6, $p < .02$.

Question 18 also asked students for their reasons why course newsgroup contributions should or should not be graded. Two students responded why it should be graded: because it is an easy way to get a good grade and because it is fun. Twenty-two reported why it should not be graded. The most common reason was that the newsgroups were not useful for learning ($n = 10$), followed by "newsgroups are not useful for all courses" ($n = 4$), "I don't know how to use CHAT" ($n = 3$), and "students don't have equal access to CHAT" ($n = 3$).

How do students rate course newsgroups as sources of information for education compared to other sources such as lectures, textbooks, and scientific publications? Students were asked to rate learning resources including their CHAT Course Newsgroups from 0 = not an important source of information to 6 = a very important source. Their average ratings are reported in Table 5.

As shown in Table 5, students rated lectures as the most important learning resource and rated CHAT discussions as the least important of all 10 alternatives, ranking well below such traditional sources as labs, office hours and teaching assistants. While

Table 5.

Average Ratings of the Importance of Learning Resources at University (0 = not important, 6 = very important).

Learning Resources	Average Importance Ratings		
	Males	Females	Total
lectures	5.2	5.5	5.4
textbooks	5.3	5.3	5.3
students	4.3	4.0	4.1
lab & tutorial	4.0	4.0	4.0
office hours	3.7	4.3	4.0
teaching assistants	3.6	4.0	3.8
study groups	3.3	3.8	3.5
Web	3.2	3.4	3.3
journals & publications	2.7	3.4	3.0
CHAT course newsgroups	2.2	2.7	2.5

84% of the respondents rated lectures as important (5 or 6 on the rating scale) only 14% rated CHAT discussions this way. There were no significant differences according to gender, school year, time, or easy access to CHAT among respondents regarding their average ratings of the importance of lectures, textbooks, and study groups.

It is interesting that students rated other students and study groups much higher than course newsgroups (Table 5), even though the newsgroups provided a medium to communicate with other students and to study together. Indeed, while reading the content of course newsgroup postings, I noticed a handful of messages arranging for a time and place to study face-to-face together. The ratings suggest that students prefer more traditional sources of information for their education, and reinforces the previous results from questions 10, 11 and 15 reported above.

Suggestions for Improving CHAT Course Newsgroups

At the end of the questionnaire I asked students to make any additional comments

they wished about CHAT. Only 23 of the 265 respondents replied, but all of the 23 included suggestions for improving CHAT. These suggestions were divided in two major categories: Technical & Structural.

Technical suggestions. About 60% of the suggestions for improvement were in this category. The most common were:

- CHAT system should be faster, especially in student labs
- CHAT menu should provide better options
- CHAT should be connected via Netscape
- CHAT should be visual, with graphics and diagrams

Structural suggestions. The remaining suggestions (about 40%) concerned organizational and educational aspects of CHAT. The most common were:

- The University should hire more computer lab assistants
- Professors should regularly post on course newsgroups
- There should be rewards for students' participation on course newsgroups
- Professors and TAs should post more messages
- Professors and TAs should post exam questions
- CHAT Course Newsgroups should provide information and discussions mainly for first and second year and some third year courses but course newsgroups are not appropriate for 4th senior year students in some majors such as engineering

In summary, the survey results highlight the importance of time limitations and of

attitudes about computer communication in using course newsgroups. From the results, it can be seen that most students have limited time to participate in course newsgroups because they work. We might expect that any student would be willing to spend time participating in newsgroups if they believed it would be time well-spent. But the respondents' evaluations of CHAT clearly show that they do not believe some of its facilities to be useful, especially course newsgroups. Though students report using e-mail and the Web frequently, they spend little time in course newsgroups, and most of that time is spent reading the postings of others rather than posting messages themselves.

The results also suggest that course newsgroups might be used more if instructors were more active in their postings and provided faster responses to the postings of students. Yet most students, especially those who made little use of course newsgroups, did not want their contributions evaluated. Their reluctance to have contributions graded contrasts with the findings of Study 2 which clearly showed that grading contributions increases the proportion of students who participate in newsgroup discussions.

Study 4: Student Interview Methods

Participants

Active students were easy to find – I obtained their names from those who posted often in the most active newsgroups observed in Study 2. Eleven active students (5 males, 6 females) agreed to be interviewed. About half of the 10 inactive students (5 males, 5 females) came from the Second Year psychology course for which I was a TA; others were found by word of mouth. Students were in second, third, fourth, and graduate programmes, majoring in Psychology ($n = 9$), Sociology (1), Computer Science

(2), Chemistry (1), Biology (1), Anthropology (1), Political Science (1), Journalism (3), Law (1), and Engineering (1). The average age of students was 25 years, and ranged from age 19 to 52.

Interview Questions

The interview questions for active contributors to CHAT Course Newsgroups (see Appendix 2b) gathered information about five themes:

1. how many years and how many hours per week they use course newsgroups;
2. perceived differences between face-to-face and newsgroup discussions;
3. the educational benefits they expect from course newsgroups;
4. sources of motivation to contribute to course newsgroups;
5. suggestions to improve course newsgroups for education.

The interview questions for inactive participants (see Appendix 2d) obtained information about two themes:

1. why they did not participate on course newsgroups;
2. what changes might have encouraged them to contribute to course newsgroups.

Procedure

The active contributors to course newsgroups were contacted via e-mail or telephone. I explained to them the purpose of the study before asking them to participate (see Appendix 3 for recruitment of participants). Inactive students were selected in response to a call for participants during an Introductory Social Psychology course lecture, or through word of mouth.

Each respondent was interviewed singly in my office. The interviews were semi-

structured. All interview questions were addressed in each interview, but additional follow-up questions were asked in about 75% of the interviews as the occasion warranted.

At the interview, I first gave them a debriefing and informed consent form -- the latter was signed prior to commencement of the study (see Appendices 4 & 5). The interviews were tape recorded and later transcribed for coding and analyzing. Each interview took 15 to 55 minutes. Participants were thanked at the end of interview and were asked if they would like to have a copy of the results of the study.

Study 4: Student Interview Results

Amount of time using CHAT Course Newsgroups

Eight of the 11 active students reported they were participating in one course newsgroup during the term in which I interviewed them. All of these eight students were required by their instructor to post, and all reported posting an average of 1.9 newsgroup messages per week. The remaining three students, all in journalism, reported participating in two course newsgroups. Though none of the instructors for these courses required posting, the three students reported posting an average of 3.0 messages per week.

The 11 active students were each asked to estimate the time they allocate to CHAT discussions. They reported spending on average 3.3 hours per week participating in their course newsgroups, but their estimates varied widely from a low of 15 minutes to a high of 10 hours. The average of 3.3 hours per week is considerably greater than the average about 40 minutes reported by students in Study 3.

Perceived differences between face-to-face and newsgroup discussions

Because active students had, by definition, more experience than inactive students participating in newsgroup discussions, I was interested to learn how the active students compared newsgroups with the traditional face-to-face interactions that newsgroups are supposed to replace. In response to my question about perceived differences between face-to-face and newsgroup discussions, most of the 11 active participants gave lists of the advantages of each.

The most often-noted advantage of newsgroup discussions, addressed by four females and one male, was the opportunity for shy people to ask questions without being embarrassed by the presence of others. These students appreciated the ability to post questions without being observed by others and to avoid being judged "stupid" by the questions they asked. One male student said, "I feel more comfortable with [my course newsgroup] because... I can post while nobody knows me." Three male students noted that newsgroups give them enough time to think before answering a question, and encourage them to write well. One female and one male mentioned that newsgroups allow the convenience of communicating with other students when the time is available rather than arranging to meet at the same place and time. Perhaps because of this, another female added that newsgroups greatly improve the possibilities for distance education.

Two other students also mentioned time saved during a discussion. One male mentioned that he liked newsgroup discussions because, "I do not have to wait to talk." In contrast, one female student noted that she liked newsgroup discussions because, "I do not have to listen to everybody in the group."

Interestingly, one female pointed out that students have more control of the

discussion in newsgroups than in the class. She noted that instructors tend to direct the discussion in the class whereas on a course newsgroups students are able to direct the discussion because few instructors contribute to it. Thus, a course newsgroup can be a place that allows students more control of the discussion than more traditional face-to-face discussion can.

Given these perceived advantages of newsgroup discussions, should we expect active students to prefer them over face-to-face discussions? Probably not. The active students listed an equal number of advantages to face-to-face discussions. Four females and two males noted that face-to-face discussions reduce the degree of misunderstanding because body language allows them to realize whether a person is being serious or sarcastic, but this is difficult in newsgroup discussions. Two males and two females commented that face-to-face discussions take less time because talking is easier than typing. As one male said, "It takes five minutes to answer a question in face-to-face discussion while it takes about three weeks to answer the same question through newsgroup discussion."

Two females and one male said that because there is no printed record in face-to-face discussions, few students will continue to criticize them after the end of class. In contrast, these three students noted, their printed comments in a newsgroup can lead to extended criticisms. One female said face-to-face discussion provides real-time interaction, and offers an opportunity for students to think on their feet and improve discussion skills. Another female noted that the chances of receiving an answer for a question raised in face-to-face discussion are much higher than in on-line discussions.

All 11 active students agreed that course newsgroups cannot replace face-to-face discussions. Instead, they all insisted that course newsgroups should be used only as a supplement to face-to-face discussion. None of them suggested that face-to-face discussion should supplement newsgroups, thus indicating that the former have priority over the latter. This reinforces the results of Study 3 which indicated that students prefer asking questions face-to-face (in class, office hours or discussion groups) to asking questions on newsgroups.

Educational benefits expected from CHAT Course Newsgroups

When asked about the educational benefits of course newsgroups, all 11 active participants noted that course newsgroups allow discussion of diverse topics and the exchange of a variety of opinions about an issue. Four students, two males and two females, also considered course newsgroups as a medium to analyze ideas from different perspectives. Three males and two females mentioned that course newsgroups provide useful information about course-related matters such as assignments and exam dates. One female said that newsgroups are a good means to interact with others, and another female claimed that on-line discussions in the course allow distant students to evaluate their own academic progress by comparing themselves with other students who participate in course newsgroups.

Sources of motivation to contribute to CHAT Course Newsgroups

Because eight of the 11 active students were required to post, it is not surprising that four males and two females said their major source of motivation to participate in a course newsgroups was to receive course credit. But other reasons were also expressed.

Two students, one male and one female, stated that their motivation for participating was to communicate with classmates, and to help classmates if they had any course problems. One female said that she read and posted on course newsgroups because her friends did. Another female student confessed that her original motivation for participating was to buy and sell textbooks. And one female student indicated that because she was shy, the faceless discussions motivated her to post questions and comments.

Suggestions to improve CHAT Course Newsgroups

When the 11 active students were asked to offer suggestions for improving educational aspects of CHAT, three major themes emerged: (1) give course credit for newsgroup participation, (2) provide better management of the newsgroups, and (3) offer more computer training. Eight of the 11 students, four males and four females, suggested that students should receive marks for their participation in course newsgroup discussion. They argued that allocating marks would increase the motivation for students to participate.

Seven students, four males and three females, suggested that professors and teaching assistants should be more involved in course newsgroups by posting questions and comments, assignments and quiz samples, and by introducing the medium to students. Eight students, four males and four females, mentioned that students need better training in using the CHAT system. They noted that many students do not know how to use CHAT facilities or even how to log onto the system. Seven of these eight students referred to their own frustrations experienced because of difficulty accessing CHAT from outside the campus and frequent system malfunctions. They suggested that

more workshops on using CHAT facilities be given and that more phone lines be added for home access.

There were a few other suggestions offered as well. One female suggested the use of “emoticons”, to indicate humor, frustration, sarcasm or other emotions. Another female suggested that part of class lecture time be used for course newsgroup discussions.

Interviews with Inactive Students

Recall that the results of observation of course newsgroups revealed that the vast majority of courses do not use their course newsgroups and that most of the discussion activity on active newsgroups comes from a small minority of students. In order to understand more fully what discourages students from participating in CHAT Course Newsgroups, I asked ten inactive students why they did not participate and what might encourage them to participate. Below are the opinions of students who do not contribute to their course newsgroups.

Why Students Do not Participate in CHAT Course Newsgroups

A review of the interviews with the ten inactive students revealed a wide variety of reasons for students' lack of participation. Eight of the ten inactive students, three females and five males, confessed to being intimidated by posting in a public medium, to disliking computers, to being bored by the postings, to finding few people posting on course newsgroup discussions, to being unable to post anonymously. The result mirrors the finding of the Study 3 in which about 60% of students reported social or motivational reasons why they did not post course newsgroups messages.

Seven of the ten students, four females and three males, mentioned practical

limitations working with computers or with CHAT. Included in their comments were lack of skill in how to use a computer or the Internet, forgetting the location of their CHAT Course Newsgroups, and having difficulty in accessing CHAT from home. Two students, a male and a female, also mentioned that they did not post on course newsgroups because they did not feel confident about their typing and writing skills.

There were logistic and motivational reasons as well. Two females said they did not have time to participate in course newsgroups. One male and one female said they did not participate because the instructor did not require it.

Changes that might encourage more newsgroup contributions

I asked the ten inactive students under what conditions they would be willing to participate in a course newsgroup discussion. Eight students suggested changes that would motivate them to post on course newsgroups. The changes they mentioned included:

- 1? mark for posting (noted by 2 females and 1 male);
- 2? requirement by the course (1 male and 1 female);
- 3? post more course related material (2 males);
- 4? post more interesting topics (1 male and 1 female);
- 5? more students postings (2 females);
- 6? faster answers to questions (1 male).

Other changes suggested by five students, three females and two males, were related to technical issues. These included easier and faster connection to CHAT, providing multimedia in newsgroups that allow students to observe colors, diagrams, sound,

pictures; and simplifying the printing of course newsgroup articles. Two females mentioned that they would participate in course newsgroups if they could post anonymously.

The results of the interviews generally reinforce the results of the questionnaire survey (Study 3). Both the questionnaire study and the interviews reveal that few students are intrinsically motivated to participate in newsgroup discussions. Instead, most students admit that course credit is an important way to encourage them to participate in course newsgroups discussions. The results of the questionnaire study showed that students are more interested in face-to-face interaction when asking questions about course material. Similarly, the active students I interviewed expressed their positive attitudes about face-to-face discussions and emphasized that course newsgroups cannot be a replacement for these discussions. Both the questionnaire survey (Study 3) and the interviews (Study 4) indicated similar barriers to newsgroup participation, including intimidation or embarrassment about posting, lack of training or knowledge about using CHAT newsgroup facilities, lack of time and lack of content. These similarities across the studies suggest that the findings are robust, and that their implications must be seriously considered in any attempts to increase course newsgroup participation.

CHAPTER 6: Interviews with Instructors (Study 5)

The survey reported in Chapter 5 revealed a general picture of students' computer communication activities and their opinions about CHAT facilities. However, students are not the only users of CHAT. Instructors also play a significant role in its use. I wanted to learn why some instructors promote student use of CHAT facilities and participate in course newsgroups and why some do not. I was reluctant to send questionnaires to instructors, so instead decided to interview 20 of them, 11 who were actively involved in CHAT and nine who were not involved. Interviews with active and inactive instructors gave me the chance to listen to their views about the educational and practical issues regarding the medium, and about how the medium might be used to better educational advantage.

Participants

As with active students, I obtained the names of active instructors from the most active newsgroups observed in Study 2. Eleven active instructors (5 males, 6 females) agreed to be interviewed. Some of the nine inactive instructors (4 males, 5 females) were found from their inactive newsgroups; others were recommended to me by their colleagues as opposed to the use of Internet for education or as technophobic.

The professors taught in the departments of Psychology (n=6), Engineering (1), Communication (1), Sociology (1), Social Work (2), Journalism (2), Linguistics (1), Law (1), Philosophy (1), Music (1), Biology (2), and Architecture and Design (1). They had taught for an average of 10 years, ranging from two to over 30 years. The average enrolment in their classes was 70 students, and ranged from 20 to 400. Seven of the 11

active instructors maintained one course newsgroup. The remaining four active instructors maintained two.

Interview Questions

The interview questions for the 11 instructors who had an active CHAT course newsgroup (see Appendix 2a) gathered information about five themes:

1. how many years and how many hours per week they use course newsgroups for their teaching;
2. perceived differences between face-to-face and newsgroup discussions;
3. the educational benefits they expect from course newsgroups;
4. how they motivate students to contribute to course newsgroups;
5. suggestions to improve course newsgroups for education.

The interview questions for the 9 inactive instructors (see Appendix 2c) obtained information about the following two themes:

1. why they did not make use of their course newsgroups;
2. what changes might have encouraged them to use course newsgroups for their teaching.

Procedure

The active instructors were contacted via e-mail or telephone. I explained to them the purpose of the study and then asked them whether they would participate/share their experience of CHAT course newsgroup activity with me. I interviewed the instructors who agreed to participate in their office. The interviews were semi-structured. As with student interviews, all interview questions were addressed in each interview, but

additional follow-up questions were asked in about 90% of the interviews as the occasion warranted.

As with students, I began each interview by giving an instructor a debriefing and informed consent form -- the latter was signed prior to commencement of the study (see Appendices 4 & 5). The interviews were tape recorded and later transcribed for coding and analyzing. Each interview took 25 to 65 minutes. Instructors contributing to the study were thanked at the end of interview and were asked if they would like to have a copy of the results.

Results: Active Instructors

In analyzing my results, I counted the number of male and female instructors in the active group giving similar answers to each interview question. On reviewing these counts, I noticed that none of them showed any remarkable sex difference in their answers. As a result, I decided in consultation with my supervisor to omit below most of the counts of male and female professors who answered in a given way and instead report only the total number of professors who did so.

Amount of Time Using CHAT Course Newsgroups

The 11 active instructors I interviewed, five males and six females, had employed a newsgroup for their courses between one and five years. One male and one female instructor were very active using their course newsgroups in previous terms but had stopped or decreased their contributions. One did so because she lacked the necessary time; the other did so because he became discouraged by students' low rate of participation. They both mentioned that before reducing their involvement, they had been

spending one or two hours per day, including weekends, to stimulate discussions on their course newsgroups by initiating new topics or commenting on students' postings or otherwise encouraging them to participate in the group discussions.

The active instructors reported checking their course newsgroups from two to 15 hours per week (average = 5.8 hours). Eight instructors mentioned they read their course newsgroups every day, and read all the students' postings. One checked twice a week. The two who had decreased their involvement reported checking their CHAT course newsgroups only a few times during the current term. One other instructor mentioned that work on his course newsgroup had become so time consuming that he asked his Teaching Assistant to help check newsgroup activity and post messages.

All 11 active instructors commented at length about the amount of time and extra workload required to maintain their course newsgroups, especially five males and one female who were also developing web pages for their courses. Eight instructors noted that they volunteered their time to develop computer technology for their teaching, but feared that their intellectual property (course outlines, lecture notes, etc.) would be used by others without their consent. Five of the eight also feared that their intellectual property would be claimed as university property when posted on the Internet. The 11 active instructors mentioned that they posted occasionally on CHAT course newsgroups to announce course news or to answer students' questions they felt they should answer. However, all said they usually let students discuss and answer each other's questions or comment about the course materials, hoping to see students carry the discussion on their own.

Perceived differences between a face-to-face and course newsgroup discussions

I also asked the 11 active instructors if they believe the course newsgroups would replace face-to-face discussions. Almost all answered by first commenting on the differences they observed between face-to-face and newsgroup discussions, and their answers paralleled those given in the student interviews of Study 4. According to six instructors, face-to-face discussions accelerate group involvement and enhance teaching more than discussions in newsgroups. Through body gestures, voice, and tone in face-to-face discussions, students increase their interaction with the instructors and fellow students and this results in a better understanding of course material. However, instructors also reported limitations of face-to-face discussions. Six instructors noted that face-to-face discussions demand coordination of meeting time and place which is frequently difficult. Five instructors noted that face-to-face discussions can work very successfully for small classes, but are very difficult and sometimes impossible for large classes. In large classes there is not enough time to answer students' questions, and it is not possible to arrange many small discussion groups to suit all students simply because instructors and teaching assistants do not have enough time.

All 11 active instructors believed that course newsgroups can be an effective supplement for discussions in large classes and for communicating with professors without having to meet them in certain places at certain times. They all noted that course newsgroups can provide dissemination of information and communication in a way especially convenient for students far from campus. In this regard, one professor said: "The great advantage of a course newsgroup is that a single mother student can

communicate with me from home and does not have to wait at my door to ask her questions.”

Instructors discussed some disadvantages of course newsgroups as well, and these limit students' involvement in discussions on CHAT course newsgroup discussions. According to one professor, a newsgroup's reliance on writing would intimidate students who do not feel confident about their writing ability. Another professor mentioned that CHAT course newsgroups would not be advantageous for small classes because in small classes there is often enough time for communication with instructors and among students. Two mentioned lack of visual cues. One said, “CHAT is a faceless conversation based on writing style not talking style” while another reported, “A newsgroup has no body language and social context. It does not allow students to see the differences between joke or sarcasm.” One instructor considered it a disadvantage that students had the freedom to criticize the course in public. And all 11 mentioned the amount of time required to monitor newsgroup discussions.

Perhaps because of the complementary strengths and limitations of the two media, eight instructors believed that newsgroups could supplement but not replace face-to-face meetings; only three believed newsgroups could actually replace them. Two of the eight mentioned that newsgroups could replace face-to-face discussions under some conditions: one suggested replacement if the newsgroups showed a picture of participants; another said they could be a replacement if newsgroups were well-moderated.

Educational benefits expected from CHAT course newsgroups

In order to learn about instructors' expectations of CHAT, I asked them what

educational benefits they might expect of course newsgroups. Their answers covered several areas of education ranging from communication among students, learning terminology, asking questions about the course materials and sharing similar problems, to ideas such as freedom from class and textbook material. Their rich variety made the answers difficult to organize. Table 6 shows my best effort to categorize their replies.

Table 6.

Instructors' expected educational benefits of CHAT course newsgroups.

Category	Answer
Communication	communication among students, between students and instructors, group learning through student questions and answers, students help each other, provide a sense of community especially for distant students.
Familiarity with technology	removes fear of technology, provides virtual discussion groups, teaches how to use tools such as SPSS.
Learning	CHAT as a pool of knowledge facilitates learning the language of the field, learning from questions and answers, learning from sharing experiences.
Access to information	access to course information, to students' comments about course materials, to Internet, to other newsgroups.
Miscellaneous	provides more freedom of expression, more democratic and intellectual discussions, saves time and resources such as paper, helps taking courses such as Law and Internet, provides data for research interest related to use of the medium.

Five professors mentioned communication (first category of Table 6) aspects of the Internet as an important tool for learning. Their focus on communication, however, varied. For example, a female instructor focussed on students sharing personal experiences and learning from each other, whereas a male instructor emphasized communication among students and instructors or TAs at a convenient time for those who are learning off campus (e.g., ITV students). One instructor also emphasized

communication and discussion of the course among students as an important means to create new topics and new thoughts. Another instructor emphasized communication as a facilitator for group learning through sharing students' understanding of course materials. According to her, students ask questions and learn from each other through their dialogue. One instructor expected students to learn course materials, while another expected students to learn how to express themselves.

The second theme of expected benefits, mentioned by four instructors, emphasized familiarity with technology (Table 6). One instructor mentioned that his course is about Internet technology; thus, students are required to learn about computer communication. The other three instructors, however, focussed more on the importance of familiarity with technology among female students. They emphasized that CHAT can help remove the so-called "technology phobia" among females.

A third theme of instructors' educational expectations focussed on learning (Table 6). One instructor mentioned that course newsgroups allow faster and easier learning of terminology. Another stressed that students can learn about the course through the questions and answers posted on course newsgroups. One instructor also emphasized that course newsgroups allow student learning through sharing their experiences with each other.

A fourth theme of expectations concerned easy access to information (Table 6). Two professors focussed on the accessibility of information. They mainly considered information about course materials, but they also mentioned the usefulness of having access to general information through other newsgroups or information sources on the

Internet.

In addition to the expectations above, professors reported a few others. One instructor added that computer communication would provide a democratic approach to discussions of ideas and thoughts and would allocate equal opportunity for each student to speak. She said: "I expected that CHAT newsgroups would give more freedom to talk, provide more democratic, mutual intellectual discussions," Another instructor addressed the issue of saving time and natural resources. He mentioned that course newsgroup could result in having classes with no paper and perhaps no textbook, and would also save time because professors would answer repeated questions once. One instructor also mentioned that CHAT course newsgroups would provide her with information for her research interest in situated learning.

The rich variety of expectations might indicate two conclusions: (1) computer communication has great potential, and (2) instructors are optimistic about the potential being fulfilled. However, the interviews with instructors indicated their disappointment with the applicability of current computer and communication technology. All eleven instructors expressed their disappointment, although from different viewpoints, at the failure of CHAT newsgroup activity to fulfill their expectations. Here is what three of them said:

"I hoped that CHAT course newsgroup would give students the chance to communicate with me and with other students, and I hoped that this intention results in creating new topics and thoughts, but I never had success with CHAT course newsgroup."

"I expected that CHAT course newsgroup provide virtual discussions among hundreds of students, especially ITV students, but students are not very interested in discussing ideas, they are more interested in gossiping and socializing."

"ITV students are usually a week behind the class. The CHAT course newsgroup gives them an idea of the class, enables them to contact TAs. So students can post their questions and TAs would respond, but the problem is that TAs are resistant to communicate with students."

The remaining eight expressed variations of the above quotes. Five more expressed frustration with students' lack of involvement in the newsgroup. Three more expressed disappointment with their teaching assistant's lack of involvement in the newsgroup.

Motivating students to contribute to CHAT course newsgroups

Instructors were asked to discuss the ways they have tried to motivate students to participate in their course newsgroups. There were two popular replies: (1) giving students marks for course newsgroup participation, (2) verbally encouraging them to participate. Six instructors had tried the first, allocating from 5 to 20% of the course mark for student participation. Of these six, two left it as a grading option (optional course credit), whereas the remaining four made it a requirement.

The two instructors who offered optional course credit for newsgroup participation reported that it was not very successful. They were disappointed that fewer than 30% of their students chose the option, even when the quality of their postings was

not assessed, and were perplexed why some students missed an easy opportunity to raise their marks.

The four instructors who required students to post in their course newsgroups graded students on weekly or biweekly postings. The four instructors stated that the main purpose for requiring postings was to help students get involved in communication technology and to lower the fear of technology, especially among female students. They mentioned that because evaluation of the quality or content of the postings might intimidate students, they marked students only according to number of postings and not according to the quality of their content. Even so, one of the four instructors said that although posting was an easy way of gaining a few marks, one of her 25 students never posted. Another instructor said that he was disappointed when several students dropped his course when they learned they had to post.

The remaining five of the 11 active instructors had chosen not to give marks but instead to encourage students verbally to participate in their course newsgroups. The encouragement included announcements in class about the existence of the course newsgroup and about its usefulness for learning. These professors noted that they would post quiz samples, students' questions asked during office hours or via personal e-mail, and course announcements on their course newsgroups for further encouragement. One professor said that he would mention students' names, questions and comments posted on course newsgroup during lectures in order to encourage other students to post. One professor said that he had given up marking students for their postings because marking is a very difficult task: "I used to give a mark for CHAT course newsgroup participation

but not any more. It is so difficult to evaluate students' postings: should I grade their quality or quantity? Should I grade the number of postings read?"

All five instructors who gave verbal encouragement for newsgroup participation mentioned that discussions on CHAT were generally not successful. They noted all the discussions evolved into exchanges among 3-6 students willing to continue posting. One professor said: "I do encourage my students by writing about myself and by posting questions and comments, but it motivates only a few."

Suggestions to improve CHAT course newsgroups for education

The 11 active instructors' suggestions can be classified into three main categories: (1) workload and protection of intellectual property, (2) organizational, and (3) technical. Each instructor addressed at least two of these three categories. All 11 showed concern about the workload and protection of intellectual property, seven stressed concern about organizational issues and six addressed technical issues.

The first theme of suggestions concerned workload and protection of intellectual property. As noted above, all 11 instructors mentioned that the workload to maintain their course newsgroups is heavy, especially when the instructor also has a web-page to maintain for the course. The instructors emphasized the many hours of extra work needed to monitor their newsgroups and to develop course web-pages. Eight instructors believed that the course newsgroup workload should be taken into consideration in job evaluations and salary. These eight instructors also mentioned that material they produce for their course newsgroups and web-pages should be their own intellectual property and that they should have control over its distribution and use. The university should provide

protection for instructors' intellectual property by insuring it is copyrighted in the instructor's name.

The organization and management of CHAT facilities was the second most common theme of professors' suggestions to improve course newsgroups. Of the seven instructors who mentioned organizational issues, five suggested that use of course newsgroups should be required for all courses, and that teaching assistants should be responsible to moderate course newsgroup discussions. These instructors suggested that teaching assistants should take more responsibility in stimulating course newsgroup discussions by posting comments and answering questions. Two of these instructors strongly expressed dissatisfaction that their TAs showed no interest in facilitating CHAT course newsgroups. However, contrary to the five who suggested that course newsgroups should be a course requirement, one instructor suggested that course newsgroups should not be used for all courses. She said: "course newsgroups should be for those professors who would like to hear students' opinions, discussions, and free writing."

More organizational suggestions were offered by the seven instructors. One suggested using CHAT to deliver distance education overseas. The professor said, "CHAT could be a great advantage to deliver courses to students who live in other countries and are interested in taking courses from Carleton. By using CHAT to reach students overseas, international students do not have to overcome many hassles to come here for education." Another instructor suggested that CHAT should be organized in a way that allows anonymous postings in order to encourage those shy students to post. Yet another instructor asked CHAT management not to remove discussions on CHAT

course newsgroups at the end of the academic year. Finally, one instructor noted: “course newsgroups should not be dominated by males.”

The third most common theme of suggestions for improving CHAT covered technical issues. Six instructors suggested there should be more phone lines available to dial CHAT especially during peak hours at night. After noting that it is now difficult to edit postings on CHAT and impossible to change postings later, three instructors suggested a WYSIWYG editor and a CHAT feature to allow authors to retain, delete or edit their messages after posting. Two instructors suggested more training opportunities for instructors to improve their use of computer technology for their courses. One of them said: “The university should provide training for professors especially those with technophobia. We need more training than students do.” One instructor also suggested that there should be a feature on CHAT that allows students to login and work on a group project.

In summary, the interviews with active instructors uncover four interesting themes. These instructors’ have high expectations of newsgroups for enhancing learning. However, they are frustrated by the time it takes to maintain their course newsgroups. time they do not have. The instructors are concerned about the ownership and copyright of their course material. Finally, the instructors are discouraged by the lack of student participation in course newsgroups and suggest that the most practical way to encourage more participation is to make it a requirement.

Results: Inactive instructors

Reasons for not using course newsgroups

Recall that nine university instructors I interviewed, five females and four males, did not maintain a course newsgroup. Their reasons ranged from pedagogical beliefs and organizational issues to career concerns.

Six of the nine instructors stressed the importance of personal contact with students as a valuable teaching technique. They mentioned that only personal contact would generate creative thoughts and scholarly interactions among students. According to the six instructors, course newsgroups isolate professors from their students. All six also noted that they did not teach courses on Carleton's Instructional Television channel for a similar reason. One instructor said: "I am not opposed to CHAT or technology but I stick to the traditional notion that the most powerful pedagogy is human interaction, and I do my best to develop my personal contact with my students; there is no substitute for personal contact." Another instructor said: "Only by personal interaction will students learn how to think and how to answer problems." One of the six instructors additionally suggested that the university should encourage more opportunities for personal interaction rather than encouraging more computer mediated activities.

Five instructors were concerned about the work needed to monitor and maintain course newsgroups. Interestingly, three of these five instructors were sessional lecturers who teach part-time, on contract and for low pay. Because their salary is no more than \$3,500 per course (about the same salary of their TAs), all believe there is no reason to add the extra workload of newsgroup maintenance to their job. Curiously, none of the 11 active instructors were sessional lecturers.

Four of the instructors simply believed that a newsgroup was irrelevant for their

course. One instructor in social sciences said: “A course newsgroup is not sufficient for my course which demands working on group projects....” Another instructor in applied science added: “The textbook and assignments are enough for my students’ learning, I do not need a course newsgroup for my courses because it is easier to talk to students and explain the questions, my students do not even need to go to the library, the nature of my courses in engineering is different from social sciences.”

Three instructors expressed concerns about their career and its security. They mentioned that the extra work to maintain a course newsgroup would not be taken into account in promotion, and instead might result in less control of their own intellectual property. For example, one instructor said: “if class information goes on line, then students have no reason to come to lectures, ...and I also know that students who use a web-page for their courses obtain poor marks.” He did not mention the source of his information.

Some miscellaneous concerns also emerged from the interviews with the inactive instructors. One instructor mentioned that he would not consider using CHAT as long as he does not receive complaints from students. Another instructor mentioned that she is afraid to use a course newsgroup because the publicity of names and e-mail addresses might result in receiving many unwanted messages such as commercial advertisements and/or anonymous harassment. Yet, another instructor said: “students in our department are not interested in using course newsgroups. Thus I do not feel I should use it.”

Changes that might encourage contribution to course newsgroups

The nine inactive instructors did not address any technical or training issues that

might lead them to use course newsgroups. However, they mentioned a variety of other changes or conditions that might encourage them to consider using course newsgroups for their teaching. Three instructors mentioned that they should first think about the utility of this medium and explore the potential of course newsgroups before they consider using it for their courses. However, one instructor said: "Under no conditions will I try it. I do my best to provide time for office hours and personal interaction with individuals and groups of students. I will never consider using a course newsgroup." One instructor mentioned that if the university provided sufficient training for students and motivated them so that they demanded the use of a course newsgroup, then she would consider using one. Another said if it is required by the university to use course newsgroup, she would do so. Yet another instructor said: "I will use a course newsgroup if I can set up the newsgroup as a discussion group for each group in class working on the same project, hoping to raise the level of discussions higher than in class." The remaining two instructors said that they might consider use of a course newsgroup if they have to teach large classes with hundreds students and with TAs who would take the responsibility to monitor it. However, none of these instructors showed any enthusiasm to use computer communication as an educational tool for their teaching.

In summary, the inactive instructors generally lack both time and motivation to use course newsgroups. Their comments regarding the requirement of time and effort to maintain course newsgroups and regarding their career concerns reinforce those of the active instructors.

CHAPTER 7: Discussion

You can lead a horse to water but you can't make it drink. I am reminded of this traditional saying when reviewing the purpose and results of my studies. My original interest in evaluating the use of the newsgroup facility on the Carleton Hotline for Administration and Teaching (CHAT) was to learn why and how students use it and what educational benefits it might have for them. As noted in Chapter 1, there were many reasons to believe that the facility could be useful for learning by promoting communication about course-related materials among students and between students and instructors. Indeed, for these reasons the administrators of Carleton had made the development of CHAT and its newsgroup facility a high priority. However, in order for the medium to be useful it must be used. The results of Study 1 gave overwhelming evidence that only a small fraction of the newsgroups arranged for each course at Carleton were used at all. Study 2 showed that even in the few courses where newsgroups were used, only a small fraction of students enrolled in these courses posted messages, and that only a minority of their messages were related to the content of their course. In addition, few of the topics posted by students received many replies. In sum, whatever potential might exist for improving dialogical learning addressed by Laurillard (1993), Shotton (1995), Shute (1994) and Kulik et al. (1985) via computer mediated discussions or course newsgroups was not fulfilled on CHAT simply because there was so little newsgroup dialogue.

The infrequent use of course newsgroups supports Schofield's (1994) results indicating that traditional teaching methods are still dominant in grade and high schools

despite the availability of computers in these educational institutes. However, Schofield found that infrequent use was primarily the result of insufficient training. My results show that training was not a major issue and that other factors were far more important.

Why was there such modest use of CHAT course newsgroups? Studies 3-5 eliminated one possibility and confirmed two others. Almost no one in the studies complained about CHAT, or raised criticisms about the usability of its facilities. What criticisms were given about the design of the facility were minor. This supports why CHAT won a national award for interface design. Instead, the studies gave clear and consistent evidence that CHAT newsgroups were not used for two major reasons: (1) lack of time and (2) lack of motivation.

Insufficient time

Among the results of Study 3, one of the most interesting was that students without a job reported far greater newsgroup reading and posting times than did students with a job. Among the most popular answers to the survey question asking why students did not participate in newsgroup discussions was "I don't have time." As the interviews with active students (Study 4) show, newsgroup discussions take a great amount of time. Indeed, the most common complaint of active instructors (Study 5) was that their course newsgroups often took far more time than they had.

Newsgroups are, it seems, time sinks (Whittaker & Sidner, 1997). It takes time to find a working computer on campus, login and reach a newsgroup. It takes time to start a computer at home, dial into Carleton (30 or more busy signals before a connection are

common) and go to a newsgroup discussion. It takes time to read previous postings and to absorb their meaning. It takes time to create a grammatical and thoughtful response that will remain public for up to a year. It takes more time to type it than to speak. These and other time requirements make it difficult for either students or instructors simply to sit down for a few minutes and dash off a newsgroup posting. Even though they may have good intentions, most students and instructors are busy, and thus have limited time to invest in, or attention to pay to, newsgroup discussions (see Thorngate, 1990, 1997). The discussions seem to remain a low priority, especially when there are little or no rewards for participating. Too often students and instructors never finish the activities they have decided should come prior to newsgroup discussions. So newsgroup discussions remain infrequent.

Insufficient motivation

Students and instructors might make time for course newsgroup discussions if they had more motivation. One of the most effective means of increasing motivation is to provide rewards. What are the rewards for spending time in course newsgroups? My studies show there are currently few.

The results of Study 2 clearly indicate that the best predictor of students' course newsgroup activity was a grade: except for journalism, activity was highest in courses that allocated a mark for newsgroup participation and lowest in courses with no such allocation. The survey (Study 3) indicates that inactive students did not participate in course newsgroups because their participation was not required, encouraged or evaluated

and that active students wanted to be graded for their contributions. Interviews (Study 4) showed that most of the active students were graded for their newsgroup participation, and half of the inactive ones said they would likely become active if they were graded for it. The results strongly suggest that the existence of newsgroups as a new medium of communication does not itself motivate course discussions among students, contrary to what Althaus (1997), Gagne (1977), and Johnson and Johnson (1997) have argued. It seems that any intrinsic motivation for communication must be supplemented by the promise of a grade to encourage more students to post.

Though the promise of course credit for posting may be the most efficient means of stimulating students to post, the results of Studies 3 and 5 give indirect evidence that an instructor's verbal encouragement may also help. Many students surveyed in Study 3 indicated that they did not post because their instructor did not encourage them to do so. And many of the active instructors in Study 5 mentioned that they gave generous verbal encouragement to students to post frequently (announcements about the newsgroup in class, posting of discussion topics, class discussions of ideas from the newsgroup, etc.). However, such encouragement may not be very efficient. Most active professors confessed disappointment in their encouragement efforts, noting that their efforts did not seem to increase students' newsgroup participation rates. And the results of Study 2 indicate no correlation between the number of instructors' postings and the number of students' postings.

If students are waiting for instructors to encourage them, either verbally or with the promise of a grade, then why do so few instructors provide this encouragement?

Recall that each term over 95% of course newsgroups lie fallow; fewer than 5% of all instructors make any use of the newsgroups automatically set up for their course.

Interviews with instructors (Study 5) give a clear picture of why: the reward/effort ratio for managing a newsgroup is close to zero. Many of the inactive instructors said they avoided their newsgroup because it would take too much of their time. All of the active instructors confessed that their newsgroup did take large amounts of time (averaging about 6 hours a week). Because most instructors work long hours, few have this time available. Instead, they must steal it from other activities, including evening and weekend activities. Why would they do it? Some would do it because of the intrinsic rewards of teaching or of using a new technology. But most of the instructors indicated that they were looking for something more tangible. At the moment, the administrators of Carleton University give verbal encouragement to instructors to spend time developing course newsgroups, but do not provide more tangible rewards to motivate the needed involvement. Such tangible rewards might include decreases in other required professional activities (e.g., office hours, lecture preparation time, committee meeting, grant proposal preparation), more time from Teaching Assistants, or additional pay.

In addition to the few rewards for instructors who are motivated to develop their course newsgroups, there also seem to be potential punishments. The interviews indicated that many instructors were concerned about issues of intellectual property and job security. With no clear guidelines from Carleton administrators about who owns materials posted by instructors and students in course newsgroups or elsewhere on the Internet, and with no good copyright protection, it is not surprising that instructors would

express fears that their ideas might be misused or stolen. With no guarantees that course materials of any kind posted by instructors on the Internet remain their own property, it is not surprising that instructors also feared the university might grab their offerings, then lay them off. In short, there now seem to be few rewards at Carleton for an instructor's Internet activity, including newsgroup activity, and some possibilities for punishment (see also Noble and Young, 1998 for similar conclusions at UCLA). Indeed, it is a bit puzzling why any instructor would be motivated to invest the time needed to make such activities successful.

Is the medium to blame?

Though this dissertation focussed on the use of course newsgroups for improving dialogical learning, it is perhaps unfair to emphasize the failure of using the new medium without comparing it to the alternatives. One obvious alternative is traditional face-to-face discussion. After centuries of use, face-to-face discussions still have limitations, and some of them parallel those of the newsgroups. For example, it seems safe to say that only a small minority of students in traditional lecture classes offers questions or opinions, even when professors encourage everyone to speak up in class. Verbal encouragement and the rewards of a mark are likely to increase the number of students involved in face-to-face discussion about as much as those involved in newsgroups. The spontaneity of face-to-face discussions is often limited by the inconvenience of synchronous communication: getting everyone together at the same time and place. The asynchronous convenience of newsgroups is limited by reduced spontaneity and the inconvenience of finding time and facilities to login. In substituting one medium for

another, we may be doing no more than substituting of one set of strengths and weaknesses for another set of strengths and weaknesses. And in either case, if instructors did manage to elicit 100% participation rates from their students, there would likely be far more extra work than any instructor could handle.

In short, student participation in class discussions seems more affected by the structure and dynamics of the class than by the medium of communication. The structure and dynamics are in turn primarily affected by the instructor's activities, and these activities are affected in large part by administrative policies. It is once more difficult to escape the conclusion that the rewards provided to instructors by administrators are central to any increase in the use of course newsgroups (see also, Jaffe, 1998).

Should CHAT be improved?

In the six years since CHAT was first introduced at Carleton, its facilities have been **greatly** expanded and improved. Once a text-only system with a rather unfriendly interface, it is now available through graphical browsers with a web page for each course and much more convenient access to newsgroups. The number of computers on campus and the number of modem lines that allow student access to CHAT facilities has grown by at least 400% since CHAT began. All of these improvements have greatly reduced the amount of effort needed to use CHAT, and thus have increased the reward/effort ratio that seems to affect CHAT use. As a result, it is possible to wonder if additional CHAT use might be stimulated by continuing to improve the convenience of its interface and access, that is, by further reducing the effort required to use CHAT. Should, for example, the

university invest in the installation of another 500 network computers on campus to reduce the time it takes a student to find one not in use?

The results of my research indicate that improvements to CHAT would probably not increase the use of course newsgroups by a large amount. CHAT is now used heavily for private e-mail and for access to web-sites (Study 3); students show little reluctance to use these CHAT facilities, and few complain about CHAT other than the number of busy signals in dial in lines and the number of broken machines on campus. Their reluctance to participate in newsgroups is thus an anomaly, and cannot be accounted for by difficulties of accessing CHAT or by its interface. No reduction in the denominator of the reward/effort ratio will increase the ratio until the numerator is greater than zero. Once more, it seems that first priority must be given to rewarding students for their newsgroup participation, which leads us again to instructors, their time limitations and motivations, and to the rewards that administrators might provide to increase instructors' involvement.

Will e-mail suffice?

Studies 3 and 4 indicated that over twice as many students reported sending private e-mail to their instructors than reported posting in a newsgroup. This result begs the question: Are these private e-mail messages more effective for dialogical learning than the newsgroup postings? Students' reported preference for private e-mail suggests that it is a more effective means of dialogical learning, if for no other reason than relative popularity. There is anecdotal evidence, however, to suggest that the private e-mail

messages may have little to do with learning. One instructor (my supervisor) has kept every e-mail message sent to him by students in his large undergraduate class. According to his estimates, about 150 messages have been sent by students in the past 18 months. Of these, only one asked a question related to the content of the course. All others were related to administrative matters: questions about exams, grades, deadlines for assignments, etc. It seems that even private messages to instructors do not themselves encourage much discussion of course related ideas.

Yet, if the proportion of private messages containing such discussion were greatly increased, professors would again be faced with a proportionate increase in demands on their time (Whittaker & Sidner, 1997). Though it might be more rewarding for each student in a course to conduct a private dialogue with his or her instructor, rather than conducting a public dialogue with fellow students, all of the burden of responding would fall on the instructor. It is important to remember that one advantage of a newsgroup is to spread the time demands of dialogue among all participants. In a newsgroup, students can help to keep the dialogue going, and reduce the time demands on instructors. For this reason alone, newsgroups continue to have a logistic advantage over private e-mail.

Some practical implications

The results from Studies 2 - 4 clearly indicate that students will increase their participation if they are graded for it. Yet the results also indicate that when a grade is given only for the number of postings and not for content, then most students will post the minimum number of messages, make them short, and add little of intellectual value to

a course discussion. Perhaps grading only for number of postings is necessary at the beginning of a course in order to encourage students to “dive in the shallow end of the pool”. But it seems that sooner or later the quality of content and its relevance to course objectives must be evaluated.

But the evaluation of content of newsgroup postings requires that an instructor (professor or teaching assistant) read the content and apply some criteria of evaluation. Where will an instructor find the time? And what will reward an instructor for finding and spending time grading newsgroup postings? The questions may be easy to answer when a course has 10-20 students. But when it has 100 or more, and when each students posts at least 5 messages, then an instructor is faced with reading at least 500 postings in order to assign grades. Assuming that each posting takes 10 minutes to read, grade and record, over 83 hours would then be needed to accomplish the task. Add to this the time an instructor might devote to organizing and participating in a course newsgroup, at least 3 hours per week according to the active instructors in Study 5, and in a 12-week course, instructors would need to find at least $83+36 = 119$ hours of time to devote to newsgroup tasks.

If any instructor animates the course newsgroup and grades all the contributions for a class of 100, then the instructor can expect to spend about nine hours per week on the tasks. At Carleton, this is almost the equivalent of one “full-time” TA (hired for a course at 10 hours per week, according to university regulations). For an instructor, the nine hours per week present a significant increase over the traditional two-hours-per-week for office hours. If a TA is assigned to manage a course newsgroup, then there will

no extra time for more traditional TA duties, and the instructor will be required to do them.

It seems there are only two logical solutions to this problem: (1) reward existing instructors for spending extra time on the new tasks created by maintaining newsgroups, (2) hire more instructors. Judging from the informal comments of instructors I interviewed in Study 5, most now spend about 60 hours per week on job related activities. So even if these instructors were somehow rewarded for their extra effort, it is doubtful that many would be able to find extra time to devote to newsgroups, especially if they were required to maintain 3 - 5 of them. And even if they could find the time, I am not sure what would reward them. It would be ironic if the most effective reward is "time off".

The alternative to encouraging professors to devote time to managing newsgroups is to hire more teaching assistants. There are some advantages to this alternative. TAs are cheaper than professors. They must now participate in TA orientations which could be extended to include workshops on managing course newsgroups hoping to increase the pedagogical effectiveness of their efforts. And they may be more enthusiastic in their newsgroup work than would full time faculty anxious to spend more time on research of other activities. But there are disadvantages as well. Newsgroups maintained only by TAs could add an extra degree of separation between students and professors and cause many students to feel increasingly alienated from them. In addition, hiring more TAs would cost more money. Over 500 of the courses at Carleton are First and Second Year and most have over 100 students. At least one additional 10-hours per week TA would

be required for each, an additional expense of over 1.5 million dollars.

It is always possible to encourage both professors and teaching assistants to share the workload of managing course newsgroups. But I am not sure this would solve the problem of time and expense. One reason is related to the shifting nature of the professoriate. Currently, about 30% of all courses taught at Carleton are taught by Sessional Lecturers, contract employees from the community who are hired to teach for about \$3,500 per course. As in most North American universities, these sessionals now represent an academic underclass. They now teach for about the same money as their TAs. Many have no TAs at all. They are not given offices. It seems doubtful that sessionals would be eager to spend the required time for managing a course newsgroup unless they were paid substantially more for it.

In short, there seems to be no inexpensive solution to the problem of finding time needed to monitor and manage course newsgroups effectively. If newsgroups are to be added to courses, then someone must be paid for the extra time needed to run them. It is ironic that much of the original interest in using newsgroups came from a vague belief among administrators that the newsgroups would save the university money (http://chat.carleton.ca/index/original_proposal.html). My research results add to the evidence that this belief is mistaken.

But if money is in short supply, can anything be done to run successful newsgroups? Few possibilities remain. One is to use newsgroups as a substitute for office hours, allowing instructors to free office hour time for newsgroup time. Yet, many

students come to instructors during office hours for private discussions, and newsgroups are not private. A student would thus be better advised to write a private e-mail message to his/her instructor. As noted before, writing responses to these student messages takes more time than speaking face-to-face, and there is usually a time lag between the message and a reply. So the spontaneity of office hour conversations would be lost.

Another possibility is to limit newsgroups to certain types of courses, or to certain students within courses. Perhaps only small courses would be allowed a newsgroup, or perhaps newsgroups would only be allowed for students taking courses off campus via Instructional Television or some future distance education programme. Such strategies could limit the amount of content to be evaluated, the number of messages requiring the time of a reply. If these strategies would reduce the costs of conducting newsgroups, perhaps the university should try them.

There is, of course, at least one more possibility: if the university wishes to limit the amount of time and money spent managing newsgroups, then it can simply limit the maximum number of messages any student can post! There is a precedent for this at Carleton. Three years ago graduate students could print as many bibliographic records from CD ROMs such as PsychLit as they wished. Two years ago, an upper limit of 100 records was set. Last year it was reduced to 50. This year, the connection between the CD ROM and the public printer was cut. Other universities have required students to pay for all printing. Perhaps Carleton should require all students to pay for their newsgroup postings.

Variations of this “user pay” idea have already been tried. For example, the Instructional Enhancement Initiative at the University of California at Los Angeles attempted to overcome the funding limitation of using the Internet for new educational services such as course web pages and course newsgroups by adding a special fee to the undergraduate tuition (Young, 1998). But, as noted in my Introduction, the attempt met strong resistance from faculty, largely because the income was not distributed to them for their extra efforts. If the Carleton administrators impose such an extra fee, experience suggests that they should ensure that the additional funds will be used to reward or assist the instructors for developing and managing Internet educational facilities.

There remain the issues of intellectual property, academic freedom and job security. While the university may not yet consider these to be pressing issues, my interviews with instructors (Study 5) indicate that all three should be immediately addressed. Instructors’ concerns about intellectual property, academic freedom and job security parallel those raised recently in some other North American universities regarding the use of computer communication for teaching (Jaffee, 1998; Noble, 1998; Young, 1998). It would seem that few instructors will bother with newsgroups or web page development until the university guarantees instructors ownership of their own educational materials, and guarantees instructors that they have as much academic freedom using the new media as they do in the classroom. These guarantees may not be sufficient for increasing instructors’ newsgroup and other Internet educational activity, but they do seem necessary.

Future research

This dissertation has documented low course newsgroup usage and explored some of the reasons why the usage is low. I have tried to use the results to indicate how usage might be increased. But one of the original questions motivating my dissertation remains unanswered. If students use newsgroups, do they learn more than if they do not? The necessary condition for answering this question was not met in my study. Future research must still address this pedagogical issue.

Let us assume for a moment that the problems of time and motivation discussed above have been solved. The administrators have found money to pay for the extra time needed to run newsgroups. The instructors feel secure in their ownership of materials they post. Students are required to use newsgroups in their courses and are graded for the quantity and quality of their postings. Can we then rest assured that the newsgroup discussions will enhance learning?

Probably not. Time and motivation are certainly necessary conditions for learning, but they are still almost certainly not sufficient. It seems reasonable to speculate that at least one other condition must be met: training. If dialogical learning is to occur, not only must the 20% of students who claimed they did not use newsgroups because they didn't know how be trained in the basics of newsgroup mechanics, but all students and instructors must learn something about how to participate in a dialogue effectively.

Observation of and interviews about CHAT discussions helped to identify what distinguishes an effective discussion from an ineffective one. By an effective discussion I

mean: (1) the topics of discussion are related to the objectives of the course, (2) the discussion is sustained until its pedagogical goals are achieved, and (3) most students participate. Effective discussions tended to have the following organizational features: (1) instructors initiated discussion through the topics they posted on course newsgroups; (2) first topics contained personal expressions such as greetings and invitations to participate; (3) the instructor monitored the discussion regularly and replied to unanswered questions; (4) postings contained stories or personal experiences; (5) time limits on discussions were maintained. It is likely necessary to train both instructors and students in these desirable behaviours in order to increase the chances that they are undertaken. Future research should address how best to provide the training and to assess how effective it is in sustaining effective discussions.

One additional issue seems especially worthy of future research. Those who promote newsgroups as a potentially effective means of dialogical learning generally predict that learning increases in direct proportion to newsgroup participation. This seems based on the assumption that the more a student posts, the more the student learns. It is curious, therefore, that Study 3 revealed there are far more readers of newsgroups than the posters. Can we say that the readers learned any less than the posters? More generally, what is the relation between how much a student writes, how much a student reads, and how much a student learns in newsgroups? It may well be that a newsgroup discussion among, say, 6 students who offer lively and thoughtful postings each day that are read by 94 other students would be more effective for learning than a discussion among all 100 students each of whom posts once a month. Future research should

investigate this likely complex relationship. If reading is found to be almost as effective as posting, the finding might lighten the burden of instructors who grade postings and redirect the strategies of dialogical learning from the production of many postings to the consumption of a chosen few.

Final remarks

During my dissertation, I volunteered to coordinate my own newsgroup using many of the principles suggested above. I found 12 highly motivated students from the Introduction to Social Psychology course for which I was a teaching assistant, and asked them to help me develop the most active and successful newsgroup we could imagine. The students did a wonderful job, each posting at least one message per week, each summarizing the week's discussion and posting their summary, and each posting a group presentation for the others to discuss. Grades were given for the postings. In total the students generated 204 messages in 12 weeks. By all accounts, the newsgroup had met all major dialogical learning objectives.

I spoke with the 12 students at the end of the term about their experiences. How did they like the newsgroup? Would they participate in others in the future? How much did they learn? Their answers were most instructive. All reported that they learned much from the newsgroup and were satisfied with it. Indeed, eight of the students reported that because their postings would be seen by others, they took extra time to read class materials before writing about them in order to make sure they were correct in their interpretations. This caused them to study more than they otherwise would. However,

they found the task demanding. Eleven students said newsgroup participation took them more time than they had anticipated. They also expressed that in the course newsgroup they could not develop a sense of community and personal interaction usually developed during a face-to-face discussion. As a result, ten of the students said that they would prefer a face-to-face discussion next time.

Their answers indicate to me that even if instructors and students do everything right, the value of newsgroups might still be limited by time and by lack of community. It also suggests that, for better or worse, a two-tier discussion system might emerge: face to face discussions for the gifted or the fortunate, and newsgroups for the rest. It is ironic to speculate that if all universities make heavy use of newsgroups, then a few elite universities might begin to offer face to face discussions as a pedagogical advantage, paid for by higher tuition fees. There is, it would seem, still value in personal contact between students and instructors.

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Today's date is: day: ____ month: ____ year: ____

1. Your age: _____ Your sex: __male __female
2. Your university major _____ Year? __1st __2nd __3rd __4th
3. How many courses do you have this term? ____ How many of these are ITV? ____
4. Do you have a job? __yes __no
If yes, how many hours a week do you work? ____
5. On average, how many **hours per week** do you use a computer? ____
How many of these hours are you connected to the Internet (via CHAT or some other Internet services)? ____
How many of these hours do you use a computer on campus? ____
6. Do you use a computer at home? __yes __no
7. Do you use a modem at home to connect CHAT? __yes __no
8. Do you subscribe to a private Internet service (Compuserve, Cyberplus, etc.)? __yes __no
9. Have you ever used your Carleton University CHAT account? __yes __no
If not, please explain why not? _____

If not, please go to Question 19.

10. On average, how many hours or minutes do you spend on each of the following CHAT activities per week?

writing & sending e-mail	__ hours	or	__ minutes	per week
reading e-mail	__ hours	or	__ minutes	per week
reading Course Newsgroups	__ hours	or	__ minutes	per week
reading other newsgroups	__ hours	or	__ minutes	per week
posting on Course Newsgroups	__ hours	or	__ minutes	per week
posting on other newsgroups	__ hours	or	__ minutes	per week
searching for library information	__ hours	or	__ minutes	per week
surfing the web	__ hours	or	__ minutes	per week
other (please specify) _____	__ hours	or	__ minutes	per week
11. Which features of CHAT are important to you? Please rate by circling the appropriate number for each of the following (0 indicate no importance and 6 indicates extremely important):

	not important						very important
exchanging e-mail with other students and friends	0	1	2	3	4	5	6
reading discussions on Course Newsgroups	0	1	2	3	4	5	6
allowing you to contact professors	0	1	2	3	4	5	6
allowing you to contact Teaching Assistants	0	1	2	3	4	5	6
allowing you to communicate with each other	0	1	2	3	4	5	6
allowing access to the World Wide Web	0	1	2	3	4	5	6
others (please explain) _____	0	1	2	3	4	5	6

12. How easy or difficult is CHAT to use? Please rate by circling the appropriate number (0 indicates very easy and 6 indicates very difficult).
 very easy 0 1 2 3 4 5 6 very difficult

13. Approximately how many messages have you **posted** on CHAT Course Newsgroups this term? _____
 If you have not posted, please explain why not?

How many messages have you **read** on CHAT course Newsgroups this term? _____
 If you have not read, please explain why not?

14. Which of the following would encourage you to increase your postings on CHAT Course Newsgroups? Please rate by circling the appropriate number (0 indicates no encouraging and 6 indicates very encouraging).

	not encouraging						very encouraging
more postings from professors	0	1	2	3	4	5	6
more postings from TAs	0	1	2	3	4	5	6
more postings from students	0	1	2	3	4	5	6
quick replies from professors	0	1	2	3	4	5	6
quick replies from teaching assistants	0	1	2	3	4	5	6
quick replies from students	0	1	2	3	4	5	6
others (please explain) _____	0	1	2	3	4	5	6

15. How helpful are each of the following for getting answers to questions you have about your courses? Please rate by circling the appropriate number (0 indicates not helpful and 6 indicates very helpful).

	not helpful						very helpful
asking the professor in class	0	1	2	3	4	5	6
asking the professor during office hours	0	1	2	3	4	5	6
sending e-mail to the professor	0	1	2	3	4	5	6
asking the professor by telephone	0	1	2	3	4	5	6
asking TAs in class	0	1	2	3	4	5	6
asking TAs during office hours	0	1	2	3	4	5	6
sending e-mail to TAs	0	1	2	3	4	5	6
posting a message on CHAT course newsgroups	0	1	2	3	4	5	6
asking other students	0	1	2	3	4	5	6
others (please explain) _____	0	1	2	3	4	5	6

16. So far this term, how many e-mail messages have you sent to:
 Your professors ____? Your TAs ____? Your fellow students ____?

17. Do you think the CHAT Course Newsgroups discussions help you learn? __ yes __ no
 If yes, why? If no, why not? _____

18. Would you like your CHAT contributions to become part of your grade in a course?

___ yes ___ no

If yes, why? If no, why not? _____

19. How important are the following sources of information for your university education?
please circle the appropriate number on the scale to rate the importance of each source (0 indicates no importance and 6 indicates extremely important).

	not important						very important	
lectures	0	1	2	3	4	5	6	
text books	0	1	2	3	4	5	6	
study group	0	1	2	3	4	5	6	
labs or tutorial	0	1	2	3	4	5	6	
teaching assistants	0	1	2	3	4	5	6	
other students	0	1	2	3	4	5	6	
office hours of professors, TAs	0	1	2	3	4	5	6	
journals & related publications	0	1	2	3	4	5	6	
CHAT discussions	0	1	2	3	4	5	6	
World Wide Web	0	1	2	3	4	5	6	
others (please specify) _____	0	1	2	3	4	5	6	

My questions end here. If you have any comments or any questions that I have not asked and you would like to add, please mention them in the space available below.

Additional comments:

Thank you very much

Appendix 1 a: Pilot Study Questions

Dear 49.210 C, V social psychology students,

Would you mind telling us something about your use and opinions of CHAT? Your feedback will help us improve CHAT facilities for next term.

1. Do you have a CHAT account? ☐yes ☐no
2. Do you have a modem at home to connect to CHAT? ☐yes ☐no
3. How many courses do you have this term? _____
4. How many have CHAT course newsgroups? _____
5. Have you ever used CHAT this term? ☐yes ☐no

If yes, how often do you use CHAT?

☐everyday ☐a few times a week ☐a few times a month

☐other (please explain) _____

If yes, what proportion of your CHAT time this term have you spent on

reading e-mail ? _____ %

sending e-mail ? _____ %

reading the 49.210 newsgroup postings and discussions? _____ %

reading other course newsgroup discussions? _____ %

posting messages on the 49.210 newsgroup? _____ %

posting messages on other newsgroups? _____ %

other CHAT activities (please list: _____) _____ %

TOTAL =

100%

6. On a scale from 0 = "Not at all important" to 10 = "Extremely important" please rate each of the following possible uses of CHAT:

Use of CHAT

Rating(0 to 10)

exchanging e-mail with friends _____

exchanging e-mail with classmates _____

obtaining course information (outline, notes, exam results, etc.) _____

contacting professors _____

contacting Teaching Assistants _____

participating in course discussion groups with classmates, Profs, and TAs _____

other (please explain) _____

7. Do you have any suggestion to improve the Psychology 49210 CHAT course newsgroup discussion?

If yes, please list your suggestions here:

Thank you very much, and have a wonderful summer!

Interview Questions for professors

Before we begin our interview to evaluate the educational, motivational, and social aspects of CHAT Course Newsgroups, I want to thank you for your participation. This interview is part of my Ph.D dissertation on uses of the Carleton Hotline for Administration and Teaching. I want to determine how you think CHAT is or is not helpful for education, and how you think it might be improved. I will combine your opinions with those of other professors and students, summarize them, and present my summary to CHAT developers. I would also be happy to provide you with a written summary.

Your opinion will remain confidential. You are not obliged to answer every questions. Before we start, if you have any questions or comments about this project please ask me.

The questions:

1. What courses are you teaching this year?
2. How many years have you been teaching these courses?
3. How many students usually enroll in each course?
4. Are you using CHAT Course Newsgroups for any of your class?
If yes, which courses and for how long?
If no, why not?
If for some courses only, why are you not using a CHAT CN for some?
5. How do you access CHAT? from home? School? Both?
6. What would you like students to learn using CHAT?
7. How useful do you think the CHAT course newsgroup is for students to learn the content of your course? Which Course Newsgroup activities are most useful? Why? Which are least useful? Why?
8. What do you do to encourage your students to participate in your Course Newsgroups?
9. Do you grade or reward students for their Course Newsgroup participation? If so, how?
10. How often per week do you read your course discussions on CHAT?
11. On average, how many Course Newsgroup messages do you post each week?
12. How many Course Newsgroup messages do your TAs post each week?
13. In your opinion, is Course Newsgroup a good replacement for face-to-face discussion groups? Why or Why not?
14. What feedback do you receive from students about your Course Newsgroups?
15. How do you think CN can be restructured or moderated to improve its usefulness for learning the content of your course?
16. What do you think can be done to encourage more of your students to participate in Course Newsgroups?
17. How could CHAT be improved?
18. How do you estimate the workload for running discussions on CHAT Course Newsgroups?
e.g., how much time do you spend on sending e-mail to students or posting messages on CHAT, or reading students comments and questions on CHAT Course Newsgroups?

Interview Questions for students

Before we begin our interview to evaluate the educational, motivational, and social aspects of CHAT Course Newsgroups, I want to thank you for your participation. This interview is part of my Ph.D dissertation on uses of the Carleton Hotline for Administration and Teaching. I want to determine how you think CHAT is or is not helpful for education, and how you think it might be improved. I will combine your opinions with those of other professors and students, summarize them, and present my summary to CHAT developers. I would also be happy to provide you with a written summary.

Your opinion will remain confidential. You are not obliged to answer every questions. Before we start, if you have any questions or comments about this project please ask me.

1. What is your age?
2. What is your major? Your year in university?
3. How many courses do you have this term? How many are ITV courses?
4. How many of your courses have CHAT Course Newsgroups?
5. How do you access CHAT? from home? from school? both?
6. How many of these Course Newsgroups do you read at least once a week? Why do you read them? How much time do you spend each week reading them?
7. How many messages have you posted on Course Newsgroups this term? Why do you post them? How much time do you spend each week writing and posting them?
8. What % of your postings have received at least one response? Have the responses encouraged or discouraged you from posting more? Why?
9. Do you read other CHAT newsgroups? If so, how many? Do you post other CHAT newsgroups? If so, how many?
10. Which Newsgroups are your favorites? Why these?
11. What do you hope to obtain from Course Newsgroups: course information? help in passing course exams? interesting postings from professors, TAs, or from other students? something else?
12. Do you feel more or less comfortable participating in class than participating in a Course Newsgroup? Why?
13. Do you see any differences between asking questions and making comments on CHAT and in the class? If so, what are the differences?
14. Would you like students contribution to Course Newsgroup be considered as part of their course grades? Why?
15. In your opinion, is Course Newsgroup a good replacement for face-to-face discussion groups? Why or why not?
16. What do you think can be done to encourage more of your students to participate in Course Newsgroup?
17. How could CHAT be improved?
18. How much time do you think you spend on CHAT Course Newsgroups?

Interview Questions for professors

Before we begin our interview to evaluate the educational, motivational, and social aspects of CHAT Course Newsgroups, I want to thank you for your participation. This interview is part of my Ph.D dissertation on uses of the Carleton Hotline for Administration and Teaching. I want to determine how you think CHAT is or is not helpful for education, and how you think it might be improved. I will combine your opinions with those of other professors and students, summarize them, and present my summary to CHAT developers. I would also be happy to provide you with a written summary.

Your opinion will remain confidential. You are not obliged to answer every questions. Before we start, if you have any questions or comments about this project please ask me.

The questions:

- 1. What courses are you teaching this year?**
- 2. How many years have you been teaching these courses?**
- 3. How many students usually enroll in each course?**
- 4. As I understand, you are not using CHAT Course Newsgroups for your class, why do you not use CHAT for your courses?**
- 5. Under what conditions, would you might consider using CHAT CN for your courses?**

Interview Questions for students

Before we begin our interview to evaluate the educational, motivational, and social aspects of CHAT Course Newsgroups, I want to thank you for your participation. This interview is part of my Ph.D dissertation on uses of the Carleton Hotline for Administration and Teaching. I want to determine how you think CHAT is or is not helpful for education, and how you think it might be improved. I will combine your opinions with those of other professors and students, summarize them, and present my summary to CHAT developers. I would also be happy to provide you with a written summary.

Your opinion will remain confidential. You are not obliged to answer every questions. Before we start, if you have any questions or comments about this project please ask me.

- 1. What is your age?**
- 2. What is your major? Your year in university?**
- 3. How many courses do you have this term? How many are ITV courses?**
- 4. How many of your courses have CHAT Course Newsgroups?**
- 5. I understand you are not using CHAT CN for your courses, Why do you not use CHAT CN?**
- 6. Under what conditions, would you consider participating in CHAT CN?**

Description of the study (Debriefing for survey respondents)

The purpose of this study is to investigate the educational, motivational, and social aspects of CHAT, particularly CHAT Course Newsgroups. I am interested in knowing how CHAT might help students to learn. Students often do not find enough time to ask questions or make comments in their classes; CHAT is supposed to provide another opportunity for them to ask questions and make comments without limitations of the classroom. I would like to know how students may or may not use this opportunity. So I would like to ask you and many other students a few questions about your experiences using CHAT. Attached is a brief questionnaire. I would be grateful if you would take about 15 minutes to complete it. There are no right or wrong answers; only I will see them and they have no effect on your course grade. Please know that I am as interested in why so many students do not use CHAT as I am in why some do use it. So if you do not use CHAT, please indicate this on the questionnaire and answer the questions about why you do not. The information you and other students provide will be valuable for my dissertation. I will summarize all of the comments and suggestions and pass them to the developers of CHAT to help them improve the system.

The following people are involved in this research project and may be contacted at any time:

Fatemeh Bagherian (principal investigator, 520 2600 ext. 8204 & e-mail: fbagheri@ccs.carleton.ca)

Professor W. Thorngate (Faculty sponsor, 520 2600 ext. 2706 & e-mail: warrent@ccs.carleton.ca)

Should you have any ethical concerns about this study then please contact Dr. M. Gick (Chair, Dept. of psychology Ethics Committee, 520 2600 ext. 2664) or Dr. K. Matheson (Chair, Dept. of psychology, 520 2600 ext. 2648).

Thank you very much for your participation.

Sincerely, Fatemeh Bagherian

Debriefing (for interview participants)

The purpose of this study is to investigate the educational, motivational, and social aspects of CHAT, particularly CHAT Course Newsgroups. I am interested in knowing how CHAT might help students to learn. Students often do not find enough time to ask questions or make comments in their classes; CHAT is supposed to provide another opportunity for them to ask questions and make comments without limitations of the classroom. I would like to know professors and students' opinions about this opportunity. So I would like to ask you and other professors and students a few questions about your experiences using CHAT. I would be grateful if you would take about 30-40 minutes to participate in an interview. Please know that I am as interested in why so many do not use CHAT as I am in why some do use it. So if you do not use CHAT, please answer the questions about why you do not. The information you and other participants provide will be valuable for my dissertation. I will summarize all of the comments and suggestions and pass them to the developers of CHAT to help them improve the system.

The following people are involved in this research project and may be contacted at any time:

Fatemeh Bagherian (principal investigator, 520 2600 ext. 8204 & e-mail: fbagheri@ccs.carleton.ca)

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Should you have any ethical concerns about this study then please contact Dr. M. Gick (Chair, Dept. of Psychology Ethics Committee, 520 2600 ext. 2664) or Dr. K. Matheson (Chair, Dept. of Psychology, 520 2600 ext. 2648).

Thank you very much for your participation.

Sincerely, Fatemeh Bagherian

Informed Consent Form

The purpose of an informed consent is to insure that you understand the purpose of the study and the nature of your participation. The informed consent must provide sufficient information such that you have the opportunity to determine whether you wish to participate in this study.

Present Study: An Evaluation of CHAT (Carleton Hotline for Administration and Teaching)

Research Personnel. The following people are involved in this research project and may be contacted at any time:

Fatemeh Bagherian (principal investigator, 520 2600 ext. 8204 & e-mail: fbagheri@ccs.carleton.ca)
 Professor W. Thorngate (Faculty sponsor, 520 2600 ext. 2706 & e-mail: warrent@ccs.carleton.ca)
 Should you have any ethical concerns about this study then please contact Dr. M. Gick (Chair, Dept. of psychology Ethics Committee, 520 2600 ext. 2664) or Dr. K. Matheson (Chair, Dept. of psychology, 520 2600 ext. 2648).

Purpose. The purpose of this study is to address the usefulness of CHAT Course Newsgroups for university education. CHAT Course Newsgroups are locations on the Internet that allow students and instructors to discuss their questions and comments about courses. We are examining the usefulness of this communication medium. So, we are asking students' and instructors' opinions about CHAT.

Project Materials, duration, and locale. Opinions and experiences of CHAT will be obtained through a questionnaire or an interview. The questionnaire will take about 5-10 minutes and the interview about 30-40 minutes. The questionnaire will be distributed in a few classes. The interview location will be determined according to mutual agreement. For example, interviews with students may take place in the interviewer's office and interviews with professors may take place in the prof's office.

Potential Risk/discomfort. There are no potential physical or psychological risks in the questions asked in the questionnaire or the interview.

Anonymity / confidentiality. The data collected from these surveys are confidential. Nowhere in the surveys, will I ask your name or your identity. Thus, your answers will remain anonymous and will be seen only by those involved in this study.

Right to withdraw. You have the right to withdraw from the participation or refuse to answer any questions in this study at any time.

Signature

I have read the above description of the **Evaluation of CHAT** project and understand the conditions of my participation. My signature indicates that I agree to participate in the experiment.

Participant's name: _____

Participant's signature: _____

researcher name: _____

researcher signature: _____

Date: _____