FACILITATING COURSES BY COMPUTER MEDIATED COMMUNICATION AND THE ROLE OF THE TEACHER: THE COMMUNITY COLLEGE TEACHER'S PERCEPTIONS

by

Christine E. Frank

A thesis submitted in conformity with the requirements
for the degree of Doctor of Philosophy
Department of Curriculum, Teaching & Learning
The Ontario Institute for Studies in Education
of the University of Toronto

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Abstract

The main purpose of this study was to investigate the experience of community college teachers who use computer mediated communication in their teaching. Semi-structured interviews were conducted with ten teachers from three community colleges. The data collection was conducted in two stages: an initial round of six interviews, with concurrent analysis, and a second round of four interviews to further investigate emerging themes.

The teachers reported that using computer mediated communication assisted them in moving out of the role of sole content provider toward a learning support role. They found that the characteristics of the medium helped them implement learner-centred strategies such as giving students more independence and decision-making opportunities, facilitating more active learning, and encouraging critical thinking. All of the participants saw online learning, which included the use of both Web resources and conferencing, as empowering for students.

Teachers experienced substantial change through designing online course sites and implementing new strategies suitable for online learning. Four teachers said their

perception of their role had changed, and they indicated that the changes were founded mainly in constructivist or adult learning theory and were confirmed by the online teaching experience. Interest in new learning and enjoyment of experimenting with technology were personal characteristics common to all participants. Most participants were seeking, and found, a sense of renewal and reward in mid to late career.

This study demonstrated how teacher development processes occur in community colleges as teachers implement computer mediated communication in their courses. Some were engaged in personal vision building and all were engaged in inquiry, mastery, and collaboration. The necessity of collaboration and its contribution to professional development were especially strong themes. Several participants had become mentors, and some of these mentors reported that they used the opportunity to guide peers toward a learner-centred approach. The patterns of individual and institutional change in the three colleges provide examples of continuous, integrated change processes.

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Chapter One
Introduction

The demand for alternative delivery of courses in post-secondary education is increasing, and community college teachers are being asked to develop and conduct courses using computer mediated communication (CMC). At the same time, they are being asked to adopt a more learner-centred approach to teaching and learning. Advocates of learner-centred, constructivist methods in post-secondary education, particularly distance education, have become aware of the advantages of CMC and view its implementation as an opportunity to bring about a change in teachers' roles (e.g., Burge, 1988; Garrison, 1993; Jonassen, Davidson, Collins, Campbell & Haag, 1995). Several authors have indicated the need for a dramatic change in the teacher's role in CMC learning environments (Beaudoin, 1990; Berge, 1996; Davie & Wells, 1991).

Leading the call for change in community colleges across North America, O'Banion (1996) has advocated a new college culture that places the learner at the center of everything that occurs in the educational enterprise. Founded in both social constructivist and adult education theory, the learner-centred approach gives greater control and responsibility for learning to the learner and emphasizes the importance of social interaction and collaboration in the learning process.

The advantages of CMC for learner-centred education have been well documented in distance education literature. CMC includes all forms of information exchange over the Internet. For example, information retrieval and human interaction technologies have improved student access to materials and allowed regular interaction not possible before among students and instructors. Asynchronous computer conferencing, in particular, combines some of the advantages of both face-to-face and distance education by allowing time-independent, place-independent, many-to-many interaction. Harasim (1989) described the characteristics of computer conferencing that allow a new kind of interaction. She found that conferencing exchanges were student-centred, involving dynamic and extensive sharing of information, ideas, and opinions among learners. Davie and Wells (1991) described computer conferencing as a medium that empowered learners by allowing them to take a more active role in the social construction of meaning. A computer conference allows all students an equal

opportunity to contribute, unlike face-to-face classes where timed-constrained synchronous interaction is often dominated by the teacher and a few students.

Other advantages that have been described are time for reflection during class discussion and the ability to compose thoughtful written contributions, both leading to the expression of deeper thinking (Andrusyszyn, 1996; Berge, 1997b). Computer conferencing, then, provides new avenues for learners to engage in active learning. However, the instructor's approach is an important factor in how well the opportunities for learner-centred education are realized.

Some discussions of faculty's use of CMC have suggested that they move toward a more learner-centred practice (Gunawardena & Zittle, 1995; Berge, 1997a). However, it was not clear how this shift happened and to what extent teachers brought a learner-centred approach with them to the medium. In a study of university faculty who used computer conferencing as the main communication medium for their course, Sleightholm Cairns (1993) concluded that teachers felt enabled by the medium to teach in a more learner-centred way. The results suggest that the teachers in the study brought a learner-centred philosophy with them to the medium and found that the medium was a tool for acting on their beliefs.

Statement of the Problem

The present study builds on reports that the experience of using CMC can contribute to change in a teacher' s approach. In adapting a course to delivery by a combination of audiographics and CMC, Gunawardena (1992) found that the technology itself did not allow her to retain her lecture approach or control of discussion. The experience challenged her to rethink her beliefs about teaching, and in her opinion, she became a more effective and reflective teacher. Boston (1992) reported that his experience teaching online influenced him to orient his classroom to a more active learning style and to view his own role more as a facilitator. In the pilot studies for the present investigation (Frank, 1998), one of four teachers reported a similar experience to Boston's, indicating that she no longer saw herself at the centre of the process and that students were more capable of independence than she had previously believed possible.

Research which examined community college teachers' adoption of instructional technology in general has shown that they are strongly teacher-centred (Parisot, 1995) and

tend to adapt innovations to their preferred style (Thorpe, 1997). Thorpe concluded that community college faculty do not have enough time or awareness of educational theory to develop the skills and understanding necessary for the effective application of computer technology to address learning directly. However, Parisot concluded from interviews that adoption of technology can stimulate faculty to move toward a more learner-centred teaching methods.

In spite of indications that use of a new technology can stimulate teacher change, according to our present understanding of teacher development, the adoption of a new technology does not necessarily lead to expert use or bring about significant change in methods or beliefs (Fullan & Stiegelbauer, 1991). Research into school improvement has shown that real change happens when individuals make meaning of the changes required of them and when change occurs on three levels: materials, teaching strategies, and beliefs. Superficial changes in methods may be achieved without teachers' understanding of the underlying principles and rationale of the change. The research tells us that real change in teaching practice does not result from bureaucratic imposition but rather through continuous change at a deeper, more personal level. Effective teacher development involves personal vision building, inquiry, mastery, and collaboration (Fullan, 1993a, 1993b). Thus, when teachers begin to use CMC, especially computer conferencing, to what extent are they engaged in the processes of development?

Studies that have investigated the needs of teachers at all levels in adapting to new media suggest that they require considerable training and ongoing support (Dillon & Walsh, 1992). What is important is that the support be sensitive to the teachers' actual experience. The Concerns Based Adopt Model (CBAM) provides guidelines for such support, emphasizing the necessity of listening to teachers' personal concerns as they attempt to employ new techniques in their work (Hall & Hord, 1987; Hord, Rutherford, Huling-Austen, & Hall, 1987; Boe, 1989; Willis, 1992). Appropriate institutional support for teacher development is essential, and, according to Fullan and Stiegelbauer (1991) the success of a reform depends on the extent to which policy-makers and local practitioners understand each other's subjective worlds. At the Third Distance Education Research Symposium-Conference, the participants included in their research agenda the questions of how faculty culture changes, how new technologies affect them, and how the technology may be "value-added" for them (Moore, 1995). This research

agenda underlines the importance of the teacher's experience in the success of CMC implementation.

Purpose of the Study

The purpose of this study was to investigate in-depth the experience of community college teachers who had conducted courses by CMC, especially computer conferencing. If the implementation of CMC in course delivery is to provide an opportunity for real change toward more learner-centred education at the college level, a better understanding of the teacher's experience during implementation is needed. Thus I sought to determine the ways in which their beliefs about teaching and learning may have changed and to document the personal meaning and value that their experience held for them. To add to our understanding of their experience, I investigated their concerns at various stages of the experience, the kinds of learning and learning processes that may have occurred, and the nature of support they found helpful. In answering these questions, I have clarified the relationship between teachers' use of computer conferencing, a medium that has been shown to enable more learner-centred practices, and teacher development.

Main Research Question

Have community college teachers' perceptions of their role in the teaching/learning process changed as a result of using computer conferencing in their courses, and if so, how?

Sub-questions

In learning to use this medium, to what extent have teachers been involved in processes of personal vision building, inquiry, mastery, and collaboration?

What concerns have teachers had about implementing this medium and how have those concerns been resolved?

Do teachers move to a more learner-centred philosophy as a result of using computer conferencing?

What role have training, support, exposure to learning theory, or other factors such as stage of career, played in any changes that may have occurred?

Definition of Terms

The main focus of this study is on the use of computer conferencing software for group interaction. The terms "computer mediated communication" (CMC) and "computer conferencing" are not identical but are often used interchangeably, both by authors as well as by the participants of this study. Davie offered this definition of CMC (1988):

> Computer mediated communication refers to the use of networks of micro-computers linked to a central host computer by a variety of means including local networks, telephone lines, or special data networks...CMC includes both electronic mail programs as well as computer conferencing programs. (p.57)

At the time of writing this definition, Davie found that most CMC courses used computer conferencing, so it is not surprising that the terms are often equated (e.g., Berge, 1995). However, the term CMC also includes electronic communication in its most general sense. The four communication paradigms that have often been used in CMC are information retrieval, electronic mail, bulletin boards, and computer conferencing. Paulsen (1997) matched the four communication paradigms to four learning approaches: one-alone, one-to-one, one-to-many, and many-to-many. Davie (1995) pointed to the additional advantages provided by the Web and the on-going integration of conferencing with Internet tools. The newest developments in CMC technology allow users to have written chats in real time, to work in real time with partners on shared documents or applications, and to see and hear each other using desktop multi-media conferencing systems (Collis, 1996).

For this study, although my interest is chiefly in the "many-to-many" interaction aspect of computer conferencing, I have often used the term CMC to enhance readability and to reflect the lack of distinction made in the literature and by the participants. Where I felt it was important to make the distinction, I have used the term "computer conferencing' or "conferencing" to specifically denote the use of conferencing software for group interaction.

Reflecting the participants' use of terms, I have used term the "online course" to mean a course where most teacher-student communication takes place online. Some of the courses were distance courses, while others were on-campus. In a few cases, CMC was being used as an adjunct to face-to-face courses.

Format of the Thesis

This thesis is divided into six chapters. Following the Introduction, Literature Review, and Methodology chapters, two Findings chapters accommodate two distinct types of analysis. Chapter Four presents an individual summary for each of the interviews, along with an individual analysis that answers the research questions for each participant. Chapter Five presents the results of a comparative analysis conducted using Atlas-ti, a qualitative analysis software program. The final chapter discusses the results from both analyses in relation to the literature and gives implications for practice and further research.

The Researcher's Role

I have been a teacher at a community college since 1985. Prior to moving to my present location, I was a counselor in a community agency and also worked in an adult career assistance program at another college. When I moved to my present college, I continued to work in typical adult education programs, including English upgrading. Since 1988, I have taught post-secondary English courses, Business and Technical Communications, and Critical Thinking.

Over the years, I developed an interest in computerized literacy testing, computer aided language instruction, and eventually educational uses of the Internet. In 1995, a year before beginning my doctoral studies in Computer Applications in Education, I began to make use of conferencing in my courses at a community college. I decided to require students in my Senior Research Seminar to post their research proposals and progress reports in a class conference. I also encouraged them to conduct research via the Internet.

In 1996, encouraged by this first experience and having been exposed to the research into educational uses of conferencing, I created a new course called Critical Thinking in the Information Age. This course was arranged as a two-hour face-to-face class and a one-hour online class to continue discussions begun in class. Students began the discussions by selecting and presenting articles on controversial subjects. This time I required them to do research via the Internet. Their response to this blended method in the first iteration was overwhelmingly positive, and at the end of the semester, they produced a booklet of their favorite contributions. Student response in later course offerings was similarly positive. I felt strongly that my ability to plan and facilitate this course was improved by the content of my

doctoral studies and by my own experience as a student in several online discussion groups.

Through the hundreds of messages that students sent to our conferences, I found that the sense of community and the momentum of discussion established in face-to-face classes were carried over and deepened in the online conference. I also found that, when students were required to use the Internet for research and to contribute to academic discussion in a computer conference, they were regularly engaged in employing the three levels of knowledge that have been established in the cognitive research literature: declarative, procedural, and strategic (Phye, 1997). I found that participation in online discussions required declarative knowledge of information, procedural knowledge of higher level thinking skills, and considerable strategic knowledge, that is, choosing for themselves how and when to compose responses to the ideas presented and to think critically with the benefit of multiple perspectives.

Working with students in this new medium, I sensed that my view of my role as teacher was changing for the better. I was controlling less and "hearing" my students more. I was also feeling a strong sense of satisfaction. Thus it was with enthusiasm that I embarked upon a study of how the experience of conferencing might affect other teachers in the community college setting

To my role as researcher, I brought my own experience as a community college teacher, which allowed me to understand the setting and the characteristics of the students involved. My experience with computer conferencing helped me understand the technology and its applications. As well as facilitating several community college courses that used conferencing as a communication tool, as a graduate student I took five courses with a conferencing component and three courses entirely on-line.

In accomplishing the subtle tasks of the research interview, my previous experience as a marriage and family therapist assisted me. A therapist must not impose his or her own views upon the client but rather draw out the client's experience. A therapist must be open-minded, listen intently, and hear the subtleties of the participants' expression. Experience as a therapist helped me to bring out the teachers' perceptions and yet avoid overly influencing the results of the study. Nonetheless, the dynamic, interactive nature of semi-structured interviews means that my enthusiasm for conferencing is reflected in this study.

Chapter Two
Literature Review

This literature review describes the current movement toward a learner-centred approach in the community colleges and establishes the theoretical foundations of this approach in socio-constructivist and adult education literature. It then documents the learner-centred characteristics of CMC and explores the changing role of the teacher in this medium. Finally, recent research into community college teachers' use of computer technology is presented, followed by a discussion of the principles of educational change and teacher development.

The Call for Change in Community Colleges

Increasingly, Ontario community college teachers are being asked to adopt a more learner-centred style of teaching (Association of Colleges of Applied Arts and Technology of Ontario, 1995). The call for more learner-centred education in community colleges is part of a larger movement in higher education to bring about knowledge construction, empowerment, authenticity, ownership, and problem-based learning (Bonk & Kim, 1998). An advocate of reform in community colleges, O'Banion (1996) described a "learning revolution [which] aims toward creating a new culture and a new architecture of education, a new system in which the learner is placed at the center of everything that occurs in the educational enterprise" (p.1). Four of the key characteristics of a learner-centred college are the following:

> The learning college engages learners as full partners in the learning process, assuming primary responsibility for their own choices.
>
> The learning college creates and offers as many options for learning as possible.
>
> The learning college assists learners to form and participate in collaborative learning activities.
>
> The learning college defines the roles of learning facilitators by the needs of the learners. (O'Banion, p.3)

The characteristics of a learner-centred college are matters that involve every level of functioning, and teachers play a key role in creating the learning environment for students.

The white paper prepared by the Association of Colleges of Applied Arts and Technology of Ontario (1995) suggested that learner-centred education entails a major change in the role of teachers, greater use of resources other than teachers, and increased expectation of student responsibility for learning, along with more flexible schedules and fewer scheduled class hours. Although the white paper argued the need for more learner-centred colleges partially on the basis of a need to meet financial challenges, the need to shift from the traditional transmittal paradigm toward learner-centred teaching has a firm basis in educational theory. It is the change in the role of teachers and learners that lies at the heart of the learner-centred approach.

Foundations of Learner-centred Education

The concept of learner-centredness in post-secondary education is founded in both social constructivist and adult learning theory, both of which emphasize the learner's active role in the learning process.

Social Constructivist Theory.

Social constructivism, which concerns itself with the development of higher mental functions through interaction with others, has arisen from research in cognitive psychology and Soviet socio-cultural theory. Cognitive psychology originally grew out of the American functionalist school. Around the turn of the century, American functionalists conceived of learning as "organism-environment transactions" (Bredo, 1997, p. 15). They advocated learning activities that enhance ability to extract meaning (understand the consequences) from experiences and apply that meaning to new experiences. Dewey (1916) viewed the continuous interaction of the learner and the environment as the process that leads to learning. Dewey emphasized that, as we perform an action, we are learning about the environment while we are continuously altering it, and are therefore to a large extent in control of our own learning.

Throughout the functionalist school, the idea of learner as both actor and inter-actor was paramount. Building on Dewey's work, Mead (1956) continued to emphasize the learner's active role but increased the emphasis on the social environment. Mead explained how the behaviour of others signals to us the meaning of our own behaviour so that we

become aware of its consequences, thus making social interaction the foundation of reflective intelligence.

Behaviourists took functionalist learning theory in a direction that focussed almost exclusively on the learner's environment, downplaying the active role of the learner in the learning process. This influential group established a model that de-emphasized the learner's inner processes, concerning itself with observable behaviour only (Bredo, 1997; Pressley & McCormick, 1995; Shuell, 1986). The behaviourist model of learning concentrated on how observable behaviour can be externally controlled rather than on the learner's intentional learning and active problem solving.

Partially in reaction to behaviourism, cognitivist researchers have attempted to understand the information-processing that goes on inside the learner as thinking becomes more complex. While behaviourist research threw light upon simple learning controlled by the researchers, cognitive researchers have studied the higher processes controlled by the learner. These processes include the formation of rules and complex schemata (the understanding of relationships among many different pieces of information) and the problem solving that depends upon such knowledge structures. In his 1986 summary of research in cognitive psychology, Shuell noted that behavioural theory had dominated nearly all research into learning for most of this century, and that while such research focussed on changing the environment to influence learning (reinforcing desired behaviour), cognitive approaches focus more on changing the learner, for example, by encouraging the learner to use learning strategies.

The learner's use of strategies is central to cognitivist view of knowledge. Phye (1997) distinguished three types of knowledge that have been established in the cognitive research literature. The following taxonomy "places the learner at the center of the teaching/learning process" (p.54):

> Declarative knowledge: facts, concepts and vocabulary stored in memory. A student must identify information that is important and then use strategies to hold and fit the information into previous knowledge structures
>
> Procedural knowledge: the intentional use of cognitive tools such as analysis, application, synthesis, evaluation
>
> Strategic knowledge: knowing how and when to use declarative and procedural knowledge to solve problems, think critically, and approach novel tasks (p. 54).

Shuell (1986) concluded from his review of the cognitive research literature that learning is active, constructive, cumulative, and goal-oriented. He explained the implications of cognitive theory for teaching in the following way:

> Since learning is an active process, the teacher's task necessarily involves more than the mere dissemination of information. Rather, if students are to learn desired outcomes in a reasonably effective manner, then the teacher's fundamental task is to get students to engage in learning activities that are likely to result in their achieving those outcomes, taking into account factors such as prior knowledge, the context in which the material is presented, and the realization that students' interpretation and understanding of new information depend on the availability of appropriate schemata. Without taking away from the important role played by the teacher, it is helpful to remember that what the student does is actually more important in determining what is learned than what the teacher does. (p.429)

Cognitive research provides support for a constructivist, learner-centred approach to education by demonstrating the learner's need to develop and apply thinking strategies. However, according to Phye (1997), cognitive science's almost exclusive focus on thinking processes has left out consideration of motivation. He states, "Many see constructivism as a movement that combines cognition from a developmental perspective with motivational issues such as volition and self-directed learning" (p. 52).

Phye summarized the constructivist view of the learning process as "an adaptive function with reference to the prevailing motivation of the student" (p. 595). He described the classroom learning process in the following manner:

> A motivated student encounters a problem situation and (1) exhibits persistent goal-oriented activity involving (2) the construction of varied domain-specific strategies and procedures that (3) result in a problem solution. On again encountering the problem situation or similar problem situation, the student demonstrates an adequate solution. (p. 596)

Phye concluded that the teacher's role in the learning process is to establish motivating conditions, create problem situations, foster acquisition and retrieval of prior knowledge, and emphasize learning to learn. While the learner is at the centre of the learning process, the teacher has a crucial role to play.

Another main influence on modern social-constructivist thinking is the Soviet school of socio-cultural approach to mind. While cognitive psychologists have concentrated on

internal thinking processes, socio-cultural theory focuses more on the social aspects of learning. Soviet socio-cultural theorist Vygotsky (1978) mirrored the functionalist view of the importance of the learner's interaction with the social environment in the development of higher order thinking and problem solving. Modern social constructivism shares this emphasis on the social environment, with particular attention to the learner's motivation. A key concept in social constructivism is the importance of interaction among learners. Human mental functioning occurs in social contexts and learning occurs through dialogue, with an emphasis on teacher co-learning, peer collaboration, questioning, students bringing knowledge to class, and joint knowledge construction (Bonk & Kim, 1998).

Building on socio-cultural theory, situated learning theorists have looked to adult culture for models of efficient learning. Situated learning is modeled on apprenticeship where young adults learn by actively participating in a culture. Within that culture, they observe, practice, and received coaching (Collins, Brown & Newman, 1989). Although the authors' point is that educators should implement apprenticeship principles in children's learning, they demonstrate how, historically, the activity of the learner in a challenging yet supportive social environment has figured centrally in adult learning.

In summary, cognitive science, socio-cultural theory, and situated learning theory have all contributed to social constructivism's emphasis on active participation and social interaction in learning. While the teacher's role is not diminished, it changes from the traditional concept of information provider to facilitator of active social learning.

Adult Education Theory. Adult learning theory, which derives largely from the American functionalist school, focuses on educational practices that are suitable for adults. The themes of social constructivism are similar to those of adult education theory, which also emphasizes the learner's role, particularly in terms of motivation, in the learning process. Adult education theory proposes that curriculum should be built around the student's needs and interests rather than around formal subjects, and that adults need to direct their own learning. Knowles (1984) summarized the principles of adult learning:

> Adults are motivated to learn as they experience needs and interests that learning will satisfy; therefore; these are the appropriate starting points for organizing adult learning activities.

> Adults' orientation to learning is life-centred; therefore, the appropriate units for organizing adult learning are life situations, not subjects
>
> Experience is the richest resource for adults' learning; therefore, the core methodology of adult education is the analysis of experience.
>
> Adults have a deep need to be self-directing; therefore, the role of the teacher is to engage in a process of mutual inquiry with them rather than to transmit his or her knowledge to them and then evaluate their conformity.
>
> Individual differences among people increase with age; therefore, adult education must make optimal provision for differences in style, time, place, and pace of learning. (Knowles, 1984, p.31)

Since the 1920's, proponents of adult learning have continued to stress the importance of self-direction, experiential learning, and individual differences. Knowles used the term "andragogy" to denote educational practice that acknowledges the responsibility of the learner for his/her own learning. Knowles, in fact, feels that a greater degree of self-directedness should be acknowledged in children's learning as well.

One of the best known proponents of learner-centred education, Carl Rogers (1983) researched the effects of changing the teacher role from authority to facilitator of learning. He advocated that teachers release the authority role and trust their students to take more responsibility for initiating and evaluating their own learning. The "person-centred" teacher focuses on fostering "the continuing focus on learning" rather than on controlling what is to be learned.

Greater responsibility on the part of the student does not reduce demands on the teacher. Garrison (1988) expressed concern that the term "learner-centredness" might mislead educators into an over-emphasis on student independence and an over-simplification of the learning process. In reply, Burge (1989) gave her personal experience as a facilitator to stress that learner-centredness does not require less effort from the facilitator. She noted that the purpose should be to move the student toward self-responsibility rather than directedness, which is a quantum leap for some students. She then reiterated the six components involved in implementing a learner-centred view. A facilitator must consider the following:

> Learners' ability, resources, and access;

Choice regarding content and process;

Relationships: theory and practice, own and peers' experience, tutor and guests;

Learning style diversity;

Support mechanisms;

Estimated level of development.

A learner-centred teacher requires a set of beliefs and attitudes that empower the learner in the learning process. These beliefs and attitudes must be realized in the methods the teacher employs.

In summary, adult learning theory concurs with socio-constructivist theory in defining the teacher's role as facilitator of active learning. It emphasizes the adult learner's need to learn experientially and to have choice and responsibility.

Learner-centred Education and CMC

Advocates of learner-centred, constructivist methods in post-secondary education, particularly distance education, have become aware of the advantages of computer mediated communication (CMC) and view its implementation as an opportunity to bring about a change in teachers' roles. For both on-campus and distance courses in the community colleges, the call for more learner-centred education is frequently paired with recommendations for increased use of alternate delivery using CMC (Association of Colleges of Applied Arts and Technology, 1995; Lang, 1996). CMC course delivery is also appealing for its flexibility and its freeing of classroom space. However, it has been argued that CMC is not just a delivery mode but rather another domain of education that allows new and different forms of interaction (Mason & Kaye, 1989).

A major benefit of CMC has been the rapid communication among students and instructors that it enables. Much of the literature on distance education has stressed the importance of using the potential of CMC to facilitate more constructivist, learner-centred methods. Garrison (1993) called for a fundamental change in paradigm to socio-constructivism in distance education. He maintained that the continuing use of print-based correspondence had perpetuated a behaviourist view of learning. He saw CMC as a tool for creating fundamental change in distance education practices toward socio-constructivism.

LeBaron and Bragg (1994) noted in their paper on teacher preparation for the next century that "discussion about the appropriate role of technology in schools increasingly stresses constructivist learning beliefs" (p.5). They advocated that distance education and adult education models should be combined in teacher training, along with use of the diverse technologies found in distance education. Jonassen et al. (1995) firmly embraced the learner-centredness of social constructivist theory, rejecting the use of technology for reproducing traditional teacher-centred classroom practice:

> Constructivist environments engage learners in knowledge construction through collaborative activities that embed learning in a meaningful context and through reflection on what has been learned through conversation with others. (p. 4)

The characteristics of CMC that facilitate constructivist, learner-centred methods are well documented in distance education literature. Computer conferencing, in particular, combines some of the advantages of both face-to-face and distance education by allowing easy time-independent, place-independent, many-to-many interaction. Harasim (1989) used the term "many-to-many" to describe the unique ability of students and instructor to interact asynchronously through written messages. This form of interaction was added to the one-to-many (broadcast) and one-to-one (tutor) models of distance learning.

Investigating the characteristics of computer conferencing, Harasim (1989) described changes in interpersonal interaction, social networking, and changing roles. In her studies of graduate courses in education, she found that there was a high level of interaction with over 80% of the messages referencing each other, that the instructor contributed only 10-15% of the messages, and that students engaged in agreeing, disagreeing, extrapolating, questioning, illustrating, expanding, and synthesizing upon ideas presented by their classmates. She reached the following conclusions:

> Our research shows that on-line learning is not only active, but it is interactive. Conferencing exchanges in the course are student-centred, involving dynamic and extensive sharing of information, ideas, and opinions among learners. Knowledge building occurs as students explore issues, examine one another's arguments, agree, disagree, and question positions. Collaboration contributes to higher order learning through cognitive restructuring or conflict resolution, in which new ways of understanding the material emerge as a result of contact with new or different perspectives. (p. 55)

Davie and Wells (1991) described CMC as a tool for the empowerment of the learner in constructing knowledge, arising from the fact that, in a conference, all students have an equal opportunity to contribute which is not possible in classes where timed-constrained synchronous interaction is often dominated by the teacher and a few students. Davie and Wells defined empowerment as:

> the expectation and enabling of a student to take a visible and meaningful role in the electronic classroom. Characteristics of empowerment are the courage to state an intellectual position, to support one's stand with well-constructed arguments, to be flexible enough to consider challenges to one's position, and to modify one's position as a result of dialogue with others. (p. 16)

Other advantages that have been described are time for reflection during class discussion and the ability to compose thoughtful written contributions, both leading to the expression of deeper thinking. It has been argued that the act of composing written comments encourages reflection (e.g. Andrusyszyn, 1996; Berge, 1997). Andrusyszyn studied the reflections of graduate students who engaged in reflective learning activities that were purposely built into their online course. She concluded that an instructor may take advantage of an online learning environment to foster reflection by using design strategies that guide and support critical thinking and meaning making.

From a comprehensive review of the literature on CMC to date, Berge (1997b) categorized the research into two types: (a) defense of computer conferencing as a viable means of education, for learners generally, and for persons with specific disadvantages, in comparison to face-to-face; (b) description of the characteristics of CMC and how they are advantageous in education. He classified the advantages into four categories:

> The time and space independence of asynchronous communication
>
> The collaboration made possible by synchronous chat or shared documents
>
> A virtual space for interpersonal interaction, social networking, and changing roles
>
> Technical advantages such as archiving and access to information via the Internet

Berge viewed the technology as having the potential to move the teacher out of the role of information dispenser and into a facilitator/resource provider/research librarian role. However, he concluded that the characteristics of computer conferencing are neutral, in that "each can be perceived as advantageous or limiting depending upon the (often tacit) theories the

educator/researcher holds when developing courses using computer conferencing" and that "each educator carries to his or her work a set of (usually implicit) assumptions about what teaching and learning should be" (p. 13).

To summarize, CMC has been shown to provide new avenues for learners to engage in active learning. Characteristics of CMC include equal opportunity to contribute, time for reflection and careful composition of messages, flexibility of time and space, possibility of collaboration with chats and shared documents, and access to information via the Internet. These characteristics may all be used to empower the learner. However, the instructor's approach is an important factor in how well the opportunities for learner-centred education are realized.

The Changing Role of the Teacher

The ultimate key to the success of a new medium is the teacher (Cuban, 1989; Lafrenz & Friedman, 1989). Research on faculty issues up to 1992 suggested that changing to CMC course delivery entails a major change for educators (Willis, 1992). Davie and Wells (1991) stated that the potential of the medium for empowering learners will require various changes in an instructor's role. Several discussions of the facilitator's perspective suggested that the change to facilitating courses online involves a paradigm shift toward a learner-centred approach (Berge, 1996; Berge, 1997a; Berge, 1997b; Burge, 1988; Gunawardena, 1992; Gunawardena & Zittle, 1996). Gunawardena and Zittle (1995) concluded that the role change comes partly from adapting to the technology and partly from previously held personal philosophy of education. However, they also referred to studies which show that instructors using video and audio conferencing do not always become more learner-centred. They concluded that teachers must be trained to utilize interactive strategies.

In a study of 42 teachers who taught at under-graduate and graduate levels, in continuing or professional development, or in combinations of any of these, Berge (1997a) concluded that all but one of the teachers employed a learner-centred approach, but it was not clear whether they had moved in this direction as a result of teaching online. He recommended further research into whether teachers changed their style after teaching online.

Several researchers have conducted investigations into teacher behaviour in computer conferencing. Ahern, Peck and Laycock (1992) examined the effects of three different styles

of teacher contributions in a computer-mediated discussion: 1) questions only, 2) statements only, and 3) conversational. The results showed that the conversational style produced more participation and resulted in more complex interaction patterns. Chandler-Critchlow (1994) demonstrated the impact of teacher style online by showing that cognitive performance was related to the type of summary notes by instructors (simple summary versus synthetic summary).

In a study of university professors who used computer conferencing as the main medium in courses, Sleightholm Cairns (1993) found that they felt enabled "to implement a style of pedagogy that reflected the implementation of individualized instruction, self-directed learning and student-directed learning" (p. i). The teachers in this study saw conferencing as a medium that facilitated their move away from a "style of teaching with which they were no longer comfortable" (p. 146). These results suggest that the teachers in the study brought a learner-centred philosophy with them to the medium and found that the medium was a tool for acting on their beliefs.

There is some evidence that the experience of using CMC can bring about change in teachers' beliefs about the teaching/learning process. In adapting a course to delivery by audiographics and CMC, Gunwardena (1992) found that the technology itself did not allow her to retain her lecture approach and control of discussion. The role change challenged her to rethink her beliefs about teaching, and in her opinion, she became a more effective and reflective teacher:

> In most instances, changing teaching style may mean changing our underlying philosophy, beliefs about teaching, and perceptions of interpersonal interactions. This change will be no trivial matter for teachers because it may mean changing, to some extent, who we are as persons. (p.64)

Boston (1992) reported that his experience teaching online influenced him to orient his classroom to a more active learning style and to view his own role more as a facilitator. He used CMC to facilitate distance classes hosted by a community college. He indicated his students were a group distinct from the usual student group and particularly valued the convenience, savings, and uniqueness of the online courses. Boston described his experience very positively, referring to the sense of community among the teacher and learners, the ability of students to download sophisticated demonstrations and activities, and the efficiency of interchange of assignments. Boston said that his classroom teaching had been improved in

that he introduced materials that he had developed for online use and he had learned to be more concise by writing online materials. Also he gained a greater appreciation for the importance of community when he saw how much his distance students interacted with each other. In the pilot study for the present investigation (Frank, 1997), one of four teachers reported a similar experience to Boston's, indicating that she no longer saw herself at the centre of the process and that students were more capable of independence than she had thought possible. (Details of the pilot study are presented in Chapter 3.)

At the British Open University, Mason (1998) has proposed that online courses are having a profound effect on higher education:

> Current approaches to teaching and learning in higher education are dominated by the following: the importance of interactivity in the learning process, the changing role of the teacher from sage to guide, the need for knowledge management skills and for team working abilities, and the move toward resource-based rather than packaged learning. All of these elements figure strongly in the literature of online educators. In fact, I would contend that online courses are driving pedagogical evolution in the higher education generally, because of the rush to digitize, virtualize, and globalize the campus. (p.5)

Mason has proposed a new way of categorizing online courses that reflects the degree of learner-centredness. She divides courses into the following types:

> Content and Support Model: relatively unchanging content matter in a course package and minimal interactivity online, may be taught by tutors rather than content experts
>
> Wrap Around Model: approximately half the course is predetermined and half requires discussions and activities, more of the course is created each time it is delivered.
>
> Integrated Model: at the opposite end of the spectrum from the first, the heart of the course takes place through online discussion and activities, the learning is dependent on the learning community.

Mason's framework emphasizes the learner-centred approach that can be achieved though conferencing.

In summary, the literature on CMC in education describes a changing role for teachers toward a more learner-centred approach. Successful facilitation of courses by conferencing, especially those described by Mason's Integrated Model, requires a learner-centred approach, and teachers who use conferencing have been found to tend toward this approach. Some university professors have found they are enabled by the medium to employ learner-centred

methods they had long felt were desirable. However, it is not fully understood how this change occurs or whether it may occur in other settings in higher education.

Support for Changing Roles in Distance Education

The teacher's behaviour in distance education courses using interactive technology is one the essential keys to effective courses. In Moore's (1990) review of studies done on the effectiveness of distance education compared with classroom, he found that one of the most important themes in the literature was that teacher behaviour is crucial to effectiveness. He concluded that teachers need to develop skill in humanizing participation, message style and feedback, and that recognition of preparation time is a must.

Studies that have investigated the needs of teachers at all levels in learning to use new media suggest that they require considerable training and ongoing support in order to adopt new roles. In an analysis of twenty-four studies that focus on instructors' use of a variety of modes for distance education, Dillon and Walsh (1992) concluded that teachers need to develop important new skills, but that faculty development programs "do little to support a dramatic restructuring of faculty roles" (p.17). Studies on teachers' implementation of computers in classrooms have indicated that teachers need substantial institutional support to make the change (Boe, 1989; Carey, 1993; Valdez, 1989). Thach and Murphy (1995) listed seven distinct areas in which distance education instructors need skills: 1) communication and feedback, 2) promoting interaction between and among learners, 3) teamwork and collaboration, 4) administrative and support services, 5) conducting learner needs assessments, 6) knowledge of distance learning technology and its impact on learners, and 7) developing a systems perspective of thinking emphasizing planning and organization.

Although the online courses that college teachers are being asked to conduct are not necessarily destined for distance delivery, discussions of faculty support needs in distance education raise important issues. For example, Olcott and Wright (1995) argued that distance education programs must make a renewed commitment to faculty if they wish to increase faculty participation and integrate distance delivery into the mainstream university. They suggested that universities must become more flexible in the way courses are delivered without compromising the integrity of the faculty's instructional roles.

Olcott and Wright's model of institutional support for faculty requires that they be at the core of instructional planning and development and that faculty be trained and compensated appropriately. The authors advocated a comprehensive faculty development program that includes training, mentoring, rewards, and dissemination of information. In relation to faculty learning needs in distance education, Davie (1995) has called for research into the utility of mentorship for the new CMC instructor in the development of expertise with the concepts of instructional design and delivery.

To summarize, experts in distance education recognize the importance of the teacher's role and are calling for more learner-centred methods through the use of CMC. They see institutional support as essential to this change. While it is understood that teachers need to learn new methods in order to implement online classes, the way in which their learning can be supported needs further investigation.

Community College Teachers' Use of Computer Technology

Studies have been conducted into how community college teachers adopt and use computer technology in their teaching (Broom, 1994; Fulkerth, 1991; Parisot, 1995; Thorpe, 1997). None of these studies focus on CMC alone but rather on computer technology in general. Fulkerth found that teachers perceived that a close relationship with students was a key component in the learning process and were concerned about how using computers in teaching would affect their relationship with their students. The same concern about personal relationship was expressed by the teachers about CMC in the pilot study for this thesis (Frank, 1997). The two separate instances indicate that community college teachers are indeed concerned about how computer technology affects their teaching role.

In a case study of a single American college, Parisot (1995) addressed the issue of whether more learner-centred teaching might be facilitated by computer technology. The technology included software packages, CD-ROMs, and authoring software such as Toolbook and PowerPoint, but no mention was made of CMC. Guided by Rogers' theory of Diffusions of Innovation (1995), the focus of the research was teachers' use of technology, its perceived impact on teaching role, and factors which encouraged or discouraged the use of technology. Through conducting interviews and administering the Principles of Adult Learning Scale (PALS), Parisot found that most teachers were strongly teacher-centred in their practice. Of

the 27 interviewees, 20 completed the PALS questionnaire. Only four of 20 respondents scored in the category of learner-centred on PALS. However, Parisot found that, in spite of the over-all teacher-centred orientation of the teachers as measured by PALS, they were learner-centred on the learner-centred activities factor, one of eight measures. Teachers tended to value activities that gave students more responsibility for their learning. From interviews in which she asked participants about the effect of technology on their role as teachers, Parisot arrived at the following conclusions:

> Technology can be a catalyst for faculty to reflect on upon their practice in the classroom and rethink their educational philosophy.
>
> Adoption of technology can stimulate faculty to move toward a more learner-centred teaching methodology. (p. 117)

In a subsequent study in Texas community colleges, Thorpe (1997) investigated the influence of computer technology on teachers' roles and attitudes. In a study of fourteen teachers in eight colleges, he found that they tended to use computers to enhance preferred teaching methods. He concluded that community college teachers did not have enough time or awareness of educational theory to develop the skill and understanding necessary for the effective application of computer technology to directly address learning. He recommended the following:

> Both faculty and administrators need to expand their learning beyond their experience into subjects that transcend their professional roles and address learning needs of their students...faculty require time, primarily, and significant support. (p. 138)

A survey of community college teachers' use of information technology asked in what ways teaching excellence award winners used information technology and what they saw as key issues (Milliron & Miles, 1998). The survey was designed using the results of focus groups and sent to the entire population of 6,958 winners, with a response from 1,670. The number one use of technology by these teachers was for student application and production, such as research on the Internet, creation of Web sites, and electronic oral presentations. Study responses indicated that online communication via e-mail and conferencing was a smaller but increasingly important aspect of instruction. The authors concluded that this elite group of teachers was integrating technology into their courses in a chiefly student-centred way.

In a study that did focus specifically on CMC, Broughton (1998) investigated how nine community college teachers in North Carolina learned to use online course delivery learning. The study's scope included all learning involved in on-line delivery, such as designing Web sites and communicating with students electronically. Broughton found that faculty followed unique learning paths but that the prevalent means of learning were incidental (occurring by chance), informal, and experiential. There was also an emphasis on collaboration and cooperation. Although there was no suggestion that teachers moved toward a more learner-centred approach, Broughton concluded that they needed to rethink course content and methods to suit the online environment. However, the author did not suggest that teachers moved to a more learner-centred approach.

In summary, most research into teacher's use of computer technology has not focussed specifically on CMC. The findings on the degree of learner-centredness in the implementation of computers have been mixed, but they indicate that college teachers are concerned about the effect of technology on their relationships with students. The largest study, which surveyed award-winning teachers, indicated that they are implementing computer technology to involve students in active learning. One study, which focussed exclusively on CMC, suggested that using the medium prompted rethinking of course content and methods.

Educational Change and Teacher Development

According to our present understanding of teacher development, the adoption of a new technology does not necessarily lead to expert use or bring about significant change in methods or beliefs. In the book *The New Meaning of Educational Change* (1991), Fullan & Steigelbauer maintained that real change happens when individuals can make meaning of the changes required of them and when change occurs on three levels: materials, teaching strategies, and beliefs. They found that superficial changes in methods may be achieved without teachers understanding the underlying principles and rationale of the change. The research reviewed in this book suggested that real change in teaching practice does not result from bureaucratic imposition but rather through continuous change at a deeper personal level in collaboration with other teachers and administrators.

According to Fullan (1993a, 1993b), the processes by which teacher development occurs are continuous: personal vision building, inquiry, mastery and collaboration. The most important is personal vision building:

> I cannot stress enough that personal purpose and vision are the starting agenda. It comes from within, it gives meaning to work, and it exists independent of the group or organization we happen to be in. (1993a, p. 13)

Intimately connected to personal vision is the lifelong habit of inquiry. As teachers gain experience and knowledge of their students, they need to question, experiment and reflect.

> Continuous inquiry is necessary for forming and reforming personal purpose. While the latter comes from within, it must be fueled by information and ideas in the environment. (Fullan, 1993b, p.13)

Along with inquiry must come mastery. "People behave their way into new ideas and skills, not just think their way into them" (Fullan,1993a, p.15). Teachers learn by experience. What the literature on teacher knowledge makes clear is that expert teachers have "built up coherent theories about and representations of good teaching through personal experiences" (Pressley & McCormick, 1995, p.77). The research reviewed by these authors has shown that experienced teachers have a better ability to monitor and interpret complex classroom events, plan for the long term, and react to student errors and questions in productive ways. Experienced teachers claim they have "images" of good teaching that have developed from their experience. This principle of teacher development is echoed in adult education theory, which places an emphasis on experiential learning.

The fourth capacity is collaboration. Personal and group mastery feed on each other in an organization, leading ultimately to change in culture:

> When one teacher collaborates with another, or many teachers work in an alliance with each other and outside partners, they are enlarging their horizons as they lengthen and strengthen the levers of improvement. When many educators act this way, the systems start to change, and become the environments that prod and support further growth and development. (Fullan, 1993a, p.145)

Creating more learner-centred education in the colleges depends to a large extent on teacher development and this development is not a top-down process but rather a complex one in which the teacher plays a prominent role. The dynamic connection between individual teacher development and change in organizational culture means that the success of a reform

depends on the extent to which policy-makers and local practitioners understand each other's subjective worlds (Fullan & Stiegelbauer, 1991). If the implementation of CMC in course delivery is to provide an opportunity for real change toward more learner-centred education at the college level, we need to understand the extent to which community college teachers are involved in the four processes of teacher development as they begin to use CMC.

One of the change models that Fullan cites often in his writing is the Concerns Based Adopt Model (CBAM), which provides a guide for monitoring teachers' experience in adopting an innovation so that timely and appropriate kinds of support may be offered (Hall & Hord, 1987; Hord et al., 1987; Boe, 1989; Willis, 1992). Although CBAM is oriented to assuring that teachers use top-down innovations appropriately, it provides a complementary framework for investigating teachers' subjective experience of change.

The model details the stages elementary and high school teachers may go through when they are involved in the adoption of a major innovation and the model addresses the kinds of support required. Teachers' concerns are organized into seven stages. In the early stages of a change effort, teachers' concerns tend to be focussed on themselves. In the middle stages of innovation adoption, their concerns are focused on management. In the last stages, concerns about the impact on students' learning are prevalent. Table 1 on the following page presents the levels of concerns and typical expressions of these concerns.

Resolution of concerns are crucial to appropriate, successful use of a new technology. The model is used to understand and monitor teachers' experience in adopting an innovation so that timely and appropriate kinds of support may be offered. Thus the concerns of community college teachers, when beginning to use CMC, are an important aspect of their experience and can help guide attempts to support teacher development.

Table 1

Concerns Based Adopt Model: Stages of Concerns

Stages of Concern		Expressions of Concern
Impact		
6	Refocusing	I have some ideas that would work even better.
5	Collaboration	What are other teachers are doing?
4	Consequence	How is my use affecting students?
Task		
3	Management	I seem to be spending most of my time preparing materials.
Self		
2	Personal	How will using it affect me?
1	Informational	I would like to know more about it.
0	Awareness	I am not concerned about the innovation.

(Hord, Rutherford, Huling-Austen & Hall, 1987, p.31)

Note: Levels of concerns are ordered from the bottom of the table.

Another theory of change that is an important basis for understanding teachers' use of educational technology is the theory of the Diffusion of Innovations (Rogers, 1995). The widely used theory provides a backdrop for this in-depth study of their experience during implementation of CMC. Since the early 1920's many studies have been conducted in sociology, anthropology, communications, education, marketing, public health, and geography. Indeed, this theory underlies the CBAM model. Extensive diffusion research identifies five categories of adopters: innovators, early adopters, early majority, late majority and laggards. Adopters in each category share similarities in some socioeconomic characteristics, personality characteristics, and communication behaviour. Innovators and early adopters have more favourable attitudes toward change and have a tendency to have wider communication networks. Opinion leaders can come from any group but those who act as change agents tend to come from the early adopter category (Rogers, 1995). Since the

participants in this study were among the first to use CMC in the community college teaching, they could be expected to share some of the characteristics of innovators and early adopters.

At the Third Distance Education Research Symposium-Conference (Moore, 1995), the delegates included in their research agenda the questions of how faculty culture changes, how new technologies affect them, and how the technology may be "value-added" for them. This research agenda underlines the importance of understanding the teacher's experience if the implementation of CMC in course delivery is to provide an opportunity for real change toward more learner-centred education at the college level.

In summary, there is a call for a more learner centred approach in community colleges, a direction that is well-founded in socio-contructivist and adult learning theory. The key to learner-centred education is the teacher's role as a facilitator of active, social learning. Computer mediated communication provides new avenues for learning, but the opportunity can only be realized through the teacher's approach. Some authors have suggested that the experience of using CMC with students can help teachers move toward a more learner-centred philosophy, and research with professors of graduate courses has shown that conferencing enables more learner-centred methods. Investigations into community college teachers' uses of technology have not provided a clear picture of how CMC is used or how its use might contribute to a more learner-centred approach in the colleges. Thus the purpose of this study was to describe and analyze the experience of community college teachers who have conducted courses by computer conferencing. Guided mainly by the principles of teacher development established by Fullan (1993a, 1993b), I sought an understanding of the personal meaning that the teachers' experience holds for them. In doing so, I was able to clarify the relationship between teachers' use of computer conferencing, a medium that has been shown to enable more learner-centred practices, and teacher development.

Chapter Three

Methodology

A qualitative research approach was chosen as the most appropriate method to investigate teachers' experience and perceptions. This chapter presents the rationale of the research design and its basis in qualitative research literature. Also described are the contributions of two pilot studies to the plan of the study. The method of selecting of participants is presented, along with a list of the participants' gender and subject areas. The interview questions are listed and the interview approach is described. The data collection and analysis, which consisted of several steps, are explained, along with a discussion of grounded theory principles. The chapter concludes with ethical considerations and limitations of the study.

Research Approach and Design

The design of this study drew on qualitative research traditions, most notably, educational ethnography, phenomenology, and grounded theory. The three traditions have much in common with each other and also with the twenty types of qualitative research distinguished by Tesch (1990). Fundamentally, the study fits under the umbrella of educational ethnography in that it sets out to document teachers' perceptions of a teaching/learning process:

> Educational ethnographers examine the processes of teaching and learning...they document the lives of individual teachers, students and administrators for unique and common patterns of experience, outlook, and response. (LeCompte & Preissle, 1993, p.28)

The investigation of the teacher's perspective was also supported by phenomenological tradition. This investigation of the meaning of computer conferencing for community college teachers benefited from a phenomenological approach that probed the individual's lived experience. "Phenomenology attempts to explicate the meanings as we live them in our every day world, our lifeworld" (Van Manen, 1997, p.11). In keeping with phenomenological tradition, the phrasing of the research questions is realist rather than instrumental (Maxwell, 1996). While instrumentalists frame their questions in terms of

observable or measurable data and are concerned about validity threats such as self report bias, phenomenological realists treat their data as evidence to be used to develop ideas about the existence and nature of the phenomenon under study (Maxwell, 1996). Thus the research questions asked about the nature of the teacher's experience.

The role of grounded theory in this study was to guide procedures for sampling and analysis. The two governing principles of grounded theory that guided the research were concurrent data collection and analysis, and inductive generation of theory from the data without the imposition of existing theory (Glaser & Strauss, 1967; Glaser, 1978; Strauss, 1987; Strauss & Corbin, 1990). Tesch (1990) attested to the influence of grounded theory on qualitative research by naming the principle of inductive generation of theory, along with concurrent data collection and analysis, among those she found to be common to most qualitative research approaches. The use of in-depth interviews as the main method of data collection was also consistent with the purpose of this study. In-depth interviewing is used when the purpose of the study is to "uncover and describe the participants' perspectives on events, that is, that the subjective view is what matters" (Marshall & Rossman, 1995, p. 81).

Pilot Studies

This study was preceded by two pilot studies that helped to establish the research questions and the method for this investigation. Both pilot studies examined the experience, concerns, and support needs of community college teachers who were beginning to facilitate courses using computer conferencing. In the first pilot, I conducted interviews with two teachers. At that time, my main focus was on establishing interview questions, as well as learning how to conduct research interviews and analyze the transcripts using the qualitative analysis software QSR NUD*IST. The second pilot entailed interviews with two additional teachers, followed by an analysis of all four interviews. In both studies, I departed from a purely inductive grounded theory approach by establishing codes according to the Concerns Based Adopt Model (Hall & Hord, 1987; Hord, Rutherford, Huling-Austin & Hall, 1987) and Transformative Learning Theory (Mezirow, 1991, 1994), but otherwise, I allowed themes to emerge. The findings from both studies, along with further review of the literature, led to new research questions and interview questions.

Participants in first pilot study (assigned pseudonyms are used) were Julie, a female teaching a course in public relations for advertising students, and Andrew, a male teaching a business communications course. In both cases, their first online courses were still in progress. Participants in the second study were Linda, a female who had taught online business communications courses over three semesters, and Don, a male who had taught several online courses in organizational behaviour and in-service courses for beginning online teachers in community colleges. With a sample of only four, a cautious approach to finding patterns in the participants' responses was necessary, but some themes emerged which held promise for further investigation. The following excerpts from the report on the second pilot study illustrate these themes (Frank, 1998).

Themes of change, learning by experience, and collaboration were prevalent. Julie experienced a dramatic change in perspective, as described in her following comments:

> I have changed my outlook on what students need....Some people would learn better in this environment; I think personally I would learn better. So I think I might have broadened my perspective on what is good in terms of learning and teaching much more than I have before. I really thought that the only way to do it was to sit and drill it into them, and, you know, 'do this' and repetition and everything else, and now I don't think that way.....I certainly look at learning differently...and I respect there are so many ways to learn.
>
> They [the students] are teaching themselves more than I am teaching them, and I guess, as we are all so egocentric, I always felt we had to be there to make it happen. And I don't think that's the case -- any more.
>
> I really think the whole process has changed me; I didn't know the value, I didn't see the value. It wasn't something I ever anticipated getting out of it.

Andrew spoke at length about trying to understand and adjust to changes in the role of teachers as a result of technology. He felt that much of what teachers do is being replaced and spoke of "realizing" and "trying to figure out how teachers are going to be valued" in light of improving educational technology and telecommunications. He felt that his questioning of the role of the teacher resulted from several activities over time: seeing things on the Net, teaching a course on the impact of technology, and teaching a course on line.

Both of the more experienced teachers indicated that they had learned something important that could be applied in their face-to-face courses. After seeing the value of the reflection encouraged by asynchronous written communication, Don came to the realization

that students often may not be "present" in face-to-face classes. It became clear to him that preoccupation with other things often prevents students from "grappling" with subject matter in class, even though he had "covered" the material during his interactive lecture/discussion classes. As a result of this realization, he was experimenting with methods to encourage reflection in these classes.

Linda had come to the realization that, in face-to-face classes, there was too much focus on her "performance" as a teacher, both from her own and the students' point of view. She found that the focus in online classes seemed to move quickly to the students' progress in learning. A very strong theme in this teacher's experience was her awareness that students go through a natural progression toward independence in college. She saw this progress to be accelerated by the self-directedness required in online courses. She went further to conclude that this progression toward independence parallels teacher progression in implementation of computer technology. She proposed that teachers and students alike should be supported in a natural progression at their own pace.

A strong theme of experiential learning as a teacher emerged. Each participant expressed the belief that one could only appreciate the unique characteristics of the online environment by participating. There was a general concern about the need for less confident teachers to be empowered to take risks – to try the new medium in spite of their insecurity or doubts about their ability to handle the technology.

Coding for concerns according to the Concerns Based Adopt Model (Hall & Hord, 1987; Hord et al.1987) revealed that the teachers' concerns fit the pattern defined by the model to some extent in that concerns were expressed at all levels. However, concerns about student impact were strong early in the process of adoption, whereas the model predicts the main occurrence of student impact concerns after management concerns have been resolved. This difference may have been due to the fact that the participants had chosen to use the technology whereas the CBAM research was done where new curriculum is often imposed. Also of special interest was the finding that considerable collaboration among college staff had taken place early and was considered essential. While collaboration is a later stage in the model, the participants expressed a desire for collaboration from the beginning of the course design process. The need for continued informal sharing with peers who were involved in the same kind of work was mentioned by two teachers, and all four talked about their need for

mentoring from more experienced teachers. All said that mentors had been very important in the early stages of their use of the medium.

To summarize, themes of change, learning by experience, and collaboration led to a shift in the focus of my research questions from teachers' support needs to an investigation of the experience itself and how it may contribute to teacher development.

Selection of Participants

The selection of individuals for the main study was designed for maximum variability within the population of Ontario community college teachers (Maxwell, 1996). Although the number of teachers using conferencing was small, I attempted to achieve a balance of gender and variety of subject areas and was successful in doing so.

In order to capture potential patterns of teacher development, I restricted the sample to three colleges. Traditionally, ethnographers have tended to investigate single settings, but studies of a phenomenon across settings, particularly of an organizational innovation, have become common (LeCompte & Preissle, 1993). I planned two rounds of interviews to allow for theoretical sampling based on the themes arising in the early interviews. The first round consisted of two interviews from each college, and the second round consisted of four interviews across the three colleges.

The first step in the selection process was to find two suitable participants from each of three colleges. Through my contacts at Ontario colleges, I solicited help in establishing lists of potential participants. I requested and was granted formal administrative consent in each of the three colleges. College A and B were both large colleges, while College C was a small college.

From a short list of potential participants in College A, I contacted two people, excluding personal acquaintances and balancing for gender and subject as planned. In College B, I was given the names of two willing participants by the administrator who was assisting me. In College C, I searched for teachers who used conferencing by talking to several people. Using this approach, I was eventually able to find two willing participants. Fortunately, over the three colleges the range of subjects and balance of gender worked out well, in spite of the small numbers of faculty from which I could draw.

After the analysis of the initial interviews, I conducted theoretical sampling, which is

the collection of further data that is likely to contribute to emerging theory. In the first round of interviews, strong themes of the importance of both exposure to learning theory and mentoring had emerged. The mentoring theme established the direction for the subsequent sampling in the second round of interviews. I expected that participants would continue to have varied exposure to learning theory, allowing me to follow through with this theme.

In the same three colleges, I chose teachers who were mentors or who were relatively new users of the medium. Through two of the first round participants in Colleges A and B, I was able to find two people who had received mentoring from them. Direct mentoring relationships existed between Jay and Lynn in College A, and between Sue and John in College B. In college C, there were fewer online teachers, and so the choice was made there simply by the availability of teachers who used conferencing. Table 2 on the following page lists the teachers by college and round of interviews, and indicates their gender and subject areas. Table 3 lists their uses of conferencing. These uses are described in detail in Chapter 5.

Assigning of Pseudonyms

In order to arrive at acceptable pseudonyms, I asked each participant to give me a pseudonym when I sent the summaries of the interviews to them. Some chose pseudonyms and others allowed me to choose. Jay, Casey, Douglas, and Max chose their own. I chose the rest, retaining gender indication.

Data Collection

In the first round of the main study, I first conducted four interviews face-to-face, two in College A and two in College B. However, because of distance, I interviewed the teachers in College C by telephone. After finding that using the telephone for interviews was satisfactory, I decided to conduct all of the interviews in round two by telephone. All interviews were audio-taped. In some cases I examined course materials on the Web. As each interview was completed, it was transcribed.

Table 2

List of Participants by College in the Main Study

College	Round	Participant	Gender	Courses
A	1	Jay	Male	Introductory computers Advanced Web course design
A	1	Casey	Female	Multi-media Small business
A	2	Peter	Male	General education courses
A	2	Ann	Female	Accounting Accounting
B	1	George	Male	Accounting
B	1	Liz	Female	Pharmacology
B	2	Allan	Male	Pharmacology
C	1	Douglas	Male	Entomology and related courses
C	1	Max	Male	Sociology
C	2	Janice	Female	Electronic communication Web research

Legend: Round of interviews: (1) initial, (2) theoretical

Note: All names are pseudonyms.

Table 3

Uses of Conferencing and Mentoring Status

Coll	Rnd	Participant	Subject	Use of conferencing	SD	M
A	1	Jay	Introductory computers	Adjunct On-campus	Y	
			Advanced Web course design	Main, Distance	Y	Y
A	1	Casey	Multi-media	Main, On-campus	Y	Y
			Small business	Main, On-campus	Y	Y
A	2	Peter	General education courses	Main, On-campus	Y	Y
A	2	Ann	Accounting	Main, Distance	Y	Y
			Accounting	Main, On-campus		Y
B	1	George	Accounting	Adjunct, On-campus	Y	Y
B	1	Liz	Pharmacology	Main, On-campus or distance	Y	Y
B	2	Allan	Pharmacology	Main with f-2-f, On-campus	Y	
C	1	Douglas	Entomology and related courses	Chose not to use conferencing	N	Y
C	1	Max	Sociology	Adjunct, On-campus	N	
C	2	Janice	Electronic communication	Main, On-campus	Y	
			Web research	Main, On- campus	N	

Legend: Round of interviews: (1) initial, (2) theoretical

Main = Conferencing used as main means of communication for the course

M = Mentor SD = structured discussion required by students

Interview Questions

The tradition of phenomenological human science requires that "the subject matter of phenomenological research is always the structures of meaning of the lived human world" (Van Manen, 1997, p.11). This meaning is established through participants' retrospection on lived experience. Since the aim of this study was to understand what the use of computer conferencing meant to teachers, I asked my participants to reflect upon their experience over the time of using that medium.

In the pilot studies for this research, I found that some participants had difficulty focussing on their own subjective experience. One participant requested that I give him the questions ahead of time to help him reflect, since the topic of teaching with computer conferencing seemed so multi-faceted. To assist the ten new participants in focussing and reflecting on their own experience, I provided them with questions before the interview. The questions were open-ended, seeking to direct the subjects to comment on the range of issues suggested by the research questions but allowing maximum freedom to express their personal experiences and concerns. These questions were preceded by questions about background information, such as years of experience in teaching, and number and type of courses conducted by computer conferencing. The main interview questions in the initial round of interviews were as follows:

What were your reasons for deciding to use computer conferencing in your courses?

How do you use computer conferencing in your courses?

What concerns did you have about implementing computer conferencing in your teaching and have these concerns been resolved? If so, how?

In what kinds of activity have you been involved in connection with your implementation of computer conferencing, for example, acquiring information, developing new expertise, or working with others?

What has your experience meant to you personally, for example, your view of yourself, your role as teacher, your understanding of the teaching and learning process, your relationship with students, your sense of purpose?

What do you think good teaching is?

Has your experience with computer conferencing affected your teaching methods in

other settings, for example, face-to-face or distance learning? If so how?

What role have training, support, exposure to learning theory, or other factors such as stage of career, played in any changes that may have occurred?

In the second round of interviews, I retained the same questions, omitting only the question about concerns. I omitted this question because the pattern of concerns in the first round closely reflected the findings in the pilot studies and revealed little new information. I used the time saved to follow up on the themes of changing beliefs and mentoring found in the initial round of the present study. I directly asked the second round participants if they felt the experience of using conferencing had influenced their beliefs about teaching and learning, and probed more into the role mentoring may have played in any change they may have experienced.

Interview Approach

In an interview, the main challenges for the interviewer are to listen carefully, respond appropriately, and elicit further expression from the participant, always keeping the research questions in mind. I used the conversational style advocated by van Manen (1997) and Rubin and Rubin (1995). "Qualitative interviewing requires listening carefully enough to hear the meanings, interpretations, and understandings that give shape to the worlds of the interviewees" (Rubin & Rubin, 1995, p.7). Van Manen (1997) warns that the interviewer must keep the focus on the main purpose of the interview. My initial strategy was to ask the participant to begin with what seemed most important to him/her after reflecting on the interview questions. However, as I progressed through the interviews, I found that most of the participants were more comfortable proceeding through the questions in orderly way.

Data Analysis

The data analysis consisted of several steps, combining continuous collection and analysis as required by grounded theory, and dual analyses: individual and comparative.

First, to probe deeply into the nature and reasons for change at an individual level, I prepared an individual summary of each transcript from the initial round of six interviews. I then prepared an analysis of each interview. The individual analysis consisted of answers to

the research questions for each person. This painstaking process took several months and gave me a very strong awareness that assisted me later in writing the summary findings.

To increase the trustworthiness of my analysis (LeCompte & Preissle, 1993; Lincoln & Guba, 1985), I performed member checks by sending copies of both the summary and the analysis to each participant via e-mail and asking for confirmation of accuracy. All participants in the first round replied, and some made some small corrections and additions in background information. None made any corrections to my analyses. By having the participants confirm the analyses, as well as the summaries, I felt assured that my interpretation of their comments accurately reflected their perceptions before I proceeded with theoretical sampling and subsequent data collection.

The next step was to examine all of the documents to date to identify themes that would help guide selection of more participants. I then proceeded with the second round of interviews and repeated the steps of transcribing, creating individual summaries and analyses, and checking with members. In this round, two of the four participants replied, asking for only minor factual corrections.

The final step was to conduct a cross-analysis of the interviews. In my pilot studies, I had used QSR NUD*IST 4.0, a software program for analysis of qualitative data, to examine the transcripts. For the main study, I chose to use Atlas-ti. Both programs allow the researcher to manage large amounts of data and carry out theorizing processes efficiently (Miles & Huberman, 1994; Richards & Richards, 1994). The researcher can code text chunks and store them in files that can be retrieved easily so that the researcher can view and reflect upon all text chunks in a category. Categories can then be merged or rearranged as the researcher explores relationships among categories. Memos can be written and attached to files for easy retrieval. I chose to use Atlas-ti over QSR NUD*IST because of its better user interface for coding and retrieval.

The analysis was guided by authors who have outlined detailed procedures and stages of grounded theory analysis (e. g., Glaser, 1978; Strauss, 1987; Strauss & Corbin, 1990). According to Strauss (1987), there are two stages of coding: open and theoretical. Open coding proceeds as follows: first the researcher finds and creates names for categories; the next step is to work on discovering the dimensions and conditions of a category. For example, if "bad care from doctors" emerges as a category, the category's dimensions are what bad care

looks like, and the conditions are those conditions under which it occurs. Next, the researcher must look for connections among this "micro-data" and then to identify core categories in the data, possibly with the aid of diagramming. Strauss warned that the danger for the inexperienced researcher is to remain at the categorization level. Memos must be written to record emerging theory about relationships among categories and thus provide the basis for theoretical coding, which Glaser defined as follows:

> Theoretical codes conceptualize how the substantive codes may relate to each other as hypotheses to be integrated into a theory. They, like substantive codes, are emergent; they weave the fractured story back together again. (Glaser, 1978, p.72)

Theoretical codes include causes and consequences, processes, maneuverings, styles, values, boundaries and so on (Glaser, 1978). In a later manual, Strauss and Corbin (1990) divided coding into three types: open, axial, and selective. Axial coding is the stage at which core categories are examined and confirmed. Selective coding is, in essence, theoretical coding, where the researcher codes only for the data relevant to the core codes.

My initial coding was comprehensive and guided by the themes suggested by the research questions, with some pre-established codes such as "concerns" and "changes in belief." At the same time, I created new categories as they emerged, yielding a total of eighty codes. My approach to the later stages of coding was to group codes into categories such as "teacher development" and to re-examine the quotations in these groupings. Rather than create theoretical codes in Atlas-ti, I created written descriptions of phenomena, such as processes and values, as they emerged during the re-examination of the quotations.

The steps that are required by grounded theory are echoed in the following description of ethnography:

> Ethnographers attempt to describe systematically the characteristics of variables and phenomena, to generate and refine conceptual categories, to discover and validate associations among phenomena, or to compare constructs or postulates generated from phenomena in one setting with comparable phenomena in another setting. (LeCompte & Preissle, 1993, p.41)

The literature of both grounded theory and ethnography seem to suggest an orderly, systematic approach, and in doing so, provide guidance for the beginning researcher. However, the act of analyzing is not necessarily very orderly or divided into distinct stages (Strauss & Corbin, 1990), nor is there one way to go about it (Tesch, 1990).

From an analysis of the literature, Tesch was able to arrive at ten principles of qualitative research, the sixth of which describes the essential analytic process:

> The main intellectual tool is comparison. The method of comparing and contrasting is used for practically all intellectual tasks during analysis: forming categories, establishing the boundaries of the categories, assigning data segments to categories, summarizing the content of each category, finding negative evidence, etc. The goal is to discern conceptual similarities, to refine the discriminative power of categories, and to discover patterns. (p.96)

Patterns in the data provide the basis of theory. Glaser and Strauss (1967) distinguished between substantive and formal theory, the first being the level of explanation that can be reached by studying a particular setting or group, and the second being the level which can be inferred across many settings. The issue of theory level is connected with the concept of theoretical saturation, which occurs when no new themes emerge in analysis. The iterative nature of grounded theory requires that the researcher continue to collect data until theoretical saturation has been achieved. However, Glaser (1978) noted that, in a limited study, saturation is elusive:

> What is gained by studying one group is at most the discovery of a few categories and a few of their properties. From the study of similar groups (or subgroups within the first group), a few more categories and their properties are yielded. But this is only the beginning of a theory. Then the sociologist should try to saturate his categories by maximizing the differences among groups. (p. 62)

By studying individuals in similar groups, I was able to arrive at the beginnings of a theory about the relationship of online teaching and teacher development in community colleges.

My approach to writing the analysis was informed by Barritt, Beekman, Bleeker and Mulderij (1984), who demonstrated how to analyze a description of lived experience and how to express common themes in simple, accurate terms. They emphasized that the best understanding of a phenomenon is accomplished when language is chosen with care and precision to be easily understood by the researcher and anyone concerned with the research. Thus, I have taken care to make my writing readable by striving for clarity, conciseness, and use of the active voice.

Ethical Considerations

Before beginning this study, I undertook the ethical review required by the University of Toronto. According to the terms of the review, I obtained written administrative consent and individual consent for all interviews. I sent a letter (Appendix A) to administrators or ethical review committees, with minor variations depending on the permission procedures established at the college. I sent another to individuals (Appendix B) with slight variations depending on the way they had been contacted. I assured all participants and all those who assisted me in locating them that confidentiality would be maintained and agreed to send a summary of my findings upon completion of the study.

Limitations of the Study

The results of this study are not generalizable to all community college teachers. Rather it documents processes that occurred among teachers in three selected groups, demonstrating how change can occur. The method of sampling was limited by the small number of potential participants, but it was fortunate that sampling yielded a wide range of subject specialties and a balance of gender. The sampling was also limited in College A and B by my dependence on other individuals to help me identify and recruit participants. In College C the sampling was limited only by the small number of online teachers. There I interviewed three out of five potential candidates.

The study was also limited by the need to keep individual confidentiality in that I was unable to pursue lines of questioning that would have led to a clearer picture of the three college settings and the relationships among the participants. Furthermore, to gain administrative consent, it was necessary to keep the study focussed on individual teachers and avoid evaluating institutional support in a way that could have compromised the colleges' confidentiality.

Chapter Four

Individual Summaries and Analyses of Interviews

This chapter contains individual summaries of the interviews, each followed by an individual analysis that answers the research questions in relation to each participant. The individual analyses provide an understanding of individual experiences in relation to the research questions. As a member check, both the summary and analysis were sent to the corresponding participant, and confirmations of accuracy were received from all but two people. The summaries and analyses are grouped here by college and then by the order in which they were conducted. The interviews are reported in present tense. My conclusions in Chapter Six are drawn from both this chapter and the comparative analysis in Chapter Five.

Jay's Story (College A)

Jay teaches in an adult education centre at a community college. He has been using computer conferencing in his introductory computer courses for three years. Recently, he has been facilitating an online Web authoring course for teachers. His formal education consists of a B.Sc. and a B.Ed. in adult education. He has taught in both post-secondary and non-post-secondary college programs.

Jay's primary reason for beginning to use conferencing was a strong interest in its educational value and in technology in general, along with the increasing availability of technical support from the college and the thrust in the college for more use of the medium. He uses conferencing in two ways: as a support mechanism in the basic computer courses, which are self-paced and have weekly face-to-face meetings, and as the primary delivery tool in the advanced authoring course, which is entirely online.

Jay uses both conferencing and synchronous chat to create a sense of community, elaborating as follows:

> It's difficult for students because it's a new way of teaching. They're used to learning through face-to-face means, with the teacher at the front, whereas with online learning you're looking at a facilitation role for the educator and trying to get the students to think differently, to be experiential, to be active learners. So

> the tool that really helps that out, so the students don't feel isolated, is computer conferencing.

In his first iteration of the introductory computer course, participation was voluntary. Since participation was minimal at first, he began structuring it by posing questions and requiring answers online. Before he began using conferencing, he had been concerned that students would not feel comfortable with the medium. With experience, he has found that some students really enjoy it, some come to accept it over time, and some resist completely. At this point, his concern has not been fully resolved but he believes that the range of reactions is an indication of different learning styles and is to be expected.

A second concern was about technical support from the college in terms of getting problems with the technology solved quickly. He used a conferencing tool not supported by the college in his first iteration because he could do it entirely by himself. Now the level of support has grown and the faculty have options of conferencing tools. He has found the administration very supportive of his efforts to try new technologies; their attitude is "very much the green light, go-ahead and try...make it happen."

Jay also described the continuing concern he has about keeping the volume of messages reasonable. He feels the answer to this is an understanding of how to structure the course. He described his own learning process:

> From a teaching pedagogical perspective [I have a] concern about the volume of stuff, what it means to the role of the teacher and how that's implemented. I mean, really, when we started this and put it into classes, we weren't sure how this would fall out, what would happen. And we're seeing in some of our courses that if you include, as I mentioned, a structure where they have to go and do this and then interact on line and interact with their peers, interact with groups, interact with a faculty member, once the student catches on, it takes off. And the volume -- simply the volume of messages out there, how they are organized in a discussion group, how you organize conferences -- that is an issue, an instructional design issue that needs to be resolved and we're sort of getting that -- getting an understanding now but I don't think we're there yet.
>
> And so faculty are having to understand how conferencing works, how to design it instructionally, how to deal with the volume of E-mail, how to design interactivity so that the volume of E-mail can be reduced or the volume of messages in a conference can be reduced. Those are still being resolved. They're not there yet but we're getting better at it, I think, as we learn.

In relation to the issue of message volume, Jay feels that a course where the instructor is the sole giver of information is a poorly designed course and that it should be structured so that peers help peers.

Jay's experience when he first began was rewarding. He considered it a professional development exercise, and since he enjoys working with computers, the frustrations did not seem too great.

When asked how he would categorize the types of knowledge he had acquired, he mentioned technical and pedagogical. He divided the latter into two areas: learning issues from the teacher's point of view and from the learner's point of view. Types of learner issues that he mentioned were economic and cultural.

Jay is very clear about the movement of faculty into a more collaborative role when starting to teach online.

> I think what we've found, too, is that faculty traditionally very much worked in isolation. They developed their curriculum, they went to the classroom, and they taught in traditional mode. With this we're looking at that support issue, idea of a team. And so it's essential now, I feel, that in order to do anything with technology, implementing technology into teaching and learning, that you need to have a team. So there is some person to go to for technical support, there's a person for instructional support, there's a person to do some production for you if you need to, you know, create a Web page and insert a conferencing tool or get it up and running, that kind of thing. So that whole concept of team now delivering curriculum as opposed to just the faculty member. I mean, the faculty's still the content person who does it but they have that team support behind them to make it work effectively.

For Jay, the increased teamwork is good thing. He views himself as a team player and has enjoyed the transition.

Jay feels that his involvement with the college's integration of technology has had a strong, positive effect on his career. He began teaching classes in a traditional way and then was moved to another campus to help implement an alternative mode of learning using a comprehensive computer assisted instruction (CAI) system for generic skill development. From there he moved into online learning. The effects of these changes included increased confidence and continuing personal growth:

> I've been shifting as the technology -- with the technology winds, I guess. So for my personal growth it has been great, I mean it's been something that I want to do and it's happened. So I can't be more happy in that sense. But it has meant a time of learning, much more demand on my time, et cetera. Up to this stage I've said that's fine because I've said it's something I want to do. I'm starting to feel at this stage, though, that it's becoming overwhelming in some respects. And I need to do some thinking about where I want to go from here and how I want to do that.

He also found that the new technologies moved him completely out of content deliverer into the role of "student helper" and he was quite willing to go along with this because he had never been comfortable with the lecturer role. His view of the teaching/learning process has "changed dramatically" over approximately ten years of teaching with changing technology:

> I guess when I started I was, as most new faculty are, this is how you teach and learn. You know, you've been through it your whole [life] -- in learning and so now when you're teaching you do that. But looking at when technology was implemented -- I mean I've always been on the technology side because what I was teaching was technology, computer skills and those kinds of things. So you look at how do students best learn that. And through experience, you say, well, maybe -- I'm a doer so I believe in experiential learning, I believe in let's just do it, you know, you have to get the experience of hands on practice and experience on this. So that was a first revelation. I had my students more on the hands-on side and more on the project side than the assignments and test side.
>
> Then when you move into CAI, then you've got resource. How then do you utilize? You don't have to deliver content any more. Content could be delivered some other way -- electronically. So how do then you fill in all the other things that the students need, how do you fill in that extra help, how do you fill in that -- just -- my big thing is we have the learning lab here. I've seen my role purely as making that as comfortable a learning environment for the student. So -- and I'm not a content deliverer any more, I'm a student helper to get them through that. So that was another revelation.
>
> Then we move on to the Web-based learning. Again, it's how do you create that sense of community because you haven't got the labs where I can talk -- sit down and say how are you doing today, you know, how can I help, that sort of thing. How do you do that on line? So that's where conferencing comes in, to help with that tool, to continue that process. I'm sure that -- the other side now, the other ten years if I'm lucky enough to do that, is what will the next revelation be? I don't know. That'll be interesting to find out.

In response to the question about his relationship with students, Jay expressed that conferencing allows him to have a much more personal relationship with students than in

strictly classroom situations. The e-mails are often personal and he feels more connection with each student. Moreover, with conferencing he is able to be "a part of the group" by seeing their comments to each other. He feels that even though they probably express themselves differently in a conference than in the halls, the teacher can get a better sense of what the issues are:

> And it's more of a human perspective, you know, you learn that a student has got these issues that they're dealing with over and above the education that they're talking about. So, you know, it changes your relationship with that student because you now become almost involved with that student personally in terms of personal conversation back and forth.

In regard to sense of purpose, Jay thinks that the teaching role becomes even more critical in learning when the teacher is no longer the content deliverer. His revelation about this came when he began using CAI. He finds strong facilitation is needed and doing it well is rewarding. However, he feels the transition, the "letting go" is hard for teachers. He feels facilitation skills must be learned somehow, either through trial and error or formal learning, and he predicted that more programs will be developed for such learning.

In answer to the question "What do you think good teaching is?" Jay suggested that, to him, it is "doing the right thing" for both the student and the teacher:

> Good teaching is trying to help the learners, making them comfortable, showing them how to use the system, being more a facilitator, being more of a guide, all those kinds of things to help them learn. The other part of good teaching, though, is taking care of yourself as a teacher, learning when is it -- when do I say enough is enough?
>
> I talked about that volume issue. How do I change my design or delivery to say that I want that reduced? I can't handle that any more. You know, balancing the teaching. What tends to happen, especially what I've experienced, is that people I know that are saying oh, this is great, I love technology, let's use it, they're immersing themselves in it and it's almost taking over. You know, they zip home -- and I've done this -- right after work you get on that computer and you're answering that E-mail and you're going okay, did I answer everybody's E-mail? Did I remember to send that to that student? Two o'clock in the morning, three o'clock in the morning, bingo, you're out there.
>
> ...You'll get burnt out that way. And so you have to take care of yourself because you're not going to be effective if you're not looking after yourself first. And then within your parameters that you set helping the students through all the means I

> talked about before. And so, absolutely students are important and you want to support their learning in any way you can, using all these new tools. But you also have to look after yourself.

Jay feels very strongly that his face-to-face teaching is improved by having the content taken care of by electronic means. By no longer being the content deliverer, he is able to use face-to-face time for discussions of how to manipulate the content and for analysis, synthesis and evaluation of the content. He enjoys a blend of face-to-face and online teaching and would never return to a traditional classroom approach. His increasing role in helping other teachers use technology is releasing him from regular teaching hours, giving him an enjoyable but somewhat overwhelming workload.

Jay feels fortunate to have been in a position to adopt technology in his early career because the two areas of learning, how to teach and how to use technology, coincided. During this time, he enjoyed pursuing his B.Ed. by alternative delivery, mostly paper-based with some face-to-face and video meetings. In fact, he defines himself as an "alternative person." The learning theory he picked up during his years of study assists him now, especially in helping other faculty to understand principles of adult learning. He subscribes to the principles of "self-directed, active, experiential learning" and tries to increase his understanding of how to apply these principles using online learning while recognizing that students have different learning styles and do not all adapt to online learning well. For example, he encourages teachers to structure group work into their online classes but is open to the idea that it may be appropriate to only some disciplines or modes.

Jay feels that the best way for his teachers to learn is try things and see what works for them. He is a strong advocate of "just do it." However, he feels learning theory is critical to help educators apply technology efficiently to curriculum. In essence, he feels his authoring course poses the following questions:

> What is your teaching philosophy? Make a statement of that. How are you going to adopt that into your use of technology? And I would say that that is of more importance than the technology itself, obviously. You've got to have that before you then decide what technology tools to use and how you're going to use them.

Being aware of Rogers' theory of diffusion of innovations, he sees himself as an early adopter. He finds that the teachers he assists range on the spectrum from early adopters, who are keen to try the technology, through those who are leery and " want to be assured through an affirmation sort of process." He has not yet found any who are completely unwilling.

Individual Analysis Jay

Has this community college teacher's perception of his role in the teaching/learning process changed as a result of using computer conferencing in his courses, and if so, how?

Over approximately ten years of teaching with technology, Jay's perception of his role as teacher has changed dramatically, first through using computer assisted learning (CAI) and then through teaching online courses. His sense of purpose has changed from being content deliverer to "content supporter." Jay perceives that both CAI and conferencing require a "letting go" of the traditional teacher role but, at the same time, they make the teacher's role even more crucial to learning.

In learning to use this medium, to what extent has this teacher been involved in processes of personal vision building, inquiry, mastery, and collaboration?

Personal vision building: Jay is a very reflective person who seeks better ways of teaching. His involvement with online learning has increased his confidence and placed him in a position to be able to help other teachers implement online learning, a role he finds very satisfying. He thinks in terms of improving teaching across the college, not just in his own classes.

Inquiry: An experimenter by nature, Jay has sought the challenge of figuring out the technology, often on his own. He also works at understanding how principles of adult learning can be applied in online courses.

Mastery: Jay has mastered computer technology for online learning at an advanced level. He is recognized for his expertise in the college by being paid to mentor and conduct courses for other teachers who want to learn how to teach online.

Collaboration: Jay has been involved with teamwork more and more as he has implemented technology. He is very pleased that he is now working with a team to support online learning. He finds mentoring and teaching courses for teachers to be a satisfying experience.

What concerns has this teacher had about implementing this medium and how have those concerns been resolved?

First Jay mentioned his early concern about students' acceptance of the new environment. This concern is at CBAM Level Four (impact on students) and follows the pattern of the participants' concerns in the pilot studies. Jay's concern has been resolved in that he has found that most students do accept the online environment, although he feels learning styles affect their enthusiasm.

His other early concerns were at Level Two (self) and Level Three (management). His self-concern was how to handle message volume, which he knew beforehand could be a problem. This concern is on-going, and he works with others to find solutions to the problem. Early management concerns about technical support have been alleviated by the improved support at the college.

Has this teacher moved to a more learner-centred philosophy as a result of using computer conferencing?

Jay has become a more learner-centred teacher at the belief level as well as the materials and strategies levels. Jay's current view of the teaching/learning process has evolved through a series of "revelations." His early beliefs about teaching were influenced by his experience as a student in a traditional lecture-style system, although he

feels he is naturally an experiential learner. His first revelation came when he began teaching courses in computer skills and recognized the students' need for more experiential learning. Then his involvement with CAI moved him completely out of the traditional teacher role, giving him the new role of "learning assistant" rather than content deliverer. Recently, online learning has reinforced his view of himself as a facilitator who supports learning at a distance and encourages students to assist each other rather than relying on him as sole information provider.

Jay brought a learner-centred philosophy to his online teaching; however, the conferencing environment has moved him even further in that direction. The high volume of questions from students has influenced him to look for better ways to allow the students to interact and answer each other's questions. He describes having felt responsible at first for answering all e-mail, yet he has learned through experience that he can't keep up with the volume. He believes that better management strategies to protect himself from burn-out will improve his teaching because it is in the students' best interest to take more responsibility for their learning and to support each other. Indicating that he has experienced deep personal change, he uses the term "letting go" to describe the process of moving out of the role of "content giver to content supporter."

What role have training, support, exposure to learning theory, or other factors such as stage of career, played in any changes that may have occurred?

Jay has been strongly influenced by his formal education in adult learning. He feels that knowledge of adult learning theory is essential to good teaching at the college level. However, he is open to ways in which adult learning principles may not supply all the answers.

His involvement with computers has formed his career path in the college. Relying very little on technical support in the beginning, his confidence and inclination to play with technology allowed him to implement computer conferencing before it was well supported by the college infrastructure. Now he is in a mentoring role, which he considers an important area of growth for himself. Jay feels fortunate to have been in his

early career when implementation of computers was beginning. He thinks that a younger teacher is likely to find it easier to accept a changing role.

Casey's Story (College A)

Casey has been teaching in a community college for approximately 25 years. Her main subject areas are English and Communications, building on a background in theatre. More recently, she has been involved with design arts and this involvement was the starting point for her interest in online learning, using both CDROM and the Web.

Casey has developed two completely online courses for college students: a course about new media and a course on entrepreneurship. She co-developed the latter with another faculty member from the School of Communication Arts. Both courses are designed for on-campus students. Casey uses conferencing in these courses "as a method of keeping in contact with them, of extending things that are not [formally] in the course, discussing things, and getting them to meet and talk with each other."

The discussion is structured with a requirement of twenty postings throughout the course. Students often post their assignments, especially in the new media course, to share their work. They also network, using both the conference and private e-mail, frequently asking how others achieved visual effects. Casey perceives that "very often it's a spin-off from the conference room that they become correspondents by e-mail."

In her courses, Casey does not teach students how to use the technology directly, but rather gives them a series of tasks that require them to learn technology in small increments.

> I believe that the important thing in technology is to be able to use it appropriately to get whatever task you're trying to do done and to be able to integrate it and have technology work for you, not fighting it. So that's what I'm trying to get them to do. So by the end of the semester they've made a Web page. All the way through, by using E-mail and using the conference and then inserting a graphic and doing this and doing that, they've actually done a Web page before they actually get to doing one. They just don't realize it.

Casey has learned from working with design arts students how to set up learning for primarily visual learners and it was for their needs that she began teaching online:

> Again, a lot of it had to do with working with the design faculty and students. We know that our students are becoming increasingly visual learners. But the graphic design students are way out in front because essentially they've made decisions about their life and their career very often based on the fact that they're not comfortable either in the spoken word or in the written word. And they communicate through their ability to draw and to use form, function, colour, those kinds of things. So they will go to extraordinary lengths to avoid learning in ways that we were probably brought up to learn, mainly from text and oral. They just don't process well that way. And so what I was trying to do was provide an alternative way, for many of those students to learn, that was non-judgmental, supportive, always there, that they could go over it as many times as they liked to get the concept and at the same time used graphic imagery, symbolism, whatever to get difficult concepts across.

When asked what her initial concerns about teaching on-line were, Casey said she worried about whether the students were really doing the work themselves, but she feels most of them are doing it. She is more concerned that the majority of them are reaching the learning outcomes and enjoying it, and she feels that this is happening.

Commenting on her own learning, Casey described her path in implementing technology from 1991 when she accepted a leadership position in dealing with student under-preparedness, integration of technology, and funding cuts. Her first area of implementation was CDROM delivery. She worked with various projects to help teachers see how authoring CDROMs might work for them. She conducted professional development courses, which led to her creating a book and CDROM on how to create effective multi-media for learning. As she was completing the package, she became more and more interested in the Web because it is much more accessible than CDROM.

In creating the CDROM, Casey has had a "tremendous learning experience" and found herself collaborating with technical experts to achieve the visual effects she wanted. However, she moved to the Web, not only because it is so accessible, but also because she believes a teacher's time is better spent on content than mastering technical and design skills.

Casey feels student interaction, both with the content and with people, is very important in Web courses. One of Casey's criticisms of some Web courses is that there is

often nothing there but text. She feels that ideal course would have a marriage of the two types of interaction:

> The ideal course would be graphically rich, would use visual metaphor, would use animation, would use video if we can deliver it well enough, audio, would truly use those sensory means of teaching to deliver the content. If you want to give people text, get a book as well and ask them to read the book. But delivering the material in a medium that is designed to be visual, after we have the Web on top of the Internet? And it's also difficult to read.
>
> It's physically tiring and difficult to read and so you have to give their eyes relief and interest, you have to stimulate their brains in terms of colour and shape and form and you need to take difficult concepts and make them visual. And then you need the interaction of the human being and that's the conferencing, either First Class or Collabra or whatever you use. And even there if you don't develop a style that is warm and friendly and becomes the equivalent of talking, then I'm not sure that the conference does substitute. So there's a tremendous amount to make it really work.

In what is an "essentially cold medium" Casey makes an effort to discover which students need more support. She feels that teaching is a very human activity. She will relay anecdotes about herself or send birthday cards just as she would in a classroom, so "it's not all work." She makes a strong effort to answer questions and return assignments quickly. The students say (and this surprises her) they feel closer to her and find her more accessible than some of their classroom teachers.

Casey feels she has changed her role as a teacher gradually. She holds the philosophy that no one can know everything, especially at the rate information is being generated, and that we need to give students coping skills: how to find information, analyze information, use information. She sees herself as a constructivist. Her early years in the theatre gave her the experience of teamwork, where the props person, the lighting person, the scene painter all must do their job or the play doesn't work. This need for teamwork is ever-present in her course development work now because many talents are required to make seamless online courses so they are very user-friendly:

> I don't want them to have to enter any code or type in anything other than their name and their password and that is the same everywhere, too, you keep that as simple as you can. And so I need somebody to make that seamless. As I say, I could go away and live in a cave for six years and come out and be able to do that. But by that time, the new things that I'd like to use I'll have to catch up with. So I want to be free to explore the technologies and use the technologies based on my

> understanding of teaching and learning, not get hung up on these other things. And so that's where I'm very happy to work with a team. And I don't see it as MY accomplishment that there's a course there; it's OUR accomplishment that there's a course there.

When Casey creates and pilots a course, she tries to make sure other teachers pick it up. In relation to one course in particular, she has been disappointed that there was not more push by the administration to attract teachers to picking it up.

Commenting on her view of her role as a teacher, Casey feels the adjustment to "being the guide on the side" was not as big a leap for her as for some people. She sees that some teachers are just not able to give up the teacher-centred role but instead raise objections to other issues such as the possibility of cheating in on-line classes. She has theorized as to why this happens:

> Well, I've thought about this a lot and teachers every time they get up in a classroom are opening themselves tremendously to disapprobation, boredom, all these other things that students can do so well. I think that a teacher identifies himself or herself with that process, as painful as it may be, and can't imagine any other.
> And so that is what we do. That is teaching. And very often people will say to me, "Well, you're not really teaching." Well, they don't quite say it but that's what they mean. "You're not doing the real thing any more." And I know that's what they feel. Sometimes it's that, and other times it would be, "I would never do the amount of work you do," they'll say to me. I say, "But it's different. You know, it's different. It has its rewards, too." You have to try it. But I think that teaching is a real -- can be an enormous ego booster but it can be an awful ego crusher, too.

When asked what other transition problems she has encountered while mentoring aspiring online teachers, Casey mentioned two main areas, with specific reference to the construction of course Web sites: mastering the technology and thinking in pictures rather than words. She sees the thinking as by far the harder one to surmount.

Casey's definition of good teaching is this:

> I think good teaching is empowering students to learn.... it's giving them the tools they need to continue to learn and to do that in a way that it's not a chore for them, to give them an enjoyment in learning and to see it as a challenge in the best sense of the word.

She has seen teaching in this way since she was a student herself and was aware that some teachers made learning fun. She feels that a great deal of entertainment goes into good teaching but that learning process is a joint effort between students and teacher. In the case of a Web site where the content is standing on its own, the teacher's role in presenting content is already done and then her role is to support students in using it. The students can use as much or as little of it as they like. She sees the students as very much in control of the learning because they must be active in the online environment:

> It's very much what they take out of it. In actual fact, at that point, I've written it in as warm and friendly a style as I can, I've provided all the information, I've made it easy to get to, I've done all the things that I would try and do in the classroom but they're now fixed in that machine. In the conferencing part I have the opportunity to develop a relationship. I would say that's what I try to do. Actually, it's all student to teacher. It really is. Because if they don't choose to talk to me or they don't send me an assignment or they don't whatever, there's very little I can do about it. I mean I can send them an E-mail saying I haven't heard from you for a while -- which I do. But that could be disappearing into the great ether. There is no face in front of me.

Casey would retain an on-line presence if she were teaching face-to-face classes. Her main reason would be to maintain the accessibility the students have to her, especially those who might be shy in the classroom setting. She feels that a teacher should use as many ways of communicating the content of the course as possible to reach everyone, including face-to-face discussion, online discussion, and online tutorials.

In answer to the question of what factors had changed her thinking, Casey replied:

> I don't think I would probably have gone as far down this road if I hadn't done that directorship of the centre. That certainly gave me an opportunity to explore things that were important to me. Knowledge of teaching and learning styles is absolutely essential but it's got to be tempered, not just theory. It's got to be tempered in the classroom. People have got to understand it. It's one thing to intellectually understand something; it's another to truly understand it. And I think the best way to do that is often to start with yourself and find out how you learn best and understand that there are certain things that are very difficult for you. Then extrapolate that and say well, obviously, there are things that are difficult for other people. So how can I in my teaching provide different methods for people to learn? And online I consciously think about how I can present material in different ways. I also think in assignments, in knowledge evaluation, particularly at the college level, we are very often stuck at the Bloom's Taxonomy very bottom levels of rote learning. And we need to understand that what the world needs now is synthesis.

> We have to constantly push our students to be operating at the higher level, not at the lower level. Unfortunately, the lower level is really easy. It's easy to structure. It's easy to test. And it's easy to mark. And the students are used to it. And, in fact, very often they will gripe and complain, well, we don't know what you mean and we don't know what you're getting at, because we're pushing them to that higher level.

Casey's understanding of learning theory is mostly self-taught. She continues to read and "a lot of that is because I'm trying find out what I really think, and what my style is, both teaching and learning." Casey thinks we will not be successful in implementing online learning unless we set up more centres to help people do it, in both the technical and "thinking" aspects. However, she thinks we must accept that some teachers will "never get it" and that it's fine because great education does not come from a "cookie-cutter" approach.

When Casey gives presentations about online teaching to other teachers, she finds they respond to her candid expression of her experience and to her belief in the methods she uses. To people who think that the administration's push for on-line learning is just an attempt to save money, she explains that is not less expensive and that she does it because it makes her a better teacher:

> And that I'm not rabid, you know, I'm not -- I have seen the light and it is technology in education. It's not that at all. It's more just because I want to be a better teacher. And right now it's working. I think it can work a lot better and I'll still be out there leading the way, trying to make it better, but if tomorrow I thought I could do a better job without the technology I'd drop it just like that. And I think that I get that across, too. So it's really interesting to see people come in -- and you can tell by their body language and everything else, you know, well, I'm kind of interested but I'm really sitting on the fence here. And by the time they leave they're going away with a different attitude to it. So that's good.

Individual Analysis Casey

Has this community college teacher's perception of her role in the teaching/learning process changed as a result of using computer conferencing in her courses, and if so, how?

Casey's perception of her role as teacher has evolved since she began designing and teaching online courses. From her background in theatre, she has always held the belief that learning is a social process, having experienced the interdependence required in stage production. Since she has been designing instructional CDROMs and online courses, she has come to see her role to be a designer of content who then acts as "guide on the side" in a process that is controlled mainly by the student.

In learning to use this medium, to what extent has this teacher been involved in processes of personal vision building, inquiry, mastery, and collaboration?

Personal vision building: Online teaching has been a way for Casey to explore better ways of teaching. She began to use technology specifically to improve student access to and interaction with course material, and she has found that her teaching has been improved by the medium. When she is called upon to share her vision of online learning, she finds that other teachers are influenced by the power of her conviction that students can learn better in online courses, especially those with more visual learning styles.

Inquiry: Casey has been heavily involved in learning how to use technology, especially to create visual effects that engage the student with the course content. However, she believes that, generally, a teacher's time is better spent learning how to teach in the medium than on the technology itself. She also reads to keep up with developments in learning theory.

Mastery: Casey has developed considerable expertise, enough to author a book and CDROM on creating multi-media for educational purposes. She also works as a mentor for other teachers who are creating online courses.

Collaboration: Working with others has been a necessity to achieve the effective use of technology that Casey seeks. She has been involved with technical experts, fellow members of the instructional technology team at her college, and many teachers whom

she has assisted with implementing online learning. She sees her accomplishments as the result of team effort.

What concerns have teachers had about implementing this medium and how have those concerns been resolved?

Casey's chief concern when beginning to teach online was whether students would do the assignments themselves, a Level Four concern (impact on students). She has not found this to be a big problem. Her concern is not fully resolved but she feels the benefits outweigh the risk that students will pass up opportunities to learn.

Has this teacher moved to a more learner-centred philosophy as a result of using computer conferencing?

Casey has always believed that learning is a social process and one that requires the active engagement of the student. She has always sought better ways of engaging and motivating the student. Casey's original interest in designing CDROM materials came from a desire to make content accessible to students in alternative ways, especially for students who are visual learners. She believes that her job is to facilitate the students' enjoyable interaction with the content in ways that match their learning styles. This job is partly accomplished by providing personal warmth and encouraging community in her conferences.

Although Casey's view of the learning process has not changed profoundly, CDROM and the Web have facilitated her gradual movement out of traditional classroom methods to engage the students in more active learning. Computer conferencing has provided a surprisingly strong way of encouraging her students' interaction with the material and each other. As a result, she has become very comfortable with the role of "guide on the side" and believes it is effective for students. Her work as mentor of other teachers has led her to believe that the shift to being "the guide on the side" has been easier for her than for some, who may find it very difficult to step out of the traditional role with both its rewards and pain.

What role have training, support, exposure to learning theory, or other factors such as stage of career, played in any changes that may have occurred?

For Casey, formal training has not played a large role in her changing methods. She is very interested in learning theory and finds she gains a deeper understanding of the learning process by doing and reading. She feels that serving in a leadership role in implementing technology has given her the opportunity to actively explore how she can understand her own teaching style better.

Peter's Story (College A)

Peter has been teaching at his college for seventeen years and is now faculty in the communication arts program. He taught English and drama in a high school for fourteen years before coming to the college to work with post-secondary students with employment barriers. He has been developing and teaching general education courses entirely online for the past three years.

Peter chose to put his general education courses online partly because he likes a new challenge. He had been to workshops that demonstrated how to teach about computers with computers, but was not excited by this use. When he discovered groupware, he felt that it would allow him to give students the flexibility he desired in his existing courses:

> I've always been the kind of person who gave a lot of choices to students and had as many tracks going simultaneously as possible. And conferencing allowed me to do that and monitor it in a way I couldn't do it in the classroom.

With his background as an English teacher, he was also interested in exploring a hunch about the value of the written medium:

> I value words and the way they're put together. I wanted to find out what I thought would be true, that the disadvantage of losing tone of voice and body language -- which is a given -- can be twisted into an advantage in a world where I'm trying to assess people's thought put through the structure of words .... it's unforgiving in that regard.

In his courses, Peter has created a non-linear structure that integrates written assignments with discussion. The structure works as follows: He provides twelve topics, each with 25 to 50 questions. A few of these topics are compulsory, and the students have the choice of the remaining topics. Each student is required to post, for each of eight of the topics, an answer to a question that no one else has yet chosen and then respond to a number of other postings. This approach allows them many choices and avoids duplication. His marking system is designed to make sure students participate regularly but not in a highly rigid time frame or sequence of topics. He accomplishes this aim by dividing the semester into roughly five equal time frames for posting and responding. He has developed a rubric for marking responses.

Peter sees his online courses as a form of collaboration with students. He feels that many college teachers are not attracted by collaboration and thus are generally not attracted to the use of groupware, which was designed for that purpose. He feels that his background as a drama teacher, where the main learning process is collaboration, helps him deal with the challenges of facilitating online discussion. When he leads faculty workshops in online learning, he suggests to teachers that they will not be comfortable with using groupware in their teaching unless they have persisted through at least two semesters of groupwork in their face-to-face classes. He believes it is very difficult to learn how to work meaningfully with groups for the first time online.

Returning to his description of his facilitation strategies, Peter explained that he wants his evaluation methods to help maintain the inherent flexibility of conferencing. However, in his third year, he found he needed to institute a penalty system for late postings. The decision was influenced by student feedback in which some people appreciated the lack of penalties but others complained that they couldn't reply to postings that weren't in on time. He designed the penalties to encourage regular participation but remain as flexible as possible. Late postings are penalized by 25% in the first timeframe, by 50% in the second timeframe, and so on. He reasons:

> I don't want to fail people because they're late, because this isn't a classroom and time has changed its meaning in this context. So to use the old mind-set of the classroom, I mean some of the time frames that we use in teaching -- not all of them by any means -- but some of the time frames we use in teaching were the product of a classroom based delivery system.

He feels that the asynchronous aspect of conferencing is a unique characteristic that should not be lost by introducing restrictions, such as weekly deadlines, that haven't even been used in most classroom settings.

When asked if his online experience has affected his view of his own role as teacher, Peter commented that he has always seen himself as a facilitator, although he does not care for the jargon. He models his teaching after a good theatre director who stimulates actors to think carefully about their character rather than telling them exactly what to do with their lines. Careful questioning can lead actors to develop their own interpretation of a part.

In relation to this concept, he referred to a flow of "pure mind" that has occurred in his online classes: "When I'm really into it and they're really into it, bodies don't interfere with the flow of thought." Rewarding as he finds this kind of interaction, there is a price. He becomes immersed in the flow to the point of spending far too long at his computer for physical comfort

To alleviate the long hours at this computer, he plans to have some scheduled face-to-face meetings with his classes in the next semester. This change is also to accommodate students' requests for some face-to-face time. He believes this balance will help him remain keen about doing online courses. Peter has enjoyed the flexibility that teaching online has given him. He has had no timetable for three years, but spends three 10-12 hour days a week at the college. However, he is ready to exchange some of the freedom for the scheduled face-to-face meetings.

An advantage he has discovered in conferencing is the tendency of a few students to post a large volume of high quality messages in the early weeks. This phenomenon affects his role as teacher by setting the tone and level of performance. Peter builds on this advantage by contacting these students and inviting them to continue to act as mentors in the group, offering them marks as an incentive. He is pleased that, in this way, he is able to cede more control of the learning to students.

Peter has thought carefully about how often and in what manner he should post in the conference. At present, he responds to all formal assignments privately and keeps his public messages in the discussion down to occasional synthesizing comments. To

encourage more critical thinking in his next semester, he is planning to require students to respond to five of his own comments, thus forcing them to deal with the puzzling questions he poses.

Peter values the ability of conferencing to allow time for carefully composed responses in a discussion. Building on this strength of the medium, he encourages critical thinking by increasing marks for three levels of response: a statement of simple agreement or disagreement, a statement with an argument, and a statement with both an argument and an example.

Peter's course structure is intended to force students into two activities, discussion and choice, while other issues remain negotiable. Using the expression "give them enough rope to hang themselves" he wants to ensure that they interact with other students and make choices throughout the course. His final exam reflects the same intention. He gives them several variations on one generic question and asks them to write an essay in which they quote themselves five times and three other students once or twice each. An additional advantage to this approach is to make it impossible to "buy" essays.

Peter is aware of "the panic that this amount of choice strikes into some people's souls." Some of these students come to his office. However, he values the amount of thinking students must do just to consider their choices. He is planning to raise their awareness of thinking processes by colour coding the questions throughout the course according to type, for example, linear or lateral. Students would need to answer at least one from every colour.

Peter's enjoyment of creating strategies for effective online learning is evident in his manner. He has attempted to communicate his enjoyment in workshops for other faculty. He finds they often have the impression that online teaching is much more work than face-to-face, but he tries to help them see that they have choices about how they use the medium. He believes the investment in such elements as graphics or video-streaming should be appropriate to the need, so that initial time investment in course development is not inordinate.

Another strategy that Peter has used was influenced by a conference on learning theory he attended. This strategy requires students to do a group project and describe their decision-making process. He further encourages them to take responsibility for their

own process by making the group sub-conferences open to other students so they can observe each other group processes.

In his evaluation of student postings, Peter does not want to "freeze the discussion" by marking grammar and spelling and, in fact, disallows students from correcting each other's language errors. Instead, he writes privately to students only about errors that cloud the meaning, thus drawing their attention to the relationship between language and meaning.

It is very important to Peter that students have the choice about whether to take online courses, and he is pleased that they do indeed have choice at the moment. He recognizes that, after trying the online medium, some students will not enjoy it and some will find they do not have the ability to manage their time.

Peter feels good teaching is "helping people learn things for the sheer joy of learning it." When asked how good teaching feels for the instructor, Peter said:

> Heady. When I see lights go on, whether it's physically or whatever, I mean there's a group synchronicity happening. Now, it isn't going to be everybody in the group.

Peter feels that, in the online medium, teaching has changed and that he is not sure of things he once"knew." He challenges other faculty to rethink their beliefs about teaching:

> What I think -- I mean throw in the jargon word "post modern". We can hyper link knowledge now. In fact, I require it. And, in fact, one of the things I like about this, when I show this to colleagues they say, "Well, the students will cheat. It won't work for me." I say, "Well, that's right. The trick here is anything that's transmissive-- regurgitate back -- they can cheat on. So you can't mark them on that any more.

Peter does not approve of multiple choice testing as a main evaluation tool for a course. He also is concerned about over-use of presentation software because it extends the transmission concept of learning. He is impatient with teachers who don't want to examine their teaching methods for contradictions between their style and what is now known about learning. He feels his embracing of online teaching is part of a willingness after so many years of teaching to take a public stand on teaching issues. He finds it

amusing that he has a reputation for technical knowledge when he feels his greatest strength is his understanding of how to structure a course. However, Peter's work in assisting other faculty with online teaching is a source of enjoyment:

> You know, this stuff is spinning out in all kinds of sideways ways. It is [fun]. I'm down to the university all day tomorrow because I'm helping another two faculty design their on-line program for adult education.

Peter enjoys leading workshops on teaching with groupware, but finds it harder than teaching other subject matter using this medium. Nevertheless, he finds he learns from the faculty who take his workshops and particularly values the technical knowledge some of them bring.

Peter has been teaching introductory courses in adult education and reflective practices in a B.Ed. program for several years. Although he feels there is a lack of rigorous debate and cross-referencing among theorists, he has been influenced to think about and develop his own understanding of how people learn.

When asked whether he saw changes in people he has helped to start teaching online, he responded:

> In the courses that I've taught, this groupware one, yes. Now, they're a fairly self selected group, although some -- every semester let's say a third of them are very kind of linear lock step people who are initially pretty uncomfortable when they start to see the implications.... They were expecting it to be another tool to add to an existing bag of tricks. They didn't expect the bag to be revised.
>
> Now, they roll with that. I'm pretty pleased. But because facilitation on-line is to me a very big part of the puzzle, they have to model that and experiment with that in the course that I teach. And that's the one that a number of them find most difficult. It's not understanding conceptually any of the stuff we've talked about, it's being good enough and fast enough on their fingers to choose *le mot juste*... to synthesize, to wrap it up. I mean if you pull away body language and tone of voice, you'd better be good with words.
>
> And I very much emphasize that people develop an on-line personality. I mean I'll type "ya wanna? You gotta cause I said so." You know, "Y-A G-O-T-T-A C-U-Z..." Because that's how you play in this medium. And play counts. Play -- I'm big on play.

In closing, Peter returned to his analogy of moving out of the traditional teaching role as being the director of a play. While some teachers are still caught in wanting to be the actor, he doesn't need to play the part any more. He needs to help other people play the part.

Individual Analysis Peter

Has this community college teacher's perception of his role in the teaching/learning process changed as a result of using computer conferencing in his courses, and if so, how?

Peter's perception of his role has not changed dramatically but his understanding of his role is always evolving. Prior to teaching courses online, he saw himself as a facilitator who gives as much responsibility for learning to students as possible. He has found that conferencing allows him to give students increased flexibility and range of choice, and he continues to search for better facilitation strategies. In his role as mentor, he finds that the medium does stimulate teachers to think about their role in the learning process, especially those with a linear lock-step approach.

In learning to use this medium, to what extent has this teacher been involved in processes of personal vision building, inquiry, mastery, and collaboration?

Personal vision building: Peter is a strong advocate of learner-centred education, although he does not use this terminology. He is committed to devising new online strategies that encourage students to think critically, engage in discussion, and make choices. In the context of helping other teachers implement online courses, and in his role as adjunct professor in a B.Ed. program, he challenges other teachers to rethink the traditional teacher's role.

Inquiry: With a strong focus on expression of ideas through the written word, Peter has directed his attention to acquiring knowledge about how to structure discussion.

He has acquired enough technical skills to be able to conduct courses via conferencing, and he enjoys learning technical information from students who are advanced in this area.

Mastery: Always trying to improve his methods, Peter experiments with various strategies to maximize student learning. He elicits student feedback and applies it in subsequent iterations. His expertise is recognized by colleagues and administrators; for example, he is asked to assist other professors at his university in creating online courses.

Collaboration: Peter's comments about collaboration occurred mainly in the context of mentoring of other teachers and collaborating with students, both of which he finds rewarding.

Has this teacher moved to a more learner-centred philosophy as a result of using computer conferencing?

Rather than changing as a result of using conferencing, Peter chose to use the medium because of the potential he perceived for allowing students more flexibility and choice. His philosophy of giving students freedom and responsibility is essentially learner-centred, and he is very pleased that conferencing is accomplishing what he had hoped. He feels that conferencing software, which he refers to as groupware, provides an ideal environment for collaborative learning in which the teacher is also a collaborator. Thus conferencing has enabled Peter to carry out his ideal role, which is much like a theatrical director who stimulates actors to interpret their characters rather than telling them how to act.

What roles have training, support, exposure to learning theory, or other factors such as stage of career, played in any changes that may have occurred?

In his late career, after 21 years of teaching, including six years conducting teacher education courses, Peter has developed the confidence to take a public stand on educational issues and to challenge other teachers to examine their thinking. In the

interview, he made little reference to his own original exposure to formal learning theory (he holds a Ph.D. in Curriculum) and expressed a dislike for words he considers trendy jargon, such as "facilitator." Nevertheless, he showed a sophisticated understanding of adult learning theory and mentioned Myers-Briggs personality theory several times. His background in theatre has influenced his thinking about learning and provides his main metaphor for teaching. His background as an English teacher contributes to his interest in the value of written communication for student learning.

Ann's Story (College A)

Ann has been a part-time teacher of accounting at her college for several years. Previously she spent approximately twenty years in business occupations. She first began teaching an accounting course online at the request of her college and has since chosen to develop and teach a second course. Her courses make use of both Web sites and conferencing and do not have a face-to-face component. Her mentor for building the courses was Jay, a participant in this study.

The college asked her to put the first course online as part of an effort to put the entire program online. She had already successfully revamped the face-to-face course to suit the program needs, and she was eager to start using conferencing: "I thought it was going to be a very interesting situation and it really did turn out to be that."

Ann feels that the first course, which serves part-time students, has been very successful. However, the second course, which was designed for full-time students, did not attract many students. She feels the reason was that "it was a foreign procedure for them." She is working with her administrator to attract more students next year. She sees the advantage to the college of reducing pressure on classroom space.

Ann places a strong emphasis on online discussion. The course is structured in ten modules that each prompt the student to discuss with a learning partner, after which they can check their thinking with an answer key. Ann gives 15% percent of the mark for participation because she sees her course as a "distance learning classroom."

She notices a big difference between part-time "adult" students and full-time students in terms of motivation to participate in online discussion. She recognizes that students at a distance have more need to communicate than students who see each other

in the halls. In her part-time course, there are students from all over the world. She finds that these students usually take up the option to use the chat feature of the conferencing software for small group discussions, although they sometimes run into problems with time zones.

Ann's greatest concern before she started teaching online was whether she would be effective in terms of providing usable online materials. She is very critical of textbooks, which she feels are usually written for teachers and not for students. To construct the first course she worked with Jay, who helped her choose wording that was well-structured and easily grasped by a person who knows nothing about accounting. Having taken a course on how to word questions, Ann aspired to word her materials in the best way possible.

In planning and building the course, Jay's assistance was very important to Ann's growth of confidence:

> When I first started off, I got the first module completed, and Jay and I sat down, and all I did with the first module was to just type.... And then gradually I kind of learned the way to actually, you know, go through this process, formatting and what not.
>
> So it ended up Jay really was the instigator as to what goes on each screen because he was the expert in that area. He was the person who was building all of these things, in charge of everything going on there. I relied on him. And eventually I learned from what he was saying. Okay, we're going to break the screen here and then I learned how to -- you know, put it down in my information that I submitted by disk. In my hard copy I would put my breaks in and we used particular things, like dashes going right across the screen. Okay, page break. Screen break. Next screen break. But it was an interesting process.
>
> As I guess we got on -- a little bit farther along I found that I was becoming more confident in what I was doing. And when I built the second program it took me less than half the time that it did to build the first one, and they were both equally as long.

Ann spoke of the of the satisfaction she felt with the finished Web materials:

> It was very rewarding to me to actually see it go up on the screen, to know that somebody tried it and said hey, I really like this, this is really good. That means a lot to me, you know, because it makes all the time that I put into it -- it took about three months to create the program in its rough draft form.

> Initially when I was doing it my concern was are they going to learn from me? Is this going to be effective? Am I putting intelligent pieces of information on the screen? Does it make sense? Is it flowing? You know, the usual traditional, building course type concerns. But the comments I got even from the students as I was communicating with them was "I really like the way these screens flow, it's so easy to follow this, I'm really understanding it." And the impact of that was very rewarding to me.

Ann feels it is essential for teachers to simplify concepts for students to make the learning easier. She tries to help them feel they truly understand the material, which generally they expect to be difficult. She developed this philosophy over the years when she was training employees. Later she took the teaching and training adults certificate program. She found this program very valuable, confirming most of her ideas on teaching and helping her improve her methods. Ann feels that ongoing teacher development is very important:

> I personally believe that an instructor, particularly with a Web site, or just building a traditional classroom environment, I mean you have to sit down, you have to plan things out. You have to say okay, I'm going to talk about these topics, I'm going to do these exercises, et cetera and so forth, when you put together your lesson plan.
>
> But I think what's very important is that a teacher can become stale. You must continue to educate yourself. And I'm not saying go and get more degrees, I'm saying more on understanding teaching methods and understanding how people think, how people learn. To me I realize that not everybody learns in the same way I do. And you have to address your teaching needs to try and accommodate all the learning styles.

Ann described her process of deciding how to structure her online courses by thinking how she engaged students in the classroom:

> I realized that I didn't have that opportunity to suddenly stop the class and say, "Okay, what do you think the answer to this is?" Or, "Can anyone suggest such and such?" So I just literally sat down when I was putting it altogether and I said to myself, okay, if I was standing in front of these people what would I be doing? And I came up with the idea of the learning partners. That's how I started the learning partners. That's why I forced them to go two or three times in each module or even more. You know, it could be ten times. And each module then is broken into sections.... I'm consistently getting them involved in discussing this with someone else. And I find that that really -- really helped them an awful lot.

Ann feels that having people work in groups is extremely important because it reflects the reality of the business world. She also works hard to make learning fun, noting that many accounting teachers are "very formatted and rigid." Good teaching for Ann means responding to students as individuals and creating a sense of ease, which she believes helps them learn difficult material more easily. An early inspiration for her was a statistics and economics teacher who used humour to help students relax, even dressing as a chicken during exams: "Unbelievable what I learned from him... Those were the two hardest subjects."

When asked if she felt computer conferencing had had an influence on her, Ann replied:

> I think it has. Since I've done the computer conferencing courses, I'm more aware when I'm in a traditional classroom mode of what I say and what I do than I was before. Before I just did it because it was natural. And now I'm aware of how am I saying this, how effective is this going to be, is my point getting across? I think it kind of leads back to what I had said before about my initial concerns [of whether I could present information effectively online].

Ann still prefers face-to-face classes because she can joke with students. She feels constrained by the online environment because joking can be so easily misunderstood. However, Ann makes sure her sense of fun comes through in the conferencing environment.

Ann recently published an article encouraging other teachers to create online resources. Her enthusiasm for the online medium and her desire to pass along what she has learned are apparent in this article.

Individual Analysis Ann

Has this community college teacher's perception of her role in the teaching/learning process changed as a result of using computer conferencing in her courses, and if so, how?

Ann's perception of her role has not changed as a result of using conferencing but she feels her teaching has improved as a result of creating and teaching online courses. Creating Web pages and thus having to express herself clearly in writing has made her

much more aware of choosing words carefully. She feels this awareness benefits her face-to-face-teaching.

In learning to use this medium, to what extent has this teacher been involved in processes of personal vision building, inquiry, mastery, and collaboration?

Personal vision building: Ann is very enthusiastic about teaching and constantly looks for ways to make a difficult subject easier for the learners. She has welcomed the opportunity to reach more students though online distance teaching and she has continued to intentionally build her teaching skills.

Inquiry: To adapt courses for online delivery, Ann spent many unpaid hours, with Jay's assistance, on creating materials and learning how to use the medium to the best advantage.

Mastery: As Ann facilitates her online courses, she is monitoring student performance and response, looking for ways to improve the learning environment and applying her learning back in the face-to-face classroom. Her sense of accomplishment has led her to publish an article to encourage other accounting teachers to create Web resources.

Collaboration: Ann's main form of collaboration to this point has been with Jay, her mentor. She has found this collaboration very helpful and rewarding. He has been instrumental in helping her learn how to arrange and word information.

What concerns has this teacher had about implementing this medium and how have those concerns been resolved?

Ann's main concern was whether she could teach effectively online. This concern has been resolved very positively. She finds the distance course works very well and she receives positive feedback about the course from students.

Has this teacher moved to a more learner-centred philosophy as a result of using computer conferencing?

Ann was quite learner-centred in her view of teaching before she began to teach online. She strongly believes the teacher must monitor and adapt to individual student needs, create a warm learning environment, and engage students in active learning. She appreciates the written nature of the online medium that allows her to make her explanations even easier to understand, and she appreciates the discussion that can go on among her distance students via conferencing.

What role have training, support, exposure to learning theory, or other factors such as stage of career, played in any changes that may have occurred?

Having come to teaching after a career in business, Ann is very committed to this second career and to continuing her development as a teacher. Ann feels that the Teaching and Training adults Certificate Program has influenced her thinking about teaching, especially in understanding how to accommodate different learning styles. Her previous experience in coaching employees has also been a foundation for her commitment to making sure students have grasped concepts thoroughly so that they can use them.

George's Story (College B)

George has been a full-time teacher of accounting for 20 years, following three years part-time. He started providing online resources for his face-to-face students and communicating with them electronically when it was suggested by his college that teachers begin to use Web CT. George saw it as "a great way to communicate with students." A leader in computer use with students at the college, he thought it would be a great tool that would allow them to ask questions or allow him to tell them something he

may have forgotten in class. Faculty seminars started him thinking about how he could gain some of the advantages of online learning, including the possibility of online class discussion.

George hoped that all of his students would make use of the online medium. He has found that his hopes have been borne out for about 50% of them. He finds that the students who do not ask questions in class are the same people who do not visit the Web site. At the time of the interview, only about five out of sixty people in two classes were reading and sending e-mail and participating in discussion. Others were using the Web site to download hand-outs or an Excel spreadsheet to view their marks. He feels that more would participate if he gave marks for the discussion. However, he enjoys Web CT and continues to improve his online resources:

> Right now my handout icon... there's too much there. So I want to break my handouts into different topic areas. So once we're past the topic I can hide it and [students] will know what's new.... So that's my next goal is now go back and work on it. I'm always evolving. My head's always moving.

George encourages student use of the online resources as part of his effort to familiarize them with the tools they will encounter in their jobs. An example of this effort was his insistence that students set up a binder with tab indexes and include a logbook of work completed, along with their back-up disk. He has found that students have been hired largely on the basis of the organizational skills shown by the binder and the logbook. George wants students to be active learners who organize themselves in ways appropriate for the job of accounting.

George values the fact that the Web makes the course handouts he has always produced more accessible to the students. When they have been away or have lost handouts, he can refer them to the Web pages. He also values the fact that accounting software on the college Network is available to them by modem and special software. George was one of the first three teachers in the college to use this system.

George's chief concern about using online methods is cheating on tests, and his department does not do online testing. This is still a major concern for him in his subject area. He feels any online testing in his subject would have to be proctored. To illustrate

the basis for his concern, he related a story about an incident that happened in an advanced class for which he conducts interviews to select students. In the first class of the semester, he discovered a student who had sent a more skilled friend to the interview, hoping George would not notice later.

George is also concerned about ESL students who cannot handle the online environment because, in his view, they do not yet have a good enough command of English. This concern has not been resolved because students are allowed to take accounting and preparatory ESL classes concurrently.

One of the disadvantages he perceives in putting course materials online is that the department has eliminated the marks for having a tabbed binder. This move was made to accommodate students who choose not to attend classes because it was felt they could read instructions online. George feels students need marks as an incentive to be as highly organized as accounting requires.

George considers himself a leading edge person in implementation of technology. In fact, he writes textbooks on using software. He likes to pick up new software and play with it. In addition, he often exchanges ideas on how do things with other teachers: "We're learning together." Many people use George as a resource and he enjoys this role, although he is sometimes frustrated by people who will not pick up a manual. He tries to help them be independent, much as he does with students, perhaps showing them a procedure or reminding them of the existing resources, and then saying, "Now you go try it."

He has found helpful the teachers who are seconded to the Web CT assistance centre. He meets with them one-on-one or in small groups where teachers ask questions and share what they do. He recently demonstrated his own Web site to a group of ten faculty.

George enjoys the recognition that his Web site has brought him in the college. His site is more advanced and uses more features than most other faculty at this point. His goal is to upgrade his site and have students always looking for or requesting information. He has been managing three courses for part-time teachers, who have now begun doing some of the upgrading themselves based on his model.

When asked what using conferencing has meant to him personally, George replied that he has always considered himself a good teacher and that means enjoying his job. He feels students benefit when the teacher is having fun and likes the friendliness he develops with students. The main difference that using Web CT has made to George is that he likes the feeling that students have much better accessibility to him and to the course materials. However, he is frustrated by the lack of curiosity and initiative displayed by some students both in classes and online. When he attempts to engage their interest by using outside sources, such as articles about computer use that relate to their future, some of them show no interest. Nevertheless, he feels good about "helping those who want to be helped."

George thinks that good teaching is staying ahead of developing trends and letting students see that he's learning, "letting them know that you don't mind, that you're studying too. Learning doesn't stop just because you graduate." It is his goal to help students be more independent and in some cases, more assertive. Often students who are talented in accounting cannot come across in an interview. George feels a teacher should address the student as a whole person, assisting them in preparing in all ways for a career. He is always concerned about building their confidence.

To help students who are very worried by computers, he uses a "gimmick." He tells them to use only three specific machines in the lab, implying that the machines are easier to use. Later, when they comment on their progress, he lets them know the three computers are no different, letting them see they are quite capable after all. Because he knows that his subject is difficult and many students expect to fail, he also uses another strategy to dispel negative expectations. In his first class, he talks about rumours of the difficulty level as if they were correct, and then tells the new students they can earn nineties if they just work hard and have a positive attitude. He uses the Web to continue building their confidence in their ability to learn.

George feels that good teaching also means being very prepared and aware of any problems with textbooks or limitation of software in relation to the textbook instructions. He feels a teacher should be able to warn students of problems they will encounter with the textbook or the software and is impatient with teachers who are not prepared to this extent.

Individual Analysis George

Has this community college teacher's perception of his role in the teaching/learning process changed as a result of using computer conferencing in his courses, and if so, how?

George's perception of his role as teacher had not changed as a result of using conferencing. He has always had a strong belief that good teaching addresses the whole student, and he values the benefit that online communication can give students who are willing to use it.

In learning to use this medium, to what extent has this teacher been involved in processes of personal vision building, inquiry, mastery, and collaboration?

Personal vision building: George has continued to follow his vision of good teaching in taking up his college's request to use the new medium. His vision is that he should help students acquire confidence and skill with the most current tools of accounting. In keeping with this view, he feels he should encourage a desire to be life-long learners. Now in his later career and as a writer of textbooks, he sees himself as leader in technology and enjoys being admired and asked for assistance by other teachers.

Inquiry: George is a naturally curious and technologically oriented person who investigates all of the technology relevant to his work. The online medium is one of his latest interests and he spends considerable time experimenting and seeking out ideas and assistance from peers.

Mastery: With his natural interest in computer technology, George learns new applications quickly and then begins to help other teachers. He has written textbooks on how to use accounting applications. His growing expertise in the use of Web CT is recognized by his colleagues, who often ask him for help.

Collaboration: George has been involved in extensive collaboration, both formally and informally, in implementing online courses. He has attended seminars and sought assistance from others, especially the staff who have been seconded to the faculty assistance centre. He exchanges ideas with faculty in other departments and constantly gives assistance in his own department.

What concerns has this teacher had about implementing this medium and how have those concerns been resolved?

Being comfortable with implementing new technology as it comes along, George did not express any initial concerns about using conferencing. At this point, he is somewhat concerned that so few students voluntarily join in online discussion, but is reluctant to force them by giving marks for it. He would prefer to see them take the initiative. George's main ongoing concern with online learning is an issue that is not directly related to conferencing but rather to online testing, that students could easily cheat if testing were done this way without proctoring.

Has this teacher moved to a more learner-centred philosophy as a result of using computer conferencing?

George's beliefs about learning appear to remain much the same. He retains his belief that he must address the whole student and that a friendly, positive learning environment is important to learning. He attempts to extend this environment for students by using the online medium in addition to his face-to-face classes. He continues to work toward the students' overall development and ability to be independent.

What role have training, support, exposure to learning theory, or other factors such as stage of career, played in any changes that may have occurred?

Although George's view of teaching and learning has not changed, the online medium has been a source of fun and renewal in his late career. More than a new tool for accounting, the online medium has challenged him in new ways and given him an enjoyable new way of communicating with students and improving access.

Liz's Story (College B)

Liz has been teaching full-time in a nursing faculty for about 17 years. She has taught two theory of medication courses online, both with the same group in consecutive years. She is an RN, with a BA in psychology, which she did entirely by correspondence. At the time of the interview, she had almost finished an MA in education.

Liz's first experience with electronic communication and computers occurred during her BA studies, during which she took an introduction to computers course using a laptop. All assignments were submitted by modem. She thoroughly enjoyed working this way and afterward purchased a computer through the college payroll deduction plan. With enthusiasm, she began using her computer for preparation of course materials and Internet research.

Liz decided to put her theory of medication course online to meet students' needs. Most of her students work and take courses part-time, and many are single parents. As a result they often have difficulties getting to all classes:

> I started using the computer to put up copies of overheads, for example, so that they could get it before class. And then I found that what we could do in class was much better because they weren't spending -- I hated waiting. "Wait, wait, wait, I want to copy down what you said." And so I started with that. And then I thought if I could put some discussions on-line, the students could go in there and we could create -- or have some discussions about some of the content areas without them needing to be in class. The first year I did this it, we used the rather difficult software then available at the college. It wasn't all that successful, not as successful as I wanted to be. I think primarily because they were still expected to come to class and that it was an add-on. And if it's an add-on forget it. I don't have the time and neither did they. Because you're still doing a hundred per cent in the classroom.

After this experience, Liz began to teach the course fully online and found that conferencing did work. She structured the discussion by requiring two postings and giving marks for them:

> They had to post at least twice to get their five marks. I would start some questions, start some threads, and students would respond to them; and then as I moderated and found that there were other threads that started, I would break that off and start new threads on a different discussion. Some of the threads were started by the students, and more in the second half of the semester. They would start posting questions themselves, and people would respond to them. It was kind of neat to see.

Liz posted brief cases with questions that required students to pose answers to problems. She worked to make the discussion interesting and fun by using humour and current events, including links to online newspaper articles. She found that she herself was excited about the discussion:

> We were able to use current events to trigger a discussion. And it was easy to put a link in then to the Toronto Star site -- so they could actually go out and read the article in the Star and then come back and contribute to the discussion. I liked that aspect of it, to be able to go and put in links to things that are happening. If I read something I'd go on, I'd be just so excited: "Oh, I just read this, I saw this last night." Actually, I remember saying this: "I saw this last night on the news and I'd never thought of this before and I thought it was really interesting...what do you think?" And then people would comment back. I can go in much like a student, wondering if anybody made comment.

Liz feels that "to really feel like you're part of a group" is essential for online learning. She attempts to create a strong sense of community in her face-to-face classes as well, often getting quite excited by the discussion. Liz learned by trial and error that smaller groups are better for online discussion. With smaller groups, she found it easier to track participation and felt that bonding was improved. She drew out more reticent students with assignments that required postings, for example, finding and evaluating articles from magazines or newspapers. For Allan, the teacher who subsequently taught her course, she divided the classes.

Wondering about the possible factors in the quality of online discussion, Liz described the "all or nothing" experience of Allan, who has recently taught her course with two separate classes, both on a partially face-to-face basis. He has found that one group discusses mainly face-to-face and the other mostly online. In relation to this phenomenon, Liz has found interesting the differences in her own fellow students' participation in her online Masters courses. Some people do the minimum and others get very involved in discussion. She found it interesting to see "how different people viewed their role as student."

When asked to describe her initial concerns about using conferencing, Liz said her main concern was computer access for the students, as most did not have computers at home. This concern was "a huge issue" and she had said she would not teach the course online without the appropriate lab access for her students. She did, in fact, manage to arrange the access she felt was needed. She would have been very disappointed to not use the online medium because she had already prepared the course and was very excited about teaching online. She had developed the basic curriculum for a Masters course and then further developed the course during release time for which she had put in a proposal.

Moving on to her own learning, Liz found the process of putting her course online very challenging and looked for others who were doing the same thing in her college:

> I knew nothing about making Web pages so my learning curve was horrendous. And I was one of the first sort of pioneers of Web CT, there was one other person in the college using it and that's how I found out about it. And there were a couple of other people investigating how to use it like me, but we weren't a group at all. Matter of fact, I met somebody who said, "I didn't know you were doing this." And, "Ah, somebody else. Another pioneer."
>
> My learning curve was horrendous. I took some professional development courses on HTML and creating Web page. And WebCT I learned by myself basically through the tutorial and trial and error and playing around. Now, that's my learning style. I tend to jump in the deep end with things once I get excited about something. So I basically learned it myself. My learning curve was incredibly high. Which is why I teach the Web CT workshops now, so nobody else has to go through what I went through.

She leads workshops for faculty, but she feels more training is needed and wonders how the money will be found to meet the need.

Liz is concerned now that potential online teachers are coming to workshops to learn the technology but are "not getting the underlying pedagogy behind it all":

> You know, a bad teacher is a bad teacher... And teacher-centred stuff is teacher-centred, only put online it's worse. But if you've got good active learning going on in the classroom, then I think you can transfer that online. So a lot of it is -- I mean I see it as a tool. It could be an overhead, videotape, anything. It's what you do with it, how you create the environment. And I think a lot of people have started -- it's the tail wagging the dog thing. So what a lot of people have done has started the tail wagging and what we have to do is convince the dog that this is a good idea, and how to make the wagging effective and get what they want.

An example she gave of teachers' lack of understanding the best use of conferencing is the common attempt to add online discussion to the course load, something Liz discovered herself doesn't work. She feels that helping teachers go online should start with constructivist theory so that courses will be well structured. Liz has been working on her own thesis and gets flashes of ideas for her online course, ideas that she then sends on to the new teacher.

Liz feels that her MA studies in education have given her the vocabulary for concepts of teaching she has always had:

> I think I've always been constructivist, I just didn't know it. I've always been the kind of person -- if you can tell me how it relates to me and how I can make sense of this from my world then I'll understand it. But I've never been good at memorizing. If I can internalize it, come up with some kind of an analogy to my life I'll learn it and remember it forever.
>
> And I've always known that about myself and I've always tended to teach that way... I mean, my first day in class in a nursing lab, I go around to the students and say, "You all have nursing experience. Oh, yes, right. You do, you all have experience." And I go and have everybody tell me what they were doing before they got here. "Oh, well, I was just a waitress." "Great, you've got organization skills, you've got manual dexterity. I can't handle six plates at once. I can't carry a cup of coffee without spilling." And each person all of a sudden realizes that they're going out with a whole bunch of nursing skills that they didn't know they had because they didn't have the right label for it. They didn't know there was transferability.
>
> I've always been that kind of person and I've always tried to bring that out in the students. I think that's important. If they can relate it to something in their life -- I've always used class examples so people can try to tie it into their own mental

> models, except I never had any of these fancy terms before, you know, because I hadn't done any of the reading that I've done for my course.

Although she feels she has always been a constructivist, Liz does think her experience of teaching online has helped her make her face-to-face classes even more geared to active learning. Her reason is that "you have to take it that one step further and really build in the activity in the on-line, whereas in the classroom you can rely on some of it just happening." For example, for an online discussion she plans scaffolding in the form of "leaders" ahead, and in the past she often did not think about how to scaffold ahead of time.

Liz finds that, as she drives to work, she plans lessons that will get students actively involved. She gets an idea for an online class and thinks about how to do it face-to-face, or vice versa:

> There are all kinds of things that students need to think about in relation to giving medication. And I thought, if I were doing this in a class, I could just take in a paper bag and ask for a volunteer and say right, I've got a whole bunch of pills here. Are you going to take them? And chances are they're going to say no. Well, then I'm going to ask why. And then they're going to give me reasons why they're not going to take it. Well, what questions do you want to ask? And I can put these questions up. And whatever questions I get from them, they're going to lead to different areas of the course,. This is a great question: "who are you?" Right, you have to know [who a patient is]-- this leads to the College of Nurses' guidelines for giving medication. You know, what are the pills for? Well, there are six pills in here. What if I take them all at once?
>
> So there are all kinds of things that I could do, tapping in on whatever they give me. In an on-line course I could have this graphic of a bag and say "Here you go. Are you going to take it? Yes or no. And then you'd think 90% of the people are going to say no. Well, I'm the kind of person I'd probably say yes to see what's next. So I'm going to say yes. They'll say, "Oh, did you grow up in the sixties?" And then maybe put a link out to something about the drugs in the sixties, in case they're born in 1982 and are babies and don't know about the sixties. So let them know what I was referring to. You know, you can make a joke about that. Which would get across my sense of humour. And then if they said yes, then go from there with a series of links related to what questions might you want to ask. And then as they click on the kind of question they might want to ask, take them to the kinds of things we're going to cover in the course.

Liz also excitedly described a lesson she had created on nutrition where she had students create a play in which they became parts of the body system and a hamburger entering it. Mutual enjoyment of classes is very important to her:

> I get a kick out of it. If I go out of a class feeling like I had a good time, then I think it's been a good class. If I go out of class feeling like oh, this is terrible, I can hardly wait for the clock to finish. Then I know if I had a bad time, they certainly did. The beauty of an on-line environment, you get an idea like that you can flip it in there at any time. For example, I saw this thing on TV about polypharmacy, and I got a whole new way of looking at it. I actually went on eleven thirty at night and said "I just watched this great thing, you know. What do you think about this?" And I put a link out to a polypharmacy site....

Liz's excitement about making learning more relevant and active for the students is quite evident in her manner.

When asked about collaboration, Liz described a progression of involvement with other college staff. When Liz first began putting her course online, she relied on one person who was already using the college's online course software. She then sought out a second person who was also learning. These contacts were inter-departmental, and at that time, she felt alone in her own department as she was the only person attempting to use the new medium. However, she began offering to create Web pages for fellow staff to help them get into the online world and appreciate the resources for teaching their subjects.

From some of her colleagues, Liz experienced strong resistance to her move into online teaching. For example, some felt that putting her overheads online, when her class was still mostly face-to-face, was spoon-feeding students and that they would then have no reason to attend class. She and her colleague Allan had to defend this practice in a meeting. She feels there is a control issue for teacher-centred faculty "who really feel they have be in control in front of the class, can't let the students get away with anything." She feels students come to her classes because they're fun and active, and she has shared her practices with other teachers, some of whom have adopted ideas from her.

Liz sees herself as a lifelong learner, enjoying her own education and taking a proactive role as a learner. In one of her Masters courses, she initiated online communication when some of the classes had to be cancelled and she also led her task

group in doing their project via e-mail. She has also enjoyed giving workshops about online teaching for other faculty in the college and would like to do more of this.

Liz reflected that she feels more nervous with peers than with students and thinks this may be because she likes to be in control to a certain extent. However, she "jumps in with the students" and maintains just enough personal distance to be able to perform her evaluative role. She enjoys giving students a degree of control by asking them to choose their own case studies and make their learning personal, "to bring it home into the context of their work." She would like to make her tests open book to encourage understanding over memorization, but has not been able to convince her colleagues to allow this change of approach to evaluation. She sometimes feels her "creative spark squashed" by teachers who share the same course and don't want to change. Thus she values the freedom that teaching the only online version of the course gives her. She shares her ideas freely with the person who is now teaching the course.

Liz ended the interview with the following story to illustrate her belief about good teaching:

> A student came up to talk to Allan while I was helping him with this course and said, "How come the RN students don't have to do this on computer?" And I said, "Because you're lucky." She looked at me like I was right out of my tree. But it is interesting. I think how faculty model the love for learning has a really big effect on the students. If you've got somebody up at the front or at the side, or wherever you want to put them, who really looks like they're enjoying this and this is the best thing since sliced bread and "let's get into it together and oh, that's exciting," ... just from their exuberance, the students are going to enjoy it.

Individual Analysis Liz

Has this community college teacher's perception of her role in the teaching/learning process changed as a result of using computer conferencing in her courses, and if so, how?

Liz's perception of her role has not changed as a result of using computer conferencing but she feels her methods are being improved. She feels she has always been a constructivist teacher by nature and has been confirmed in her way of teaching by

her MA studies in education. She was drawn to online teaching because it allowed more flexibility for busy adult students and also because she appreciates the potential of this medium for a constructivist approach. She feels that planning for online learning has stimulated her to think about how to make her face-to-face classes even more active and student-centred.

In learning to use this medium, to what extent has this teacher been involved in processes of personal vision building, inquiry, mastery, and collaboration?

Personal vision building: Liz sees online teaching as a vehicle for improving her own teaching and also helping other teachers adopt a more learner-centred philosophy. She loves teaching and is enthusiastic about perfecting her methods. She has found that she really enjoys using the conferencing medium and that it gives her a feeling of being a leader in her college.

Inquiry: Liz has eagerly sought out the skills she needed to implement online courses. She enjoys experimenting with technology and trying new things, and at the same time has sought to understand learning theory to clarify for herself what her job is about.

Mastery: She has successfully integrated the knowledge gained through her MA coursework with her experience as a teacher in implementing conferencing. Liz has learned a new set of skills that she eagerly uses in her teaching and is now sharing with colleagues.

Collaboration: Liz's online teaching has involved her in a large amount of collaboration: helping peers in her department, working through the implementation problems with people from other departments, providing workshops for peers, and mentoring the teacher who took on her online course. She finds this collaboration a source of satisfaction, especially the interdepartmental contact.

What concerns has this teacher had about implementing this medium and how have those concerns been resolved?

Liz's main concern before teaching the course was student access to computers on campus. By forcing the issue of appropriate lab space, she resolved this concern for herself. This concern falls in the CBAM Level four category, impact on students.

Has this teacher moved to a more learner-centred philosophy as a result of using computer conferencing?

She has always believed she should structure classes for active learning and personal relevancy of content for students. Conferencing is a tool that has helped her find better ways to teach according to her beliefs.

What role have training, support, exposure to learning theory, or other factors such as stage of career, played in any changes that may have occurred?

Exposure to learning theory has helped Liz understand and improve her own methods. Liz discovered through her MA in education studies that her way of teaching is naturally learner-centred. She has been taking courses almost constantly throughout her career and these formal studies are very important to her. Having been teaching for a long time and being confident in her knowledge of teaching and learning, she feels a desire to assist others in improving their teaching. She feels that many teachers are opting into online teaching without questioning their philosophy or trying to understand how to teach better, and she wants to help them improve their teaching with this medium.

Allan's Story (College B)

Allan has been teaching nursing at his college for about 12 years and three years prior to that at other colleges. He has worked as a nurse in a variety of clinical settings since he received his diploma in 1975. Through the years, he earned a Bachelor of Nursing and a Masters degree in education. At the time of the interview, Allan had just

finished teaching his first fully online classes, the same course in medications that was designed and taught by the participant Liz. Allan was asked to take over Liz's course when it became available on the basis of his online experience: he had been providing adjunct materials on the Web for his own classes and had several years experience with monitoring online journalling.

Allan found the first month of teaching the course very challenging because he had not had time to learn about WebCT before he started. He was taking the formal six-hour course WebCT course, led by Liz, while she was assisting him with the course itself. When asked if he departed from Liz's methods, he said that one difference was that some of the students decided to meet the requirements for discussion, normally held asynchronously, by holding small group chats, the transcripts of which Allan then read. He was comfortable with this change and felt that the quality of discussion in the chat was better than the asynchronous discussion.

Another difference was that Allan met with the groups because classroom space had been scheduled for them. Interestingly, he found that one group immediately chose not to attend regularly, once they understood the course was designed to be fully online, but about 75% of the other class chose to attend and used the face-to-face time for clarification and discussion. Allan felt that this use of class time was very productive because the students had to do the coursework online and thus were better prepared for discussion.

When asked how online teaching had affected his view of himself as teacher and the learning process, Allan replied:

> It certainly has expanded -- I mean I'm really quite excited about it because you don't have to sit in the office or you don't have to show up and spew at them kind of thing. It's a much better use of time because the content that you've got on-line is focusing in on what you're doing, it's brought all the material together and focused it on the course. Of course, everybody runs their courses differently but this is what we're doing at our college. And then your time is really spent helping them really understand what the material is all about, what to do with it, those kinds of things.

Allan is concerned about the amount of preparation time for online courses, but remains enthusiastic because he sees both his and the students' time put to better use. He especially likes the combination of the full online course with face-to-face meetings,

which serve more as a tutorial where prepared students can learn more effectively. Allan related his impression of student learning in his classes:

> They really seemed to -- once they got into it -- they really seemed to enjoy it more. And they seem to be understanding it better. We're getting past just, you know, doling it out. They were actually looking at it and discussing it, and so they really seemed to understand it better and synthesize it better than the usual lecture method.
>
> They would make connections and they would understand the importance of doing things. It was a pharmacology course so they really understood the significance of having to do the math and doing it right. You can't guess at this and yes, it is important, because if you do your math wrong you're going to kill somebody. They would bring the discussion topics into [face-to-face] class and talk there as well. [I don't know] whether they wanted more the emotional aspect that you don't get on-line.

Allan emphasized that the requirement for students to access the course content online is a key factor in the improvement he perceives in students' learning. They cannot just wait to listen to the lecture, expecting to learn the content passively:

> The only place they're getting the content, is if they go on-line.... So it's the same kind of reaction we get from students who do the prep before they come to class. They'll be the ones that will have some sketchy notes and they'll have done the readings, and if they don't understand they'll ask you in class. I had much more of that going on in this class, as opposed to "I'm here, you bore us and I'll take it in."

In spite of his appreciation of the improved interaction, Allan feels that not all learning styles are accommodated by online learning. In fact, his concept of good teaching is to be very adaptive as a teacher:

> I guess it's very simple: whatever helps the student get the information and synthesize it and understand it and be able to really use it the way it needs to be -- is supposed to be used. You know, whether that means lecture method -- and that's how some people learn, whether it's independent study -- and some people do that. I mean there is no one answer for what is teaching because everybody learns differently. With some people it doesn't register until they get right in there with their hands.... So it's just whatever helps the student learn and obtain and synthesize material.

A strong point of his online course, in Allan's view, is the variety of ways of learning made possible by the online content, online discussion and face-to-face classes. He feels that giving lectures using overhead transparencies is problematic because

students copy rather than interact with the ideas, and so it is much better to place notes on the Web ahead of time which can then be expanded during face-to-face classes. He noted that he had taped lectures himself at university for science courses such as chemistry.

Allan feels that the teaching role must change from information provider to facilitator because of the amount of information:

> It's going to change how we do it, certainly in higher education. I think it's going to be much more independent. So we're going to have to be -- we keep talking about being facilitators and all this other stuff but I don't think anybody really does it, we're just here and we do lectures like we always did lectures.... But that is definitely going to have to change. We're going to be just facilitators because there's just too much out there. And what we're going to have to start teaching them is how to find materials, not what the material is but how to go and find it.

Allan has found that online learning makes it easier to be a facilitator:

> I think before perhaps I felt too overwhelmed and didn't know how I was going to handle this, kind of thing. ... But now with the technology it's much easier, guiding the students, showing them how to get information.

When asked whether he felt that using online technology itself was bringing about change in other teachers, he replied:

> I think the technology helps you because you see -- as I said, I find I'm using my time better, I'm better able to help the students with what they really need, as opposed to just throwing the material at them, really helping them understand it. So I think when people go through that experience you can't help but sort of change your ideas on what you're going to do and how you're going to do it.
>
> Yes, I can see some of them getting there bit by bit anyway. And slowly changing. And I think the technology, as it progresses and becomes more user friendly certainly ... there's a lot of stuff you can do with Web CT, so that just a few lessons gets you interested, you know, whets your appetite, and you can go off on your own and go through this mammoth book and figure out what else you want to do with it.

Allan has found that he spends more time interacting with students online because he can work from home. He often gets "hooked in" and spends much more time answering student messages than he intended. He feels he knows his online students better than his strictly face-to-face students and offered three reasons for this: There is more student/ teacher interaction, he sees their name on the messages, and many of them express feelings and ideas that they wouldn't express in a classroom. He has found a

similar effect in his classes where students submit journals via e-mail. He finds this closer relationship rewarding because he feels the learning is enhanced:

> You get to know the students better and they're more willing to share with you and it probably helps them. I'm not sure if it shows up in grades but it certainly helps them, I think, grow as a professional.

In response to a final question about mentoring, Allan was very enthusiastic about the help he had received from Liz in teaching the course. He felt her help was essential to the success of the course and emphasized the importance of having the support of a person who has been through the same experience. When asked if she had influenced his beliefs, he replied, "Yes, she has given me a lot of things to think about and things to act on."

Individual Analysis Allan

Has this community college teacher's perception of his role in the teaching/learning process changed as a result of using computer conferencing in his courses, and if so, how?

Allan feels that online technology has enabled him to become a facilitator rather than an information provider. Although he has been aware of learner-centred concepts for many years, he did not know how to implement them in his nursing science courses. Through his first semester of teaching online, along with previous experience with electronic student journalling and providing Web page support, he has found that CMC technology makes it much easier to take on the role of preparing students for the life-long learning that is now necessary for nurses.

In learning to use this medium, to what extent has this teacher been involved in processes of personal vision building, inquiry, mastery, and collaboration?

Personal vision building: Becoming involved with online learning and seeing the changes in his own practice has helped him feel he is accomplishing larger goals that are necessary for educators. He sees a need for change in the direction of nursing education

and professional education overall and is very pleased to be involved in the change via technology.

Inquiry: Allan has been accumulating knowledge of technology over several years by adding online aspects to his courses. When he needed to learn very quickly how to conduct the online pharmacology course via Web CT without having used it previously, he found the experience somewhat overwhelming. However, he feels it has been very worthwhile.

Mastery: At the time of the interview Allan was still processing his first experience as an online teacher. He was building on his awareness of learning theory and on his experience of online journalling.

Collaboration: Collaboration with his mentor has been very important and very rewarding for Allan. Liz was very keen to ensure his success with the online course that she had designed. As well as helping him learn technical skills, she has influenced him in terms of thinking about the learning process.

Has this teacher moved to a more learner-centred philosophy as a result of using computer conferencing?

Allan's learner-centred ideas, such as developing student self-directedness or accommodating varied learning styles, did not develop as a result of using conferencing. However, seeing how well it can work has increased his enthusiasm and confidence in the learner-centred approach.

What role have training, support, exposure to learning theory, or other factors such as stage of career, played in any changes that may have occurred?

Allan's exposure to learning theory through his Master's degree in education laid the foundation for his change in methods. He had found it difficult to change his methods until technology made it more natural to begin moving out of the content provider role.

Douglas's Story (College C)

Douglas has been a professor of entomology at a college for eighteen years. He also teaches at a nearby university. Douglas first started using the Internet as a research tool for entomology. In an article posted at his Web site, Douglas states:

> Throughout the early 1990's we explored gopher sites and completed Veronica searches on a wide variety of entomological subjects. This text only connection, with such sites as the Universities of Colorado and Minnesota gave us instant access to current and often obscure documents, on such topics as insect biological diversity or pest identification.

Douglas offers three different courses on the Net that can be taken individually whenever a student chooses. Douglas has considered using conferencing in his courses, especially for a biological illustration course, where he feels students would benefit from knowing what other students were doing. He would use conferencing if he taught courses where controversial issues required the sharing of multiple perspectives. However, he has chosen not to use conferencing at all because so much work is involved in organizing and maintaining conferences relative to the potential benefit in his subject area. In a case where two students were working on the same course and were inexperienced with the technology, he paired them so that they could support each other.

At first, Douglas chose to put his course materials online to organize his own lecture notes. His courses, as they appear now on the Web, contain many photographs of insects, plus audio and video files. Besides wanting to organize his material, he was feeling "a bit stale" with the course after about 15 years and was excited by the challenge of learning HTML and manipulating the visual effects. Then he realized that many students could benefit by taking courses strictly via the Web, for instance students who needed only one course to graduate or needed the information for their work. At the moment the courses are not actively promoted, but students at a distance find the course through searching.

As a naturalist, Douglas is very interested in the environment and likes the saving of paper that online courses allow. He refers to his courses as "paperless."

Douglas described the early progression of his use of the Net:

> Back then, it was basically a little bit of information about my [face-to-face] entomology course, like a paragraph, a summary if you like, and then a series of links to universities and data sites that had information on insects. I think I had the US Library of Congress link. I don't remember but there were a few links to some pretty impressive sites that back then you could have access to data. The main reason I did it was we couldn't afford a number of the journals like the Annals of the American Entomological Society and so on.
>
> So now the students had access to that. We'd use it as a research site -- not very well, but it was kind of cool and I'd be able to say to them, "Oh, you can use the Internet, and they'd look at me with questioning look, not knowing what I was talking about. Because back then very few people had heard about it and [even those few] had never actually sat down and used it. So I made them use a few electronic sources in their essays. If they were submitting an essay I wanted to see some effort -- that they had used this new medium.
>
> And that's how I started out. That was about all I used. And then eventually it grew into more E-mail contact with other people who were teaching, a few of my wired students. And then I started putting the course notes and everything on. So by early in '95, I would have had the first complete course on.

Douglas interacts with his students through e-mail and by an 800 number. He finds that students usually use e-mail and he often feels a more personal connection with these students than with face-to-face students. To illustrate his point, he related the story of a recent student in Bulgaria who was being affected by the NATO bombing. He heard about this person's life and also saw photographs of the area because the student submitted his insect collection digitally. Douglas also described a person who is taking his course to update his knowledge for his tree maintenance business in another part of Ontario. He enjoys the way this student discusses problems specific to that area and how he is essentially tailor-making the course for himself.

When asked about concerns, Douglas said he does not share the "standard concern" about cheating on tests. He has always encouraged collaboration:

> My exams aren't multiple choice, they're like take home essays. And, in fact, I encourage students to collaborate with other students in the course, to collaborate

> with other entomologists, to use the Web to research. I even have a search engine on the exam. So I'm more interested that they find the information out and if they have to find it out from other entomologists, rather than looking it up in a book, so be it. But I'm looking for specific things in the answers and so I'm not too paranoid about that.

Douglas feels that his preference for a "learning by inquiry" style of teaching stems from his years as a student. He went to a university where this style was prevalent and found it suited him. Later he enjoyed the latitude given in his graduate work. Douglas has never taken any training as an educator. Rather, his ideas of teaching have been derived from his own experiences as student and teacher. He found he enjoyed sharing information with groups of people when he was a naturalist. Over the years, he has "absorbed some theory" such as learning styles from his wife, who is a teacher.

Along with teaching, Douglas holds a position that allows him time to help other faculty put materials online. He feels that, being faculty himself, he can help teachers understand how to use the technology appropriately for the students' learning. He updates his technical knowledge of the technology by attending workshops and searching on the Web. Interestingly, Douglas does not have a computer at home or even much in the way of television: " We just lead a totally schizoid, different life at home."

Douglas gets pleasure from helping other faculty create online resources:

> It means a lot. I like to see other people get the fire and the excitement that first attracted me to it. And that's what keeps my excitement up. Because I'll eventually get to the point where writing code will be not that interesting any more for me. But if I can -- it's like -- you know, if you've been to the Max Gallery of Ontario a hundred times yourself you might not go that 101st time. But if you know you're bringing a child with you who's never seen European Max before you can have the experience through their eyes and their excitement. So that's what I get out of helping other people out who are a little bit new at it. You can see them go "Oh, cool. Didn't know you could do that." Even though it's kind of old hat, it's -- you know, just even simple little tricks, it's fun to see their excitement.

Douglas believes that good teaching involves continuous learning for the teacher, and values the fact that he learns from his students. They ask questions that he has never thought of himself, and this challenges and pushes him. He also feels good teaching means developing material that is useful to as many people as possible. The material

should be as flexible as possible, so that people can use just what they need. It should be portrayed in a multi-media fashion so that if they have problems with one way of learning, they can still get something out of it.

When asked directly if his view of teaching and learning had changed, Douglas said that he feels he has changed very little:

> I think I'm still doing the same thing, I'm still interacting with students in the same way. It's just now it's different way of communicating with them. So rather than face to face sitting on a desk at the front of a classroom I'm doing it over a phone line or a fibre optic line.

However, Douglas feels that having online resources has affected his teaching in face-to face settings. He has found that online, he does not get low level questions such as "Is this going to be on the exam?" And if they ask basic content questions that they should know the answer to, he can direct them to the materials on the Web. He has found this experience online has helped him step out of the role of information provider in the classroom:

> I direct them back to where the information is and let them discover it for themselves rather than just simply continually spoon feed very basic information that they probably should know on their own. So maybe that's changed a little bit in my interaction with students, in that the information's there, they just have to know how to unlock it and get to it. And that's one of the things they learn in the course, is that -- how to search and query and find out that information, not always count on going to that knowledgeable professor and he'll answer every question they have.

Douglas finds that the availability of information on the Net brings out higher level questions from students:

> And they'd ask something like, for instance, well, I was reading about your philosophy on biological control. Rather than saying what are five methods of biological control, that kind of a question, they'd say, "I was reading your opinion on biological control and quite frankly I don't think you defended yourself well when you were saying that viruses are better to use against insects than bacteria. I read on another site that said blah, blah, blah and why don't we talk about this in a little more detail?" And it's great to get a challenging question like that.

And then you can get something going. I didn't seem to get much of that in the old style when I'd arrive in a Socratic fashion and disseminate my pearls of wisdom, and

they'd frantically write them down. By the end of the class there was really no time to have any intelligent questions. They were usually "when's the test and will this be on the test" type of question.

Students in the online courses have appreciated, often after their course is over, that Douglas forced them to be more independent, use electronic resources and submit all assignments electronically. Many have written him e-mails saying they 'liked learning the subject but more of them say they liked learning the subject in that fashion."

Individual Analysis Douglas

Has this community college teacher's perception of his role in the teaching/learning process changed as a result of using computer conferencing in his courses, and if so, how?

Douglas has made a considered decision not to use conferencing in his online courses but values its role for sharing multiple perspectives in more controversial subject areas. He uses online resources extensively in a way he feels is appropriate to his subject. By being able to direct students, both online and face-to-face, to this information, he is enabled to move away from the information provider role and encourage higher level thinking.

In learning to use this medium, to what extent has this teacher been involved in processes of personal vision building, inquiry, mastery, and collaboration?

Personal vision building: Douglas's vision of his work is very much tied to his passion for his subject and his interest in related issues such as conservation. He has pursued his vision of extending knowledge about his subject by offering courses via the Web and gains great satisfaction from knowing he is reaching more people via this medium. He also believes that the Web is helping him be a more effective teacher.

Inquiry: Douglas enjoys experimenting with Internet technology. He used the Net for research and teaching before the Web's arrival and has continued to explore how to use the Web for better learning.

Mastery: Douglas has created very attractive, user-friendly online courses with multi-media appropriate to the subject matter. High quality photographs of insects are an integral part of his site. The college has recognized his expertise by giving him a position where his job is to help other faculty put materials online.

Collaboration: Douglas's main involvement with collaboration has been assisting other teachers. This mentoring role is important to him. He enjoys the excitement that people experience when they are learning how to use Web technology for the first time.

What concerns has this teacher had about implementing this medium and how have those concerns been resolved?

Douglas's main concern about computer conferencing is the time it takes to administer when he already has extensive e-mail interaction with students who are taking his online courses at an individual pace. This CBAM Level two "self" concern has not been resolved and is the main reason he does not use conferencing.

Has this teacher moved to a more learner-centred philosophy as a result of using computer conferencing?

Douglas's philosophy of teaching has not changed but he finds he can use more learner-centred methods with the use of the online medium. Although he does not use the term "learner-centred", he has always believed that it is better for students to have a high degree of control in their learning. From his own experience as a student, he believes in learning by inquiry. For example, he has always required students to create their own insect collections, thus actively learning through experience about the physical

characteristics, the habitat, and so on. He has also always believed in collaborative learning, usually assigning take-home final exams.

He has found that providing online multi-media information and directing students to that information enables them to be more prepared and to ask higher level questions, leading to better discussion and critical thinking. He has seen this effect in both his individual online students and his face-to-face students. In his face-to-face classes that are supported by online resources, he finds he can spend less time lecturing and more time facilitating discussion.

What role have training, support, exposure to learning theory, or other factors such as stage of career, played in any changes that may have occurred?

Douglas's exposure to learning theory is not extensive. The knowledge he has acquired informally has influenced him mainly in terms of providing for different learning styles. He has found a new excitement in the later stages of his career in developing his Web courses.

Max's Story (College C)

Max has been teaching in his college for twenty-eight years and is within three years of retirement. He has always worked in the Law and Security program and his main subject area is sociology, with the occasional courses in penology, criminology, psychology and law. He has BA in sociology and an MA in corrections. Max first created online resources for students in 1994 when the college began to advocate that teachers use the online medium. He found it an easy transition, turning text files that he had prepared for students into HTML. When the college purchased Web Board in 1998, he began to use computer conferencing as an adjunct to face-to-face courses.

When asked why he chose to use computer conferencing, Max explained that he had been a member of online discussion groups about online learning via an online learning resource site and was curious to see whether he could create online the same

kind of atmosphere that he could create in the classroom. He also wondered if having a conference could allow the discussion of issues to spill over into the students' free time:

> It was an enrichment sort of notion -- or if students were studying on the weekend or an evening and they had questions, they could put them out there, and if anyone was signed on, they could get answers and that kind of thing.

Max is experimenting gradually with various strategies to see what works:

> I'm not sure yet if I'm ready to do a whole course that way. And I think we're not ready to do that. But [I'll] certainly nudge it slowly and surely in that direction as each semester passes.

He has felt some frustration with lack of student participation. The students in his course are in first semester and many are not comfortable with computers in the first six weeks of class. Student readiness to use the online medium is one of his main ongoing concerns:

> I don't think I can [attach marks to the discussion] because in part the technology isn't that reliable, in part they're just -- terrified is too strong a word -- they just are uneasy. Even E-mails, you know, I make up distribution lists in E-mail and the most some of them do is kind of reply and I get the automatic receipt sort of thing. And some of them will ask questions about the course, but as far as involving them in any kind of conversation, they see it as a strange way to do things. And that, in part, I think reflects their behaviour in the classroom, you know, they're still not ready to engage things in the classroom.

He has considered trying to help first semester students by working closely with their computer teachers, but he has not been able to work this out yet.

At the beginning of a recent semester, Douglas took an informal poll and found that only about 25% of his students were comfortable with e-mail and chat rooms by the time they started at the college. Nevertheless, some first semester students dive right in:

> The students who come here with those skills, they're right in up to their -- they're in there kicking and laughing and splashing. And we have fun. But the others are kind of sitting there wondering what's going on.

Max is looking forward to an opportunity to use conferencing with a third semester class when students are more attuned to college and to computer use.

Max has also been concerned about how to best fulfil his role as discussion facilitator. He recognises that strategies are required. His main role model so far has been the moderator of the professional development discussions in which he has participated.

He admired her manner of handling the discussion, for example, summarising weekly or starting new threads from a point made in the discussion.

Max has found the discussions about online learning very helpful. He also feels he has been "learning by doing." He has joined listservs and conferences, observing how people go about things. He remembers sending his first e-mail, timidly offering advice in a gardening discussion: "And I'm not sure what the feeling was, that My God, I finally did it!"

Another great help in his learning has been the assistance of a more experienced colleague who was doing her M. Ed. in Computer Applications. She happened to have an office very near Max's, and "it was easy to just kind of holler." She has been an important mentor for Max. Now her office has been moved, and he is concerned that he has lost the advantages of that proximity. Max has also learned by seeking assistance from the computer services department on technical problems.

When asked what he thought good teaching is, Max referred to three influences on his thinking:

> About a year ago I learned about Parker Palmer and some of his writing about teaching. And his way of his talking -- wonderful expressions! I think he said, to paraphrase somewhat, is "Technique is what you use until the teacher shows up."
>
> [Parker talks about] the importance of being comfortable in your subject and being comfortable in your place, of being centred, you know, that kind of language. And that technology, whether it's a piece of chalk or software, becomes an extension that allows you to communicate with the students and allows them to broaden their experience and return it to the classroom, whether it's a virtual one or not. So there's that part.
>
> The other part is that I'm involved with the Native Education Council here. I've been looking at some of their traditions in teaching and the idea that teaching and learning is really part of the same process. That a teacher is less a source and more conduit, that as a teacher learns that information then becomes available for the learner to learn.
>
> And another thing that influenced me, I was reading Northrop Frye a couple of years ago. He mentioned the role of a critic; he doesn't like modern criticism because it attacks. He sees the role of a critic as joining -- he was talking about poetry -- to help the poet explore the human condition. Now, that's pretty grand language but it struck me that's what teachers should be doing, is joining with the student in this investigation.

Max feels these influences have caused him to be more flexible and considerate of students' needs. For instance, he is designing questions to be more open-ended and he has become more lenient with due dates. He feels a flexible approach is suited to sociology, where it is more important that students gain insight than know all of the information. Web technology fits into the picture as a support for students, and conferencing specifically as a support for dialogue. Max wishes that more students would join in the online dialogue because "sociology is like a language... a way of thinking ... the more you do it the better you get." However, he has come to realize that in first semester he can only "plant the seeds" for a way of thinking that must mature over the years.

An important effect that Web technology has had on Max is his reaction to having two ways of getting the material across. He feels that the lecture notes he has placed on the Web allow the students access to the material as he meant it to be, freeing him to be more spontaneous in the classroom. This notion ties in with his idea of good teaching as it has evolved over the years:

> Well, I think when I started, it was being prepared and meeting the schedule -- and Monday we start the next topic. I think now, particularly with budget cuts and so on, our classroom hours have shrunk and I say, "God, what do I cut here and how do I get through it all?" I'm less uptight about that.
>
> And so I think good teaching requires that you be flexible, little more relaxed, more comfortable in it. Allowing students within some wide barriers or wide constraints to find their own way through. Also, I think it is to promote an atmosphere of trust and safety in the classroom where people are comfortable in saying things and they know that someone isn't going to leap down their throat or go spreading rumours and so on. And to awaken in students a curiosity about things. I don't like what I hear often from colleagues, the idea that we're just here to teach them technical skills. You know, I think there's more to being a person than that. Sociology allows that, of course.

Max feels that the Native education philosophy of addressing the whole person is an essential part of good teaching, including the spiritual side, expressed through concern for people and the environment. Beyond that understanding, he is still perplexed by the ups and downs of face-to-face classes, where one day, he feels the material has been "lifted off the page' and other days "it just lies there." Acknowledging the role of the students in the way a class turns out, he recognises that their mood or the time of day

affects the learning process. He appreciates the mature students who can add their life experience, saying "Yes, I've seen that," thus adding to the atmosphere in the class.

Max is not sure what effect his mainly informal exposure to learning theory has had on his teaching in relation to conferencing. He feels unsure about constructivism and isn't sure he needs to know about learning theory. At his college, there has been very little formal training in learning theory, other than a few workshops, and there has been no policy setting in this regard.

He thinks his tendency to be more flexible stems partially from being in the later stages of his career:

> Maybe age does mellow or become a little -- I don't think it's less demanding, but more forgiving maybe, that you have to allow people to kind of learn at their own pace. As I mentioned earlier, my idea of deadlines and so on has become far fuzzier.

In a follow-up e-mail message, Max reflected on his present view of education:

> I sense that the traditional (Native) ways of teaching/learning retain something that western schooling has discarded as useless, not economically viable, even embarrassing: the lifelong "education" of the whole person in her or his physical, emotional, psychological and spiritual aspects. I suspect that some of the grief that we see in schools - acting out, lack of motivation, the shootings and threats - is due to our reluctance to address the spiritual aspect.

Although Max has been eligible to retire for some time, he plans to stay until he has reached compulsory retirement age. He enjoys teaching. In addition, he finds experimenting with online learning helps has been an important part in keeping things interesting:

> It's been fun here. Historically our college has been well managed and a good place to work and learn stuff .... and there's enough wiggle room in my workload that I can continue to do this Web stuff and learn things... Even though there are frustrations at making it work there is something fascinating about creating a Web page.
>
> But there's so much potential here, I think. And it's so much fun -- getting into it and pushing it and see where it'll work. Sure, I'd keep going until I go out in a gurney.

Individual Analysis Max

Has this community college teacher's perception of his role in the teaching/learning process changed as a result of using computer conferencing in his courses, and if so, how?

Computer conferencing is contributing to Max's ongoing exploration of the learning process. Now in his late career, Max is actively investigating the teacher's role both online and in the classroom. He has studied online facilitation by being a part in online discussions and is experimenting with new strategies in his own teaching. Max is also attempting to integrate the beliefs he has developed through reading and being involved with the Native Education Council.

In learning to use this medium, to what extent has this teacher been involved in processes of personal vision building, inquiry, mastery, and collaboration?

Personal vision building: Max has been very much involved in reshaping his vision of teaching. Spirituality is playing a large role in his understanding of his work. He feels that good teaching is more about the integrity of the individual teacher than about technique. His exploration into the phenomenon of online discussion is part of an overall quest to fully understand his life's work, to which he is very dedicated.

Inquiry: In order to implement both computer conferencing and Web research in his classes, Max has investigated widely. He has joined online discussions (some specifically about online learning), experimented with the technology, and sought help from colleagues. His search for information is a source of excitement.

Mastery: Having introduced conferencing to his classes, Max is continuing to learn by doing. Max finds his increasing understanding of Web technology and online teaching strategies to be a source of satisfaction.

Collaboration: Max has been involved with collaboration in two main ways: working with colleagues to learn about Internet technology and its uses, and participating in online discussion with peers outside of the college. One person in particular at his college has acted as a mentor, and he has found this relationship very valuable. At the same time, he has been a member of the Native Education Council, a collaboration that has profoundly affected his thinking about teaching and learning.

What concerns has this teacher had about implementing this medium and how have those concerns been resolved?

Max's main concern is student readiness to use the online medium, a CBAM Level 4 student impact concern. This concern has not been resolved. He has also been concerned about how to fulfil his role as discussion facilitator, a Level 2 management concern. He has taken the initiative in resolving this concern by joining and observing online discussions, including discussions with experts on online learning.

Has this teacher moved to a more learner-centred philosophy as a result of using computer conferencing?

Max has been moving toward a more learner-centred philosophy of teaching as part of an overall quest to understand the essence of good teaching. His use of computer conferencing has been a part of his learning, offering him a way of giving students alternative ways of learning and expressing themselves. Being able to provide his lecture notes on the Web has had a direct effect on his face-to-face teaching style because he feels free to be more spontaneous in class, knowing an organized version of what he meant to say is available to the students.

What role have training, support, exposure to learning theory, or other factors such as stage of career, played in any changes that may have occurred?

Max's evolving beliefs about the role of the teacher have been influenced considerably by Native Education philosophy, and also by constructivist theory through such writers as Parker Palmer. He has come to believe that good teaching grows out of the integrity of the individual and a willingness to join students in the discovery process. Max also feels his age is also a factor in changing his approach toward a gentler, more flexible style of teaching that is more focussed on the students' needs and their personal growth than on covering the curriculum.

Janice's Story (College C)

Janice has been teaching at her college for about 22 years. She came from university to teach English upgrading and later moved to teaching various post-secondary Communications courses. She has now added two online courses, one about searching issues on the Web and one about communicating electronically.

Janice co-developed these courses with another Communications teacher at the college. They arranged for the college to purchase an online research course, which they had both taken previously themselves. Janice and her colleague then adapted it for their setting. They wrote the other course themselves after looking for about two years for a suitable course or even a textbook on the subject. At the time of this interview, Janice was three weeks into her first semester of online teaching. Janice has not otherwise facilitated an online course other than conferencing with some students whose face-to-face schedules were problematic.

At the time of the interview, Janice was sitting in a lab where students could see her. In response to an interaction with a student who seemed to need help, Janice commented on the isolation that computer use can bring and on the different ways people with various learning styles react to online learning. She had taken two online courses during her MA studies and had found she learned more this way than in most face-to-face classes. However, two friends to whom she recommended online learning hated it because they missed the face-to-face interaction.

Still in an experimental mode, Janice was excited about the online discussion that had taken place so far. In the research course, she had required assignments to be posted but had not required any responses to these, and no discussion had taken place. However,

in the other course, where she had required responses, a "lovely discussion" had ensued. She wondered, in the second instance, whether discussion might have taken place without specific instructions. In both courses, she had begun replying to some postings herself to model this activity and was very interested to see what students would do over the semester.

Commenting on the importance of conversation in learning, Janice recalled her own experience as a student in this regard. She remembered how easy it was to feel left out if other students did not respond to her, and she has already observed this phenomenon in her class.

She also recalled a facilitation technique that her colleague had learned from being in the same online course at a different time. The instructor had summarized a few individual messages weekly, catching everyone over the semester, and Janice's colleague had always looked to see if her name was there. During the interview, Janice made a note to herself to remember to try this strategy.

In the new electronic communications course, Janice and her colleague had decided to give weekly assignments. To explain the reason for this, Janice related a prior experience:

> This last term in Communications ... the lectures would start out with 150 people and go down to 10 as the semester went by. It was just appalling, a total waste of our time. So we decided to put the lectures into an E-mail. It was a diverse pile of information, including our lecture content, interesting Web sites, interviews with experts on whatever the topic is and some assignment questions. Students then E-mailed the assignments back. So it was not pure computer conferencing because they were not dialoguing with one another. But we found the response rate was amazing.
>
> One day the E-mail did not come out on the Monday. We had a glitch. I sent an E-mail saying, "You'll get it on the Tuesday." The students were freaking because the E-mail didn't come out on the Monday. They had got themselves quite regulated -- and when we fell down in the routine, it really threw them! So that was one of the reasons we made it weekly -- comes out on a Monday, assignment due on the Sunday.

Janice elaborated on her delight at the positive outcome of this experiment:

> The quality of their work was amazing. I was just so stunned. Each assignment that they did for us was worth three marks. I had to give some four out of three because they went so far past what I could envision as an answer to questions.
>
> And maybe those are the writers. I don't [know]. I was surprised at how responsible they were, how self regulating they were, how much time many of them put into their assignments, how seriously they took it.

When asked what her experience of using computer conferencing meant to her personally, Janice talked about the feeling of renewal she has gained from using the new medium:

> This has been a really tough time at the college and I don't think we're any different than any place else. There has been a lot of burn-out in some really difficult circumstances. So it was really exciting to go into a different way of teaching. I've had a tremendous amount of energy to do the development and to actually see this course revealed. We are really proud of the one course we wrote and we're glad that we can facilitate this other course because we feel students really need it.

Janice is also running a seven-week staff version at the same time and is quite excited about this class as well. However, she is concerned about the time it has taken her to prepare the courses. She has been shocked at the many hours it has taken, even though she had been warned beforehand.

One of the advantages that Janice has found in the short time she has been teaching online is the ability to respond unemotionally, for example, to a student who has made an unreasonable request for make-up privileges. She finds that writing the answer allows her to find the right words, whereas in person, she finds it very stressful to hide her impatience with the student's lack of responsibility.

> I think I am better at putting the right tone there without the anger or frustration. So at least that's how it feels right now. It'll be interesting to see if that's the way it is at the end of the term. You know, I'm anticipating there'll still be "Oh, dear, I'm only at this [mark]. What can I do?" But I still think it is easier to write that message back than to say it and make sure that your voice and tone and body language are consistent with not being frustrated by the question.

While elaborating further on this point, Janice came to the realisation that the online environment also gives her the time she needs to weigh out the situation, rather

than feel she must make a judgment immediately. Referring to an article on the advantages of asynchronous conferencing for introverts, she saw that, in this context, she herself needs time to think before responding.

Related to this idea is Janice's appreciation of the one-to-one communication that happens in the online environment, something she liked about the upgrading environment, which uses a modularised, individualised approach. Although she likes the individualising potential of e-mail communication with a student, she does not want to return to the silent rooms of the upgrading environment. Online, she has already been delighted by the exchanges among the students.

Janice has noticed great differences among students in their way of answering questions she poses. Some will simply answer the question without elaboration, thus revealing little about themselves, whereas others will reveal a great deal about themselves. These differences have made her think carefully about her evaluation criteria:

> Some students are just over the top... personality plus, and they're using -- this is something we talk about in Communicating Electronically -- all of the tools available to us to convey personality and preferences and facial expressions and all of those things. And it's just so imbedded in what they write. Which is interesting from a marking perspective because I have to have clear in my mind how I'm evaluating -- am I evaluating as if this were a written assignment or as a verbal assignment?

Janice has been amazed at the quality of students' work online:

> Now, maybe they write better when they're writing for a real reason as opposed to "imagine the coffee pot in the staff lounge is broken and you must put in a request for another one. " And I had never been comfortable with those kinds of scenarios that are false because I don't write well under those circumstances. And maybe because this is real, they're telling me what they looked for, they're telling me how they interpret certain types of E-mail. Maybe because of that, the writing's been good and the marks so far, it's a 90 average. Because they've done the work and they've done it well.... I don't know how I would take marks off. So we'll see if it continues.

Janice feels that being in the online environment has caused her to be even more helpful to her students than she is in the classroom. Janice is happy playing with technology and learning by trial and error, but she recognises that many students can be "immobilised" by frustration:

> I think because I understand how difficult it is for many people, I want to be available, I want to be accessible to compensate, I think, for what might otherwise be, again, this isolating environment. I don't want it to be isolating. And I think then, in the tone of my messages ... I just want to try to be so approachable even with stupid, ridiculous questions. Especially with stupid, ridiculous questions.

Janice's approach has been very much influenced by her own experience as a student in two online courses, one being the Web searching course she is now teaching and the other being unrelated to her job. In the first course, the discussion was facilitated very well by two teachers but there was a "primitive, text-only" Web site. The second was very poorly facilitated but had a very beautiful and comprehensive Web site. Janice and her partner have attempted to create an excellent Web site, and Janice is using the good facilitators as role models. She has learned how important the teacher's behaviour is to a successful discussion.

Janice thinks good teaching is "as immediate and relevant to what students want to learn as it can be." She believes good teaching happens when a teacher has done plenty of preparation but, in the classroom, the students take over. A good class is one where the students do not notice the time passing. She had been frustrated by the move the college had made toward large group lectures for Business Communications. These lectures have had very poor attendance, and so the seminar hours have ended up being small lectures. In the online environment, she feels she is able to achieve the kind of teaching she wants:

> A week ago, the students had a conversation, and I value that I had only a slightly greater role than the students do. And it's marginally greater. To step back and let them have a conversation and I am sitting quietly is a very good lesson for me because I think I am a controlling type of person and I'm not sure that I'm the best person to be in a classroom then. Not these days, not with adults, not with what I think I value.
>
> So I'm hoping that this type of learning will help me get it right because it's what I believe in, but it's going to be a bit of a stretch for me... because I have to let the learning happen and I can't direct it.

Janice feels that her learning about letting go control is part of a larger life change. She is also learning the same lesson with her teen-aged children. The online

environment gives her a chance to practice what she believes is needed by both her students and her children:

> It's perfect for what I idealize as learning. You do the work ahead of time, you send it out there and you have to trust that they're going to get it. You're still there to help, to facilitate, but you just have to let them do it on their own.

Individual Analysis Janice

Has this community college teacher's perception of her role in the teaching/learning process changed as a result of using computer conferencing in her courses, and if so, how?

Still in the early stages of facilitating online courses, Janice's view of her role as teacher is evolving. She has actively explored better ways of teaching through taking online courses herself and has continued to learn through collaborating on the development of online courses for students at her college. Her evolving understanding of her role as teacher is part of a larger life change in which she is attempting to give control to others when it is appropriate. The experience of computer conferencing, both as a student and a teacher, has increased her faith in students' ability to learn in a less controlled environment. At the same time, she has also become more aware of the individual differences among learners and the need to help some of them deal with deep frustration.

In learning to use this medium, to what extent has this teacher been involved in processes of personal vision building, inquiry, mastery, and collaboration?

Personal vision building: Janice is committed to personal vision building. She has thought a great deal about the connection between her work and her personal growth, and she has been integrating her learning in all aspects of her life. Learning to use conferencing has contributed to her evolving understanding of her work and has added to

her enjoyment of teaching. Although the course preparation has been very time-consuming, she has found it very exciting and a source of energy to go into a different way of teaching.

Inquiry: Janice has sought out the information and skills she needs for online teaching by taking several online courses and by experimenting with the technology. She has studied both the nature of conferencing and effective facilitation strategies by observing them from a student's point of view. She is continuously seeking strategies appropriate to the medium and to her understanding of the learning process.

Mastery: Janice has mastered many technical skills in order to use the online medium effectively. Having facilitated fully online courses for only three weeks, she is working at mastering the facilitation skills as she proceeds.

Collaboration: Janice has worked closely with a colleague on the development of her new courses and is also sharing the teaching of this course. Prior to this collaboration, she chose to learn in online groups about the online environment.

What concerns has this teacher had about implementing this medium and how have those concerns been resolved?

Janice has been concerned about students' frustration with the technology, a CBAM Level 4 concern (student impact). She is dealing with this concern by making herself very accessible both online and in person. An ongoing concern is the physical toll of spending so many hours at a computer. At the time of the interview she was experiencing neck and shoulder pain and serious eyestrain for which she felt she would require medical help. This concern is at CBAM Level 2 (self).

Has this teacher moved to a more learner-centred philosophy as a result of using computer conferencing?

Computer conferencing has played a role in Janice's shift toward a more learner-centred concept. She has always thought the best learning takes place when students are very active in the process and interact through discussion. However, seeing the performance of students in an online environment has increased her faith that students learn better when they are more in control of their own learning. In the online environment, she has been surprised and delighted by their ability to produce high quality work independently. She has also been delighted by student interaction that has taken place. She is hoping that the new environment will help her achieve her intention of letting learning happen with less direction from the teacher. She feels that preparing a course carefully and then "letting the learning happen" is an ideal teaching approach that is facilitated by online courses.

What role have training, support, exposure to learning theory, or other factors such as stage of career, played in any changes that may have occurred?

Janice attempts to integrate the learning she acquires in many avenues of her life. Thus her formal education and her personal growth are both factors in her growth as a teacher. In particular, her stage of life as a mother of teen-agers is affecting her understanding of students' needs.

Summary

By summarizing and interpreting each interview according to the research questions, I was able to reach an in-depth understanding of each participant's experience. This approach also allowed me perform member checks to verify my accuracy and my understanding. The individual stories of the ten participants show the depth of their thoughts and feelings about teaching and CMC. These teachers talked enthusiastically about their beliefs, goals, rewards and disappointments. Of course, their experience varied in terms of the amount and the nature of change. In the next chapter I give the details of changes along with my discussion of all themes that emerged. Then, my conclusions in Chapter Six are based on both the individual and comparative analyses.

Chapter Five
Comparative Analysis

This chapter contains the findings from the comparative analysis of all interviews. The analysis was conducted using the qualitative analysis software, Atlas-ti. First, an overview of all participants' uses of conferencing and background is presented. Then the teachers' initial reasons for using conferencing are given, followed by their concerns. The main content of the chapter consists of the themes that emerged from the data and discussion of these themes in relation to other research. The themes are grouped as follows: perceptions of change, individual factors affecting change, enabling effects of CMC, personal rewards of online teaching, and teacher development beyond the individual. The themes within the last category are collaboration and mentoring, followed by reward, purpose and influence in the mentoring role, and then by the role of administrative support. The chapter ends with a brief summary.

Uses of Conferencing

Of the ten participants, seven teachers were using conferencing as the main or sole medium for communication among students in online courses. All seven facilitated some form of structured discussion among students. Two others, George and Max, were in the early stages of experimenting with conferencing as an adjunct (optional for students) to regular face-to-face courses. They had recently added conferencing to allow discussion beyond class time in courses they had been teaching for many years. Among the whole group, it was common for participants to use conferencing in more than one course. Darryl had gone even further, electing to teach all of his courses online. Jay used conferencing for one distance course and also as an adjunct for an on-campus course. (Refer to Table 3 on p. 35 for a list of uses by all teachers.)

One person did not use conferencing at all. Douglas had taught distance online courses in entomology for several years. He had decided not to use conferencing but interacted regularly with students via e-mail and telephone. I chose Douglas as a participant because he was an experienced online teacher and I wanted to understand his reasons for not using conferencing. He was straightforward about his main reasons. His

courses were offered on a continuous intake basis, so there were no "groups" doing the same thing at the same time. He felt it was too difficult for the teacher to arrange and facilitate conferencing under such circumstances. He also believed that student interaction was not necessary for his basic science subjects. Nevertheless, he indicated that he would use conferencing in courses where multiple points of view would be crucial to learning.

Most courses featured a course Web site, and several were being delivered via comprehensive online course management systems such as WebCT. The participants had planned all features of online delivery, with the exception of Allan, who had taken over a course designed by Liz.

Most of the courses were designed for full-time or part-time local students (referred to as "on-campus" in Table 3 on p. 35). Only Jay, Douglas and Ann had designed courses expressly for distance students. Both Douglas and Ann had students in several countries.

Most of the participants had constructed course Web sites. Since my focus was on conferencing, I often did not pursue details of the Web sites. However, Casey, Ann, George, Liz, Douglas, and Janice all talked about their experience in designing their sites, and they placed considerable emphasis on this aspect of online teaching. Jay was an instructor of Web site design and had assisted Ann in building her sites.

Participants' Background

The educational background of the participants varied widely. Their subject specialties included science, social science, English, theatre arts, accounting and nursing. All had at least Bachelor degrees, two additionally held a Bachelor of Education or the equivalent, and three had Master's degrees in Education and one a Ph.D. in Education. Career stages ranged from mid to late career, with ten years being the least number of years teaching at a college. Some had previously worked in a professional field while others had been employed mainly as educators. Some had taken formal courses or workshops about online learning, and some had engaged in formal online courses as students. The details for all participants are presented in Table 4 on the following page..

Table 4

Background of Participants

Participant	Bachelor's Degree	Graduate Degrees	Career Stage	Took Courses re Online teaching	Took Online courses	Other
Jay	Science and B. Ed.		Mid			Computer teacher Used CAI
Casey	Theatre Arts Teachers College		Mid-late			Theatre, Visual Arts Author of Book and CDROM
Peter	English Theatre Arts	M.A. M.Ed. Ph.D.	Mid-late			Former high school teacher Theatre Teaches B.Ed. courses
Ann	Accounting		Mid-late			Self Employment Adult Ed courses
George	Accounting		Mid-late	Yes		Accounting software textbook author
Liz	Nursing Psychology	Education	Mid	Yes	Yes	Clinical experience Continuing Education teacher
Allan	Nursing	Education	Mid	Yes		Clinical experience Online journalling
Douglas	Science	M.Sc. Ph.D	Mid-late			Visual Arts Forestry
Max	Social Science		Late	Yes	Yes	Native Education Law/penology
Janice	English	Education	Mid	Yes	Yes	Individualized adult instruction

Initial Reasons for Using Conferencing

For most of the participants, "going online" was a voluntary choice. Jay, Casey, Liz, Douglas, Max, Janice and Peter had taken the initiative to create online courses, with varying degrees of encouragement from others in their college. The remaining three teachers had made the decision after being asked by their respective colleges: George had always used computers in his teaching and answered a general invitation for faculty to use his college's new online course management system; Allan was asked to take over an online course because he already used the Internet in his courses; Ann was asked by her department to put her first course online and then volunteered to put her second course online.

The decision to use conferencing as a medium for communication came from a shared conviction that students need student-teacher and student-student interaction to learn. Casey stated this reason succinctly:

> I've developed two courses on line. And I used conferencing in both of those because I feel the students need to feel attached to each other and to me. And that personal contact that they would have in the classroom isn't there any more.

Where conferencing was used as a classroom adjunct, the teachers were attempting to extend the dialogue achieved in the face-to-face environment.

Concerns

The most common concern, expressed by six of the teachers, was an initial worry about students' ability to adapt to and learn in the online environment. With experience, the teachers tended to feel less concerned about this issue. Jay described his resolution in this matter:

> I was concerned that the students would not perhaps feel comfortable with it and accept it as part of their learning. That has been resolved to varying degrees of success. Some students, because of the different abilities, learning styles of the students, some students take to it and really enjoy it. Some students resist it completely. And some students come -- over time they will accept it.

Another concern about the impact of online learning on students was ease of access to computers. Liz resolved her concern about access for on-campus students by insisting

that her college make appropriate lab space available for the new course she had designed.

Ann was concerned about the effectiveness of her course design, especially the usability of her Web site:

> My biggest concern was would I be effective, would I be able to do this efficiently, effectively, would they actually learn from reading on the screen. Because I know what trying to learn from a textbook is. I find that textbooks are written for instructors, never for students.

Ann resolved her concerns by seeking Jay's expert assistance in building her site and by using conferencing to extend the learning mode beyond interaction with the course materials only.

Max was concerned about his ability to facilitate the discussion in an optimal way. He dealt with this concern by taking online courses himself and observing facilitation styles. Janice also used this method to build her skills.

These early concerns about students' ability to adapt to the environment and about effectiveness all fit into the CBAM category "student impact" (Hall & Hord, 1987; Hord et al., 1987). Since concerns in this category are not predicted in the early stages of adoption, these teachers did not fit the model in this particular aspect. This same difference was also found in the pilot studies for this research. It is possible this difference is explained the voluntary use of the new medium by these teachers, whereas elementary and high school teachers often have innovations imposed upon them.

An early concern that could be categorized as a Level 3 management concern was the issue of cheating. Casey had been concerned at the beginning that students would not do their assignments themselves but, with experience, had not found it to be a big problem. George was worried about cheating on tests and had concluded that tests, at least in his subject of accounting, must be held in proctored settings. Otherwise, he was happy to have students work together as long as they were not simply copying other students' work. Peter ensured that students could not "buy essays" by asking unique questions. He suggested that the possibility of cheating on tests should not be a big issue for teachers because they should not be asking students to "regurgitate" memorized information anyway. Douglas indicated that he never been concerned about cheating

because he welcomed collaboration and he constructed his tests to require thought rather than memorization. Casey mentioned that other teachers used the potential for cheating as an objection to online learning but suspected their fear was really at a deeper level, that is, anxiety about a change in role

The main self-concern expressed by participants was the amount of work and time required to prepare online materials and facilitate discussion. Seven of the teachers commented on how much work they had to put in, but most indicated that it had been worth the effort up to that point. Nonetheless, the amount of work was a continuing concern. Jay expressed it this way:

> It has meant a time of learning, much more demands on my time, et cetera. Up to this stage I've said that's fine because I've said it's something I want to do. I'm starting to feel at this stage, though, that it's becoming overwhelming in some respects. And I need to do some thinking about where I want to go from here and how I want to do that.

A related self-concern was the toll of sitting at the computer for long hours. One common problem was the large amount of personal time spent answering messages at home, and another was the physical damage. For instance, Janice mentioned that she needed medical treatment for her back and was very worried about her eyes.

To summarize self concerns, these teachers expressed problems that came out of the experience, rather than the early anticipatory self concerns predicted by the CBAM model. The fact that these concerns remained largely unresolved calls for attention to these concerns by change agents.

An ongoing concern shared by several of the participants was resistance to change by other faculty. Some were keenly aware that they were part of a minority in their college who wanted to implement online learning and some suggested they were unusual in pursuing more learner-centred methods. This concern is linked to the later collaboration level predicted by the model. When teachers wanted to work with others in the college to implement what they themselves had learned, they were frustrated that many people were not willing to try something new.

In relation to administrative support, which overlaps both self and collaboration concerns, one person mentioned the lack of understanding by administrators of the nature of support required by online teachers, and another mentioned the inability of college

infrastructure to adjust to online courses. However, most comments about administrative support indicated that it had been growing and meeting faculty needs more fully than in earlier years.

Perceptions of Change

Participants made many references to changes in their role as teacher. To analyze their reports of individual changes, I have grouped them according to the three levels of teacher development specified by Fullan and Steigelbauer (1991): materials, methods , and beliefs. Changes in these three categories varied from person to person.

Materials. Although changes at the material level were not the main focus of this study, participants talked a great deal about their work in creating Web sites and some invited me to look at their sites. The creation of new materials for online learning was a very strong focus for several of the participants. For the current discussion, I have defined materials as the textual and graphical resources that were provided for students via the Web. Since participants produced or used some materials in collaboration with each other, the findings for this level are organized by college.

In College A, all but one person strongly focussed on designing new materials for the Web. Jay's main job as a mentor/instructor was to assist other teachers in creating appropriate course Web sites. College administrators had recognized Jay for this expertise by giving him time to do this work. His colleague, Ann, attested to the value of his assistance. He had helped her to ensure her wording was absolutely clear and that the amount of text per page was appropriate. Ann was very pleased with the courseware she had created with Jay's help, and she had written about this aspect of online teaching in her article for other accountants.

Casey had developed considerable expertise in creating online materials, first for CDROM's and then for Web sites. She had authored a textbook and CD on how to create multi-media courseware. She was especially interested in ensuring that online course materials maximized the visual learning and student-content interactivity that is possible with CMC technology. Peter was the only participant from College A who did not

indicate a strong focus on course Web sites. He concentrated on devising online discussion strategies that would fall into the "method" category.

In College B, participants were all using Web CT. Liz and George had created course Web sites: Liz's site was a complete online course site, while George's site functioned as a support for his face-to face courses. Allan had not created a site but was using the courseware that Liz had designed and was pleased with students' use of it.

Liz did not discuss her Web materials in detail, focussing more during the interview on the human interaction in her course. George, however, showed me his site as soon as I arrived for the interview. He had posted course handouts there and was quite eager to make optimal use of other Web CT features, for example, the gradebook, which allows students to calculate their marks as the term progresses.

In College C, Douglas' main focus in online learning was the construction of highly visual course Web sites. This focus suited his subject areas of basic entomology, in which students must identify insects, and art, in which students must draw nature. He expressed a strong interest in ensuring that his course Web sites were designed for online student use. He mentioned that one of his reasons for putting courses online in the first place had been to organize and update his materials collected over many years of teaching.

Heather had devoted considerable effort to creating good course Web sites. She commented that she had learned from her experience as an online student that two essential elements of a good online course are a well-designed site and good facilitation by the teacher. Max had placed lecture notes online to support his face-to-face classes but was more interested in online student-student interaction.

To summarize, changes at the material level, then, appeared to be substantial for some participants. Jay, Casey, Ann, Douglas, and Janice had designed complete online courses, taking care to ensure that materials worked for students Web sites. Jay, Casey and Douglas were recognized for their expertise in this area. George and Liz had made use of Web CT and were assisting others in doing this. The others had experienced change on a smaller scale: Allan was using Liz's new materials; Peter made very little mention of materials other than the series of questions he had developed to evoke discussion; Max had just begun to place materials online.

Methods. Changes at the method level were also substantial. By itself, the change from synchronous, oral, face-to-face communication to asynchronous, written, online communication constitutes a new kind of interaction (Harasim, 1989). All but one teacher experienced change at this level simply by choosing to use conferencing for group interaction.

In the context of moving into the online environment, all teachers reported using at least some new teaching strategies. These changes entailed devising or adopting specific strategies to encourage various learning activities including online discussion, completion of assignments, finding and sharing outside sources of information, and collaboration. The common thread of change at the method level was the adoption and invention of new strategies that would increase active learning and student control. Peter was in the process of devising assessment strategies to encourage critical thinking and writing in the conference. Ann had planned a series of units for her distance course that required regular student collaboration in pairs. Janice and Max said were adopting successful discussion strategies that they had seen instructors using when they took online courses. Both Jay and Casey described strategies to increase the sense of community in the conference. Allan let go of lecturing and spent more time engaging students in critical thinking. George was attempting to increase active learning by placing materials online and encouraging online communication outside of class hours.

Some of the participants reported that very specific characteristics of conferencing had influenced their approach. For example, Jay found that the volume of messages in a conference actively discouraged him from retaining the role of sole information provider. The workload of attempting to answer all messages was so great that he needed to find ways of reducing the work. He accomplished this by encouraging students to help each other and to use Web resources.

Several participants mentioned the effect of the ease of sharing information via the class conference. They found that, since both students and teachers can easily hyperlink external Web resources into the conference, the traditional teacher's role of sole provider could not easily be sustained.

To summarize, the teachers were making changes at the method level to suit online learning. These changes were not mandated, but rather adopted or devised by the teachers.

Beliefs. The main question of this study is whether teachers' perception of their role had changed, which means change at the belief level. According to Fullan and Steigelbauer (1991) changes in methods are not necessarily accompanied by changes in beliefs. The question of whether the experience of online teaching brought about changes in beliefs cannot be answered by a simple yes or no. Some indicated that they had moved toward a more learner-centred philosophy over time through a variety of experiences including online teaching. Those who did not report changes in their beliefs said they were already proponents of active learning. In some cases, teachers referred specifically to constructivism or adult learning theory to describe their philosophy, while others described learning goals and concepts that were compatible with a learner-centred approach. All of the participants said they had chosen to implement online learning at least in part to give students more independence and access. The following descriptions of each individual show the range of perceptions.

Jay described online teaching as a "new way of teaching" where the teacher is no longer "at the front" but playing a support role. His said that his philosophy had changed over time through a series of revelations. First, through teaching basic computer skills, he had seen more clearly the value of experiential learning; then, through using CAI, he began to let go his role as content deliverer; finally, through conferencing, he realized the importance his role in supporting learning at a distance, especially by building community. Jay described how his role had changed dramatically over ten years:

> With online learning and using the technology, the role changes completely. You're looking at more of a helper role, facilitator role, than you are with the sage on the stage kind of role in your lecture series traditional mode.

> When I first started teaching I had a traditional view, this is how teaching and learning is done. That has changed dramatically over the ten years that I've been at the college. And I believe at this stage this is the right way to go.

Jay's studies in adult education had a strong influence on this thinking, and his belief in adult learning principles were confirmed by the way students adapted to the online environment.

Casey also described her beliefs as changing over time through various influences. She saw herself as trying to understand herself and her optimal way of teaching, and she found that the experience of creating first CDROM courseware and then Web courses helped her increase her understanding. She commented, "Online I consciously think about how I can present materials in different ways."

Casey said that she had reached more clarity about her role through the use of conferencing along with designing course Web sites:

> I think [teaching and learning] is probably a joint effort. Again, if you go to on-line teaching, it becomes much clearer because then the content is standing on its own.... You've done that bit. Now you can only work on the other part, the encouraging them, the helping them, the giving them the right feedback, those kinds of things.

She emphasized her evolving perception of her role by commenting on others' reactions to online teaching:

> Very often people will say to me, "Well, you're not really teaching." Well, they don't quite say it but that's what they mean. "You're not doing the real thing any more." And I know that's what they feel. Sometimes it's that, and other times it would be, "I would never do the amount of work you do." I say, "But it's different. You know, it's different. It has its rewards, too." You have to try it.

Casey's comment that "you have to try it" indicates her belief that the experience itself brings about a change in thinking about teaching. With extensive experience in mentoring, she commented on the changing perceptions of other teachers. She had noticed while coaching other faculty that the moment of recognition can be dramatic:

> I was working with a teacher the other day and showing her how we would develop the Web site, et cetera, and she said, "My God, this means that I have to re-think my whole role as a teacher."

Janice, who had only just begun teaching her first online course, explained how her role was changing already:

> A week ago the students had the conversation [in the conference]. And I value that I had only a slightly greater role than the students did. And it's marginally

> greater. To step back and let them have a conversation, and I am sitting quietly, is very good lesson for me because I think I am a controlling type of person and I'm not sure that I'm the best person to be in a classroom then.

Janice was quite pleased about the change to a less controlling role because it fit with her personal growth pattern at the time. Being very new at facilitating, she was excited about the possibilities of the medium to help her grow as a teacher. In words remarkably similar to Casey's, she commented:

> It's perfect for what I idealize as learning. You do the work ahead of time, you send it out there and you have to trust that they're going to get it. You're still there to help, to facilitate, but you just have to let them do it on their own.

Heather described herself as being in the process of letting go control, both with her students and her teen-aged daughters. She made little reference to her Masters degree in Education but made references to various aspects of constructivist learning theory. Her comments indicated that seeing the strong performance of students online, with very little input from the teacher, was reassuring her that releasing control to students is the right thing to do.

Allan, who was also fairly new to the use of conferencing, said that being out of the "lecture" position was helping him to rethink his role:

> I think the technology helps you because you see -- I find I'm using my time better, I'm better able to help the students with what they really need, as opposed to just, you know, throwing the material at them, I'm really helping them understand it. So I think when people go through that experience you can't help but sort of change your ideas on what you're going to do and how you're going to do it.

Allan talked enthusiastically about his changing role in the learning process. He indicated that he had moved toward a learner-centred philosophy while doing his Masters in Education but had not been able to fully implement these ideas until he found himself away from the front of the classroom. Allan expressed his excitement at finding students learned so well in the online environment:

> They really seemed to enjoy it {pharmacology] more and they seem to be understanding it better. We're getting past, just, you know, doling it out. They were actually looking at it and discussing it, and they really seemed to understand it better than just the usual lecture method.

Allan seemed delighted to find that constructivist methods work so well, confirming his philosophy.

The remaining participants in this study did not indicate that their beliefs had been influenced by their use of conferencing. Nevertheless, the general trend among the participants was toward a more learner-centred practice and their participation in online teaching was tied closely with this trend. This was especially true of Max, who had just begun to use conferencing as an adjunct to his regular classes. He was very focused on his changing beliefs. For Max, conferencing was a tool that fit well with his changing perception of his role in the learning process, but he attributed the changes to his personal growth, influenced mostly by exposure to learning theory:

> [Parker Palmer talks about] the importance of being comfortable in your subject and being comfortable in your place, of being centred.... And [he says] that technology, whether it's a piece of chalk or software, becomes an extension that allows you to communicate with the students and allows them to broaden their experience and return it to the classroom, whether it's a virtual one or not.
>
> The other part is that I'm involved with the Native Education Council here. I've been looking at some of their traditions in teaching and the idea that teaching and learning is really part of the same process. That a teacher is less a source and more conduit, that as a teacher learns, that information then becomes available for the learner to learn.

Peter, who had conducted all of his on-campus courses via CMC for several semesters, greatly valued the characteristics of the medium that allow learner-centered teaching strategies. Peter had been attracted to conferencing because he suspected it could enable students to participate more actively in discussion and make more choices. He had not been disappointed in his expectations. Peter also commented on other teachers' response to being introduced to conferencing and its unique potential:

> In the courses that I've taught, this groupware one, they're a fairly self selected group, although some -- every semester let's say a third of them are very linear, lockstep people who are initially pretty uncomfortable when they start to see the implications. They were expecting it to be another tool to add to an existing bag of tricks. They didn't expect the bag to be revised. Now, they usually roll with it.

Peter said that he challenged teachers in his courses to think of their role in a new light. He indicated that he had always been a learner-centred teacher and was delighted, with the help of the technology, to influence other teachers to give students more choice and responsibility for learning.

Liz expressed delight with the medium's facilitation of learner-centred methods that mirrored her classroom methods, for instance, discussion that helps students relate the course content to their personal realm of experience. Liz said that she had always been a constructivist, even before gaining a Masters degree in Education, and that she had gained the language to describe her approach via learning theory. For Liz, the online environment enabled methods that encouraged active learning but did not change her way of thinking.

Ann, whose course attracted students from various parts of the world, valued the student interaction not otherwise possible in distance delivery. Otherwise, she preferred face-to-face teaching. Ann said that she had not changed much in her thinking since she had been teaching online. Rather, she indicated that her view of her role had been confirmed and refined by her adult education certificate program.

Douglas, although he did not use conferencing, was very pleased with the ability of online courses to allow greater access and flexibility. Douglas did not think he had changed in his thinking, but did feel enabled to encourage more student independence. His knowledge of learning theory was minimal, according to his own report, and acquired mainly through his wife, who is also a teacher. He stated that he had gravitated naturally toward giving students more control because he had preferred this way of learning as a student himself. He was very concerned with creating online courseware that would work well for students.

Finally, George, who seemed to be the most traditional teacher in this study, did not suggest that he had changed in his thinking about teaching at all. His description of his teaching style indicated that over the years he had maintained a fairly traditional classroom approach. The value of CMC for George was in allowing students to access information independently and to use the medium as a professional accountant would. He saw CMC as a tool similar to other computer applications he had used over the years but one that added an important new dimension of communication. George used

conferencing and a course Web site to extend the positive learning environment that he considered important to both learning and the growth of student independence.

In summary, teachers reported substantial changes at the material and method levels through planning online course sites and using new strategies suitable for online learning. Where teachers said their thinking had been influenced, they indicated that the changes were founded mainly in learning theory and were confirmed by the online teaching experience.

The main tendency of the teachers' experience at all three levels was a movement away from the role of content provider toward the role of learning facilitator. There was a strong theme of greater congruence between their methods and their beliefs as computer mediated communication assisted them in moving toward a more supportive, less directive role which they already saw as desirable.

The effect of confirmation of beliefs by experience is consistent with Fullan's position that teachers behave their way into new ideas (1993a). In other words, methods and beliefs can affect each other. Pahares' comprehensive review of research on beliefs (1992) indicates that beliefs are very resistant to change. However, Guskey (1986) found that when teachers can be induced to use a new procedure, tremendous attitude change is often reported, and these changes only take place when teachers notice an improvement in their students. Most teachers in the present study were impressed with their students' performance in this new environment where students had to take more responsibility for their own learning.

Individual Factors in Change

In the changes at all three levels, several factors were at work. The main individual factors were personal characteristics, exposure to learning theory, and stage of career.

Personal characteristics. All of the participants reported that they enjoyed using technology and saw themselves as pioneers in improving their students' learning with online communication and resources. Some spoke at length about their experimentation with computer technology. These tendencies are typical of innovators and early adopters, who generally have favorable attitudes toward change (Rogers, 1995). The participants

exhibited a desire to learn and grow in their profession, in spite of the fact that all were in mid to late career stages:

Jay:

> I enjoyed the challenge of trying to make it work and trying to get the students to use it and finding different ways to do that.

Casey:

> I did put together a CD-ROM and I did write the book and did get published. It was a tremendous learning experience. And around about the time that I was coming out of the end of that I became more and more interested in the Web.

George:

> I write textbooks. I consider myself a leading edge person: I'm always wanting to know what's happening right now.

Douglas:

> I think good teaching is when you yourself learn a lot more in the process, that the teacher learns.

Liz:

> Our online course management system I learned by myself, basically through the tutorial and trial and error and playing around. Now, that's my learning style, you know, I tend to jump in the deep end with things once I get excited about something.

Janice:

> And it was easy to learn because I was motivated to learn it and I like to play.

Max:

> There is something fascinating about creating a Web page. So it's ... fascinating in a way that keeps me going, that I can create a resource that others can look at and use .... And it's so much fun getting into it and pushing it and see where it'll work.

Peter's focus was less on experimentation with technology but rather on trying out unique strategies for facilitating discussion. However, he enjoyed the technical skills that he learned along the way:

> I learned some incredible things from my colleagues. Of the people who are taking these courses, many of them have [given me] not only feedback on ideas. A lot of them have far more technological expertise than I do.

Although Ann and Allan did not describe themselves as loving to play with technology, they were eager to learn how to use the technology to be current in their teaching:

Ann:

> I did it for the experience. I didn't do it for the money, believe me. It was not very much. But I did it because I wanted to have the experience. It was a new technology; I wanted to get going on it.

Allan:

> We're going to be just facilitators because there's just too much out there. And what we're going to have to start teaching them is how to find materials, not what the material is but how to go and find it.

One of the strongest themes throughout the interviews was a desire to step out of the role of content deliverer into the role of co-learner. Some participants described good teaching as continuous learning and collaborating with students in the learning process:

Douglas:

> You're learning as you're going and you're absorbing -- I learn just as much from my students as they learn from me, I'm sure. They're always noticing things that I don't notice or asking questions in areas that I've never thought of myself and it constantly pushes and challenges me. And I think that's what good teaching is.

Max:

> Northrop Frye sees the role of a critic as joining with -- he was talking about poetry -- to help the poet explore the human condition. Now, that's pretty grand language but it struck me that's what teachers should be doing, is joining with the student in this investigation.

Peter:

> I give my permission to students to do that entirely. I mean if you learn more from each other than you learn from me, I don't feel bad. And I think a lot of our colleagues do feel bad. They still want to -- you know, they still want to do their show.

Several participants commented that they had appreciated and did best with alternative modes of teaching when they were students. Jay mentioned that he had always

liked experiential learning as a student and that he enjoyed the alternative delivery during his Bachelor of Education. Liz explained that she had never been comfortable with straight lectures and had liked the having lectures on tape for some of her distance courses because she could stop the tape recorder, follow up a thought of her own, and then return to the tape later. Douglas had appreciated the unusually flexible atmosphere at his university during his undergraduate years and found the increased freedom of graduate school very suitable for him. Ann had appreciated teachers who stepped out of the "authority role" to help students relax with difficult subject matter. Both Casey and Peter had a strong background in theatre production and suggested the interdependency they had experienced there had influenced their beliefs about learning.

Exposure to learning theory. Familiarity with constructivist and/or adult learning principles was a crucial factor in change. This exposure may have occurred either formally through advanced degrees in education or informally through reading, personal contact, and workshops.

Three teachers mentioned the term constructivism. Both Casey and Liz appeared quite knowledgeable about the theory, and both considered themselves to be constructivists. Max had heard the term but was not sure of its meaning. Although he had moved to a more learner-centred view, his learning theory has not come via formal education in constructivism.

Jay, Casey, Liz, Peter, Allan, and Ann talked about the importance of learning theory as a basis for their teaching methods and for implementing online learning in general:

Jay:

> During my ten years at the college I did my B.Ed degree in adult education at the same time so while the technology was being adopted I was learning about the teaching/learning side of it as well. So that's been really good for me in terms of integrating both streams there, technology and how to use the technology most effectively.

Casey:

> I've always self taught avidly. I mean I continue to read in this area, I continue to try to keep up to date in what's happening, the latest theories. And a lot of that is because, as you've probably heard, I'm trying to find out what I really think and what my style is, both teaching and learning.

Liz:

> I'm locked into certain grading structures because of the program. And we do have an external regulatory body that says we must. So I actually wrote a paper on this for my ed. psych., "How to be constructivist in an objectivist environment."

Peter:

> Since 1993 I've been involved (teaching) with a university, the B.Ed. in adult education program. And that, although it was wearing a bit thin in my head, was another piece of the puzzle -- to be forced to concentrate on this whole field.

Allan:

> Guiding the students, showing them how to get the information sounds great in theory, but trying to apply it is rather difficult and now with the advent of computers and the ease of this whole thing it's much more conducive -- to where I would have liked to have gone but I couldn't get there because I wasn't sure how to get there. Now, with the technology it's allowing me to explore that area and go there.

Ann:

> I had trained my employees over 20 years when I worked in business. And I've just mushroomed from there and taken courses and what not, got my teacher's certificate. Actually, it's really interesting that when I took the [adult teaching and training] teaching course, it just solidified in me all those things that I was doing right, and it showed me areas where I could improve myself or things that I wasn't quite doing correctly. Personally I believe that an instructor, particularly with a Web site, I mean -- or just building a traditional classroom environment -- you have to sit down, you have to plan things out.... But I think what's very important is that a teacher can become stale. You must continue to educate yourself. And I'm not saying go and get more degrees, I'm saying more on understanding teaching methods and understanding how people think.

These findings are inconsistent with Thorpe's findings (1997) that community college faculty did not have enough time or awareness of learning theory for effective application in their use of technology. In this study, most participants had exposure to

either constructivist or adult learning theory and were consciously applying these principles in their teaching via CMC.

Training for online teaching. Several of the participants talked about the influence of courses they had taken about online teaching. Some had taken full courses and most had taken short workshops. In addition, a few had themselves been students in online courses.

Liz had focussed on online learning throughout her Masters courses and had taken courses online. She had used this opportunity to observe the different ways her classmates approached learning:

> Some people would read an article, write a comment on it, post it and say, "There, I'm done." And there were a few of us who really got into this would post and somebody would respond and we would have a discussion. Other people read three articles, wrote three synopses and posted [as required]. And it was interesting. We actually got into some interesting discussions about -- I mean it was a computer course –so we were looking at the dynamics of what was happening and saying we don't have a moderator. And that maybe somebody would like to be a moderator. Well then, you know, we would go off on that. But it was interesting how different people viewed their role as a student.

Max had also learned about conferencing by participating and observing others, which he did in online conferences about online learning:

> But it's simply doing a lot of it and looking at new technology and trying it and getting into these big international [online] conferences and taking note of what people do.

Janice had taken two online courses, a personal interest course and an electronic research course. She had found one instructor to be a very poor facilitator and the other very good, and she had learned from the differences in approach. Max and Janice both said that they learned a great deal about good facilitation by observing other facilitators' behaviour. Both commented on the skill and effort needed to draw all students into the discussion, and they attempted to emulate the good facilitators.

The training mentioned by participants was usually self initiated or at least voluntary. This tendency is consistent with Fullan's position that real change is not a top-down process but rather begins with personal vision building and inquiry (1993a, 1993b).

In some cases the training was offered within the college, showing the interplay of administrative support and faculty learning described by Fullan and Stiegelbauer (1991).

Stage of career. For some of the teachers, age and stage of career played a role in changing beliefs and a sense of renewal. Casey, a teacher of 25 years, found taking on a leadership role in implementing both CDROM and Internet courses to be a way of reaching a deeper understanding of teaching and learning:

> I don't think I would probably have gone as far down this road if I hadn't done that directorship of the centre. That certainly gave me an opportunity to explore things that were important to me. Knowledge of teaching and learning styles is absolutely essential but it's got to be tempered, not just theory. It's got to be tempered in the classroom. People have got to understand it. It's one thing to intellectually understand something, it's another to truly understand it. And I think the best way to do that is often to start with yourself and find out how you learn best and understand that there are certain things that are very difficult for you and then extrapolate that and say well, obviously, there are things that are difficult for other people. So how can I in my teaching provide different methods for people to learn?

Nearing retirement, Max suggested his changing philosophy was partially due to age:

> Maybe age does mellow... I don't think it's less demanding or forgiving but [you] recognize maybe that you have to allow people to kind of learn at their own pace. I mentioned earlier -- my idea of deadlines and so on has become far fuzzier. Certainly in the early days it was one minute late you get zero and all that real tough stuff. And I can't imagine, in retrospect, why I did that.

For Jay, a mid-career teacher with a strong computer background, online learning strongly affected the direction of his career, which had become a rewarding blend of teaching and mentoring. He said he felt fortunate and thought older teachers might not be as flexible as he could be and yet knew people who had adapted well:

> When the changes of technology have been implemented, I've been more on the beginning side of the career and so have been able to adapt, I think, more easily perhaps. Whereas somebody who might have been a longer serving or have more entrenched in other means might not have been able to, I feel. The change that has to be made in that sense is much of a drastic change, I think, for somebody who has had, say, twenty years of traditional classroom, then jumped into technology. I don't know. I mean some people I know that have done that very well. They have had twenty, twenty-five years of traditional service and said "Oh, let's do technology!" and adapted really, really well.

As a sense of renewal through online teaching was a strong theme among the participants in this study, Jay's doubts about older teachers were not born out by these individuals. Rather, Casey, George, Douglas, Max, Janice, and Peter, all long-time teachers, expressed a sense of enjoyment and increased effectiveness through online teaching.

According to Huberman (1992), positive renewal in mid career is most likely to happen with teachers who have "tinkered" with new methods in their own classroom and reached a better sense of self efficacy through this process. Although the extent to which this tendency to experiment is subject to external influences is not known, Huberman's conclusion is that teacher development efforts should be "grafted on to the ways teachers naturally go about tinkering in their classrooms" (p. 137). The experience of the participants in this study support Huberman's recommendation.

Enabling effects of CMC

Every participant indicated that his/her teaching had been improved in some aspect by the overall online teaching experience, which included both conferencing and the tasks involved with preparing course Web sites. The themes that emerged are grouped below under terms that reflect a learner-centred approach.

Allowing flexibility and accommodating differences. One of the key characteristics of a learner-centred college is the provision of options to meet varied student needs (O'Banion, 1996). Participants in this study valued the flexibility of online learning to meet varied practical needs and learning styles of students, and to increase their freedom of choice. For instance, Liz chose to put her course online partly to accommodate mature, part-time students with full-time jobs. Douglas wanted his very specialized courses to be available to students who were not on campus. To accommodate learning styles, Casey had created an alternative learning environment for highly visual learners. Allan saw online courses giving variety to people who need variety. Ann attempted to accommodate different learning styles in her online course by using learning partners and group discussion (student-student interaction in addition to student-content interaction).

For Peter, one of the main values of conferencing was the flexibility in the breadth of choice students have in conference discussion, among both topic threads and

individual messages. He also valued the inherent time flexibility of the asynchronous environment and wanted to exploit its potential:

> I don't want to fail people because they're there late, because this isn't a classroom and time has changed its meaning in this context. So to use the old mindset of the classroom, I mean some of the time frames that we use in teaching -- not all of them by any means -- but some of the time frames we use in teaching were the product of a classroom based delivery system.
>
> And some of them were valid learning constructs. So now that we're changing the "which" we use, we need to tease apart, well, "which" the hell is the reason for the time frame here? Is it administrative convenience for us?

While participants saw online learning as enabling them to provide flexibility for students, they were aware of and concerned about students who do not like online learning. For instance, Allan made it very clear that he did not think online courses were suitable for all students, and Jay was very open to learning more about the advantages and disadvantages of the medium. There was a generally shared feeling that students should always have a choice about whether to take a course online.

Community. A sense of community plays an important role in empowering students (Sleightholm Cairns, 1993; Davie, 1988; Davie and Wells, 1991). The role of conferencing in creating a sense of community among learners was a strong theme in the interviews. This finding is similar to Sleightholm Cairns' in her study of university professors, who also regarded community as an important aspect of online learning (1993). For example, Jay commented on the importance of community to support students in becoming independent learners:

> We want to make sure that we have a sense of community with the participants, that they're not isolated, that we haven't got a classroom, we need to try to create that experience.
>
> With on-line learning you're looking at a facilitation role for the educator and trying to get the students to think differently, to be experiential, to be active learners. So the tool that really helps that out, so the students don't feel isolated, is computer conferencing.

To help establish community in her courses, Casey used strategies such as sending birthday greetings. She noted how the students participate in building community:

> They like to share their work. I find they network a lot, too. They will ask each other for help, they will ask how you did such a thing, you know. If they see somebody has integrated a graphic or done something neat with text, then they'll ask how that was done. And so they'll use the conference and each other's private E- mail. Very often it's a spin off from the conference room that they become correspondents by E-mail.

Janice described an incident that emphasized the importance of community for students:

> It was very interesting in the last [discussion] where students responded to one another. There were a couple of students who responded to lots of them. And one poor student sent an E-mail to the person who was very busy responding saying, "Why was I the only one you didn't respond to?" And that's a factor that I remember very clearly when I would participate in news groups or courses, that you can't help but feel left out. And so eventually someone did respond to hers and she said, "Oh, you're the only one who did. I'm so happy." And just that human emotion that went with it.

Deeper relationship with students. The sense of community was complemented by a sense of deepening of the relationship between students and teacher. A similar benefit was described by Sleightholm Cairns (1993): "It enabled the teachers to become more aware of their learners through interaction" (p 146). The concern that using computers would negatively affect a teacher's relationship with students, reported by Fulkerth (1991) and in my pilot studies (1998), is addressed by this finding. The participants' experience indicates that teachers need not fear loss of relationship in the online environment.

Jay, Casey, Janice, Allan, and Douglas commented on the closer relationship with students they were able to establish through the conference or through e-mail, leading to a better understanding of their needs.

Jay:

> You get much more of a personal relationship with students, my sense is anyway. In the traditional classroom... some people don't come for extra help, some people you only see in class... With conferencing it's almost one-on-one, in some

> respects. You get those personal E-mails. You learn more about the student, all that stuff, and so you get a more of a personal connection to each of the individual students.
>
> And it is terrific in terms of getting them interacting with each other. With the conferencing you'll see it because you can read it and you're part of the group. Whereas if it's in a traditional classroom you don't, you know, they talk in the halls, they will talk outside of class, you don't get to see that.

Janice

> And, you know, with my background being in upgrading, to me this going back to where I started and that is that I am one-on-one, which is just such a gift!
>
> And seeing so much of the writing, too, which we always did in upgrading.

Allan:

> Because they're answering one question at a time, it's not this faceless hand that goes up and they ask you a question and you're sort of trying to address the answer back to everybody. In the conference, the first thing that comes up is their name.... So you probably get to know your students better as well.... They're more willing to share with you and it probably helps them. I'm not sure if it shows up in grades but it certainly helps them, I think, grow as a professional.

Douglas:

> It can be quite personal. I mentioned that I had a student from Bulgaria. Well, he lives in the suburb of Sophia that was hit by that stray NATO bomb that was -- I think it was two weeks ago, they were bombing the western end of Yugoslavia and a plane -- a jet had moved away because it was being tracked by radar, released a bomb and regrettably it went into Sophia. And so we talked back and forth about that a little bit, about politics, and I found out a little bit more about him and it was quite personal and interesting.

While closeness has its benefits, the physical distance of conferencing can also enable a teacher to be more learner-centred at times. Janice found that having time to think before responding to student requests allowed her to get over her immediate response of impatience and find the right words. The value of reflection time for the teacher was also mentioned by participants in Sleightholm Cairns' study (1993).

Empowering students. The teachers in this study described practices in their use of conferencing and Web resources that can be categorized as empowerment methods (e.g, Berge, 1997b; Sleightholm Cairns, 1993; Davie & Wells, 1991, Harasim, 1989). Their empowerment goals included building students' self-confidence, independence, critical thinking skills, and life-long learning habits. They gave examples of how using online technology helped them achieve these goals. Casey described the confidence building effect of online courses on mature students:

> You'll have somebody who has come back to college -- I can think of several who were very nervous about taking an on-line course. And they'll say that right up front, you know, I'm older than most people in the class and I'm not computer literate and I'm scared that I won't do well. And very often they do better than anybody else. And that kind of empowers them. You know, at the end they'll say, "I can't believe I did this."

Liz observed the growth of students' confidence in starting threads:

> I would start some questions, start some threads, and students would respond to them. In the second half of the semester they would start posting questions themselves, and people would respond to them. Kind of neat to see.

Teachers' observations that students were building confidence through technical mastery is consistent with the empowerment of students described by Davie and Wells (1991). Along with building confidence, Allan said he believed that encouraging lifelong learning habits was very important, especially in his subject area of healthcare:

> And what we're going to have to start teaching them is how to find materials, not what the material is but how to go and find it. Because there just is too much stuff out there to possibly think in a three-year program you're going to know everything you're ever going to have to know.

George attempted to encourage active, ongoing learning by creating a space for students to ask questions whenever they came up, no matter how late at night that might be. He also attempted to set an example of life-long learning by using new technology himself:

> I think as long as you can help students learn by being ahead and kind of letting them know that you don't mind, you're studying, too. Learning doesn't stop just because you graduate.

As a foundation for life-long learning, Casey was emphatic about the need to encourage independent, critical thinking:

> I don't believe that one person any more can know even approaching everything and that also I think that what we need to teach our students now is not how to regurgitate information but how to find information, analyze information, use information. And nobody can keep up. We have to give them coping skills. Information is doubling -- what is it -- every sixteen weeks or something?

Allan found that students in his online courses were able to focus more on higher level thinking because they were responsible for learning the material independently online:

> We're getting past just, you know, doling it out. They were actually looking at it and discussing it and so they really seemed to understand it better and synthesize it better than the usual lecture method.

Douglas encouraged independent learning by placing exams on his course Web site, with intent that students could pull in information electronically:

> I encourage students to collaborate with other students in the course, to collaborate with other entomologists, to use the Web to research. I even have a search engine on the exam.

The reports of student involvement in social learning and higher order thinking through dynamic interaction in a conference confirm Harasim's initial assessment of the potential of conferencing to encourage meaningful interaction and higher level thinking (1989). These findings support Sleightholm Cairns' findings that teachers perceived improvements in their students' thinking skills (1993). As noted, the teachers' impression of confidence building echoes the effect found by Davie & Wells (1991). Additionally, the empowerment of students through access to information via the Internet is one of the key benefits of CMC distilled from the CMC literature by Berge (1997b).

One of the most interesting parts of this study was hearing about strategies that participants had devised to involve all students in discussion. For instance, Peter was devising unusual strategic evaluation methods for his online courses to help students take more responsibility for their learning. Peter explained how he employed conferencing to force students both to participate and to make choices, something he had found many college students reluctant to do:

> Each student chooses one question from my list of 25 to 30 or 50 topics, or whatever it is. And I have a claim system in my conferencing. First come, first serve, claim your question, nobody else gets your question. If you get there first you get a choice of all of them, if you get there last you've probably still got a

> choice of ten. And the theory is in the next ten days you are responsible for responding to, let's say, two to four responses to other people's answers. But do you see what I'm trying to do here? There are a lot of choices out there.

Peter planned his course structure and evaluation very carefully to require and reward synthesis and argumentation:

> Now, of course, I get a lot of off-the-top- of-the-head responses on the screen. I'm not pretending that's not true. But in the critical thinking category I had to set up some criteria, for all responses are not created equal.

He had learned how to capitalize on all students' automatic access to group sub-conferences:

> If your group is having trouble getting your discussion going, go and see some other group, see how it works when it's working.

Liz described this inclusion strategy to bring all of her students into active discussion:

> You have to really feel like you're part of the group. Takes a while for some people. There are definitely some lurkers there.... But I got them in there, forced them in a sense with some of the assignments I put on. One of the assignments was to read an article, a non-medical article, anything related to medications, and they had to post the title of their article so that we wouldn't have six people doing the same article. Then they had to do a one-page maximum evaluation of this article and post that evaluation.

In the early stages of creating her first online course, Ann planned discussion strategies that she later discovered worked well:

> I just literally sat down when I was putting it altogether and I said to myself, okay, if I were standing in front of these people what would I be doing? And I came up with the idea of the learning partners. That's how I started the learning partners. That's why I forced them to go two or three times in each module or even more. You know, it could be ten times. And each module then is broken into sections.... I'm consistently getting them involved in discussing this with someone else.

The word "forced" may seem overly authoritarian in the context of a learner-centred approach. However, the intent of Peter, Liz and Ann in using the word appeared to be a desire to help reticent students over their initial reluctance and engage them in

discussion in spite of their fears. The enthusiasm of these teachers for making optimal use of CMC is apparent. The challenge of engaging students in discussion was stimulating new plans for empowering students.

Enabling effects on face-to-face teaching. Some of the participants reported that their face-to-face teaching had been improved by their experience with online teaching, showing that the positive effects perceived by Boston (1992) are not isolated. Boston said that his classroom teaching had been affected positively in that he used demonstrations and interactive materials there that he had developed for online use and he had learned to be more concise by writing online materials. Also he had gained a greater appreciation for the importance of creating community in face-to-face classes when he saw how much his distance students interacted with each other. Most importantly, he had come to view himself more as a facilitator of the learning process in any setting.

Like Boston, Ann reported that her clarity of expression in class had improved as a result of writing online materials. Liz found a positive effect in her face-to-face classes in that planning scaffolding for a conference discussion helped her be more aware of scaffolding in general to support active learning:

> But thinking about how I would structure classes on-line has helped me in a face-to-face classroom be even more active learning. Because you have to take it that one step further and really build in the activity in the on-line. Whereas in the classroom you can rely on some of it just happening. So it's hard to separate the two because it all kind of happens together for me.

Allan held some face-to face classes to support his first online course. Because the complete course was available on the Web, he felt enabled to rely less on lecturing and more on classroom discussion that encouraged independent critical thinking. Similarly, Max found that having his lecture notes online allowed him to worry less about "covering" material in class and to engage students in deeper discussion:

> Yes, absolutely [having a course Web site has affected my face-to-face teaching.] I mean it can't not affect. I can spend the time in the classroom for more productive things, what I would call more critical thinking areas. The content's taken care of, I don't have to do that. Let's talk about how we manipulate that content, what impact it has on whatever the subject matter is. So that's -- the face to face becomes more of a critical thinking time where we can evaluate and do

> some analysis and some synthesis of all that content that's out there through -- delivered through electronic means.

Like Max, Douglas found having online resources allowed better discussion in his face to-face classes because students who accessed them were better prepared. He valued this tool for encouraging independence:

> If you get the kind of question that they should know the answer to, it's easier to direct them back to the Web. Not just simply discount them and say oh, don't be so stupid -- or be sarcastic or anything like that, but direct them back to where the information is and let them discover it for themselves, rather than just simply continually spoon feed very basic information that they probably should know on their own. So maybe that's changed a little bit in my interaction with students, in that the information's there, they just have to know how to unlock it and get to it.

It is evident that the knowledge gained by participants by teaching online and the knowledge that students could access materials online had a positive effect on face-to-face teaching.

Personal Rewards. Running through all of the interviews, and reflected in the findings above, was a sense of reward and purpose gained through involvement in online learning. These findings help to answer how technology may be value-added for faculty, one of the questions posed by delegates at the Third Distance Education Research Symposium-Conference (Moore, 1995). For instance, Jay described on the reward of discovering how crucial the teacher role is in facilitating discussion:

> My personal view, too, is that the teaching component becomes even more critical because you need strong facilitation with this. So the sense of purpose is that yes, it's rewarding if it's done well and, you know, in a nutshell the facilitator then becomes crucial.

Casey drew a sense of satisfaction from becoming, and helping others to become, better teachers:

> And that I'm not rabid, you know, I'm not -- I have seen the light and it is technology in education. It's not that at all. It's more just because I want to be a better teacher. And right now it's working. I think it can work a lot better and I'll still be out there leading the way, trying to make it better, but if tomorrow I thought I could do a better job without the technology I'd drop it just like that. And I think that I get that across, too.

> It's really interesting to see people come in -- and you can tell by their body language and everything else, you know, well, I'm kind of interested but I'm really sitting on the fence here. And by the time they leave they're going away with a different attitude to it. So that's good.

George joked about the personal enjoyment he felt in being part of an online community:

> I check my Web site more than I check my voice mail. "Nobody loves me. I got no E-mail today."

Liz described her enjoyment of the personal interaction made possible by conferencing:

> If I read something [in the newspaper] I'd go on, I'd be just so excited, "Oh, I just read this, I saw this last night.... And then people would comment back. I can go in much like a student to say, "I wonder if anybody made comment."

Douglas found that the online medium allowed him to promote ecological principles beyond the classroom and also by example:

> I like to espouse my philosophy whether it be about forest fragmentation or biological control of insects or whatever. I like to promote that message, in particular wherever I can back it up with good documentation and scientific research and get that message across. And even with just using the medium, I like the fact that I don't have to hand them reams and reams and reams of paper, and that they regurgitate back to me reams and reams and reams of paper which only get shredded or thrown out or maybe recycled.

Along with the direct comments listed here, the tone of enthusiasm that pervaded most of the interviews indicated that teachers found the experience "value-added" for themselves (Moore, 1995).

Teacher Development Beyond the Individual

The findings presented to this point have described changes in individual teachers. These changes did not occur in isolation. Across all three colleges, the pattern was the same; participants found themselves involved with other college staff as a necessary and welcome part of teaching online. Collaboration is an essential component of teacher development (Fullan & Stiegelbauer, 1991; Fullan, 1993a; Fullan, 1993b).

Collaboration. The theme of collaboration ran through every interview. Participants said that going online had required more collaboration than any other process they had experienced in teaching and they highly valued this way of learning. Jay described how things had changed with the advent of online courses:

> Faculty traditionally very much worked in isolation. They developed their curriculum, they went to the classroom and they taught in traditional mode. With this we're looking at that support issue, idea of a team. And so it's essential now, I feel, that in order to do anything with technology, implementing technology into teaching and learning, that you need to have team.
>
> There is some person to go to for technical support, there's a person for instructional support, there's a person to do some production for you if you need to, you know, create a Web page and insert a conferencing tool or get it up and running, that kind of thing. So that whole concept of team now delivering curriculum as opposed to just the faculty member.

Casey explained the importance to her of being supported by technical people

> I want to be free to explore the technologies and use the technologies based on my understanding of teaching and learning, not get hung up on these other things. And so that's where I'm very happy to work with a team. And I don't see it as my accomplishment that there's a course there, it's our accomplishment that there's a course there.

Max commented on the need for interdepartmental collaboration to implement online courses:

> You know, it means a lot of curriculum change and at different departments in the college.

Most comments about the necessity of collaboration were said with an expression of pleasure and satisfaction. At times this enjoyment was balanced by regret that not all college staff understood or supported online learning. Collaboration is a necessary stage of Fullan's model of teacher development (1983a, 1983b), and it is clear that the implementation of CMC required a great deal of collaboration, more than is customary among college staff, and that participants found this collaboration contributed to their professional development. It is important to note that the need for collaboration early in the stages of adoption of CMC is a departure from the normal order of activity predicted

by CBAM (Hall& Hord, 1987), which places collaboration as a later stage of implementation.

Mentoring. As part of the collaboration, a great amount of mentoring among faculty took place. These findings address Davie's call for research into the role of mentoring in CMC implementation (1995) and shed light on how faculty culture changes (Moore, 1995). The more experienced teachers had all become mentors for other faculty wishing to use the medium. Their roles included both formal and informal mentoring in all three colleges. (I am defining "formal" as a case where release time to assist other faculty has been given, and "informal" as a case where an experienced teacher shares experience and information.)

College A appeared to have the most formalized faculty assistance program in relation to online learning. Jay, Casey, and Peter worked out of a centre that had been established to help faculty implement online learning. They worked with both individuals and groups and found great satisfaction in the mentoring role. All three were eager to share with other faculty their personal vision of learner-centred education through CMC. Indicating his strong awareness of being part of a team, Jay often used the word "we" when discussing his thoughts about online learning, referring to the people who worked in the centre. Ann, who was one of the faculty in the college who had received help from Jay in building her course Web sites, was very grateful for his assistance.

In College B, both formal and informal mentoring was taking place, especially around the implementation of a new online course management system. George had always been an informal mentor for faculty who needed help with general computer applications. Initially, in order to implement CMC, he needed help from other faculty. When he decided to add online resources and discussion to his face-to face classes, he sought assistance in learning to use the system:

> We have a pro. dev. department. There are a couple people there who are way ahead of me at this point, they've been seconded to learn the new online course management software. I'll go, "Bill, how do I do that? I want to try this." "Well, let's try it now." And "I never thought of it; that's a good idea."

George, in turn, was actively working to convince other teachers in his department to use the medium and had been given some release time to assist them. His intent was to help other teachers see the value of providing resources that students could access independently.

Liz, also in College B, was formally assisting other faculty by leading short courses in the use of the new course management software. She was also informally working with Allan at the time of the interview to help him conduct the course she had originally designed. Allan commented on the benefits, both to himself and to Liz, of collaborating to implement online learning in a place where not everyone is embracing change:

> I mean you don't work in isolation out there, at least very few people do. And this is just something that is much more pleasant, it's partly social and it's certainly business and just makes life a whole lot nicer. When it comes down to it, it's what it is. I mean we can all struggle on our own little selves and we need to, but it's much more pleasant if you don't. Liz's also out there and I think she's sort of really on the cutting edge because she just set this course up. I feel very insecure because I just ran it; I didn't set it up. And I think she doesn't feel that too many people around appreciate her.

Liz was very pleased to act as mentor for Allan and also for others by leading workshops:

> On my sabbatical I was asked if I would come in on a contract basis and teach the workshops for our online course management system. And I was very happy to do that so somebody doesn't have to go through what I went through. I'm able to give them support in terms of suggesting things, like take an HTML class.

The three teachers at College C did not work directly together. Max and Janice were quite new to using the medium in teaching. However, Douglas was engaged in formal mentoring. He had been a very early pioneer in online learning, and at the time of the interview he held a position in which he assisted other faculty to create online courses. He described the process of mentoring:

> I'm in the role here of educational technology coordinator. [I help] other faculty who are starting to get turned on to the Web as a resource for their students or just because they want to have material on line, or they may want to have links or for whatever purpose they are. I'm given a bit of time to help walk them through and get them started into that media.

Douglas said that his experience as a teacher was important to his ability to help in a meaningful way:

> I'm kind of like a technician but because of my faculty background, I think I can work more easily with other faculty members and help them design it so that it's user friendly to their students.

Max, who was fairly new to the medium, had received help from Jill, a person who was pursuing her M.Ed. in computer applications (not a participant in this study):

> A couple years ago Jill and I had offices adjoining and every once in a while I'd just kind of holler, "Jill, I can't do this." And she'd say push that or do that. And so that very informal kind of mentoring or coaching has been very useful.

Janice did not mention a mentoring relationship within the college. However, Janice was working closely with a colleague with whom she shared the work and the commitment to online learning. Janice and her co-designer/teacher could seen as following a mentor outside of the college in that they took guidance from the instructor behaviour and course Web sites they had observed in online courses they had taken.

To summarize, the instances of teachers helping teachers were many. In Colleges A and B, it was possible to see the value of this mentoring in the reports of both mentors and the recipients of their help. Instances of mentoring were also reported in college C, although the teachers in this group did not specifically mention working with each other. Theses findings help to answer Davie's question (1995) of how mentoring may help teachers effectively implement CMC.

Reward, purpose and influence in the mentoring role. The mentors in all three colleges found this role to be very gratifying. The participants who were newer to online learning greatly valued the mentoring they had received. In colleges A and B, all of the participants who had assumed a mentoring role in the implementation of the technology (Jay , Casey, Peter, and Liz) viewed it as an opportunity to influence peers to bring about more learner-centred teaching in the colleges. In other words, they were acting as change agents (Fullan, 1993b) in their own institutions. They carried out their role, varying in their style, but all with a strong sense of purpose. Jay took a very gentle approach:

> I'm seeing that when I'm helping faculty, [we're] looking at how adults learn -- or what we feel as how adults learn, and trying to implement some of those strategies into what we do. And some faculty are cognizant of that and some are not quite there yet. And it's a difficult thing because you don't want to force faculty to do a certain thing, you want them to try it for themselves. You know, if you're adopting these things, go ahead, try your mode and experience that for yourself and if it works, it works. If it doesn't, perhaps here are some other strategies you can try.

Jay's gentle approach to faculty learning was consistent with his idea of adult learning in general. He indicated that the team approach at his college was succeeding in improving teaching:

> What's happening now -- which is good -- is that we're starting to recognize -- to get a body of faculty using this tool because I think we all agree or believe that this is a great tool for learning. And we need those [tools].

In spite of his confidence in both the team approach and in the tool, Jay admitted there were challenges in influencing other teachers' thinking, and he was very open-minded about whether discussion is always necessary in an online course:

> The courses that we try to put online we very much try to convince faculty that group work is essential, it's peers help peers as they go. When we've done that on line students have come right back to us and said "Look, I did this on line because I just wanted a traditional correspondence course. I want to go away and do it on my own and get it done and then that's it. And so why do I have to do all this group work?" So it's trying to convince the faculty to keep with it. Yes, it does work, we think. Or maybe there's a stage where you have to say no, with this particular course, this particular discipline, this particular mode, maybe the students just want to take it home, do it, and that's enough of that.

Ann enthusiastically described how Jay had helped her create her first course:

> I relied on him. And eventually I learned from what he was saying. Okay, we're going to break the screen here and then I learned how to -- you know, like put it down in my information that I submitted by disk. In my hard copy I would put my breaks in and we used like a particular thing like dashes going right across the screen. Okay, page break. Screen break. Next screen break. But it was an interesting process. As I guess we got on – a little bit farther along I found that I was becoming more confident in what I was doing.

During the interview Ann mentioned that she was going on to help others by writing an article in a professional periodical to encourage other teachers to put courses online.

Like Jay, Casey felt reasonably successful in her attempts to promote learner-centered concepts. She related her experience in giving presentations about online teaching to other teachers:

> What I find is that people respond very well to that, because this is such an unknown area and such a new thing and many people are quite fascinated by it. But it's kind of the toe dipping stuff. And to hear somebody talk really from the heart and who's been through it and is still struggling with it and whatever else I think makes it -- it's not 20 easy tips, but it's saying, you know, this is what works for me. Maybe it won't work for you. But here's what I really believe in. And they respond to that belief.

Casey described how she dealt with scepticism of some faculty:

> Where I think that there's a great deal of scepticism about on-line learning because many teachers believe that the administration simply wants to do it because it's cheaper. And about the first thing I do is to totally disabuse some of that. It's not cheaper and it never will be cheaper. So, you know, you're not going to do this because you're trying to satisfy the administration's desire to save money. Because (a) they won't and (b) you won't. You know -- from that perspective I've found that I've been really well received.

Peter was active in promoting online learning and learner-centred teaching. The following is an excerpt of an article, published online, in which he stated his commitment to use technology to bring about change:

> One of the questions that I was asked more than once when giving workshops on electronic delivery was, "Do you put your lecture notes on-line?" When I first heard this question, it hit me that I had no such thing as lectures notes -- was I a fraud?! I knew that I wasn't. I also knew that the very asking of the question implied a particular view of classroom teaching, and that it was not a view that very much overlapped with mine.
>
> The more I thought about the question and its relative frequency, however, the more I realized that a teacher's interest in learning about the possibilities of on-line delivery was an opportunity to show examples of successful on-line methodologies that had no lecture notes.

Peter looked upon his mentoring role with a crusty enjoyment of challenging others to step out of the transmission mode:

> What I think -- I mean throw in the jargon word "post modern". We can hyper link knowledge now. In fact, I require it. And, in fact, one of the things I like about this, when I show this to colleagues they say, "Well, the students will cheat.

> It won't work for me." I say, "Well, that's right. The trick here is anything that's transmissive-- regurgitate back -- they can cheat on. So you can't mark them on that any more. Ha-ha." Now I don't ever say it in those cruel terms but you see my point.

In College B, Liz was a very avid proponent of learner-centred applications of technology but found that, in spite of her enthusiasm, she sometimes met with strong resistance from other faculty:

> And I tend to get -- when I get excited about something I tend to want to share it with everybody. And I feel sometimes it's been an uphill battle. For example, posting overheads on a server before our new online course management system came around. Just posting them in the site, saying to students, "Go and get my overheads and then come to class and we'll have more time for discussion." There was incredible resistance from a lot of faculty: "Students won't come to class. You're spoon-feeding them." Well, no, I mean you put an overhead, they copy it down. I'm just making better use of my class time.

Liz was very glad to have the support of Allan in the face of such resistance:

> Well, actually -- and Allan, my friend who's teaching this course now, he agreed with me and he did it. We had to actually go and defend this at a staff meeting and say no, we think this is a valid educational tool, you know, to use this, to do this. And part of it's a control issue, people who really feel they have to be in control in front of the class, can't let the students get away with anything.

In summary, the mentors in Colleges A and B felt a strong commitment to promoting learner-centred principles. Jay, Casey, Peter, and Liz specifically referred to the need for teachers to let go control in the teaching/learning process and commented on how difficult some teachers found this to be. Their desire and intention to influence their colleagues' perception of the teacher's role was very apparent. Furthermore, their comments indicated they saw a need for common commitment among forward-looking faculty to bring about change at this fundamental level. These teachers had taken personal vision building (Fullan, 1993a, 1993b) to a higher level as they promoted their vision in their mentoring roles. In College C, only one teacher, Douglas, had used CMC long enough to have acquired a mentoring role. Although he did not talk about promoting a particular vision of teaching, he gained satisfaction from helping others make the technology work well for students.

The role of administrative support. Several comments were made on issues of technical support and administrative support. Of course, these two types of support are closely related, as funding for technical support is always an administrative decision. In all colleges, participants perceived that support for teaching online was growing. The common thread in the comments was that administrative support is very important in the provision of appropriate software, technical assistance, and release time for faculty to implement or help others implement online learning. Jay spoke about the growing technical support in College A:

> Now that that support has grown, we have a dedicated centre for supporting faculty using technology so they do support now First Class and Web CT and Netscape Communicator. So that sort of technical issue, although still there, is starting to become resolved. But we have options, we're not married to one platform, we have -- faculty has some options on what they want to use.

Liz described the growth of support via the centre at College B:

> It's getting there. It's getting there. The instructional support studio that we have here has people that can help with all of this kind of thing, lots of professional development sessions, technical support – I mean it's an ever growing field and there's constantly stuff.

College C, which was a smaller college, also was perceived to be providing growing support but did not appear to have developed infrastructure to the same extent as the larger colleges. Comments about support for online teaching were made mainly in relation to mentoring support. Regarding administrative support, Max mentioned that he found his college to be supportive of his need to grow and learn:

> Historically our college has been well managed and a good place to work and learn stuff, and there's enough wiggle room in my workload that I can continue to do this Web stuff and learn things.

Growing support by administration for the concept of online learning was a factor in bringing newer teachers online. Ann, George and Allan began teaching online courses because they were asked by their administrators to do so. In all colleges, the administrative decision to make conferencing systems available had paved the way for individual teachers to try online learning.

Prior to this stage of institutional support, pioneers had forged ahead more independently. Several teachers talked about the work they had to do in the beginning. For instance, Jay had originally used conferencing tools not supported by the college because it was easier to use software that he could troubleshoot and support on his own.

On the whole, the pioneers talked with warmth about their early days of experimentation and felt proud of their accomplishments. Most, in turn, had ultimately been rewarded for innovation by being given time to help other faculty. Jay, Casey, Peter, George, and Douglas were all assisting faculty with online learning in an official paid capacity. Liz was conducting workshops for other faculty while she was on sabbatical to finish her Masters degree. The growth of institutional support, as reflected in the interviews, had the quality of a spiral, where teacher innovation stimulated innovation by other faculty and further support by administration, and so on.

Despite the growth, Jay commented that college administrators do not yet fully understand how to support online learning:

> I'm not sure the administration really truly understands this yet. I think they're aware of it. I think they know it's trendy and out there but I don't think they know the nuances of what it means. I mean how does it affect -- for full-time faculty -- what does it mean for workload, what does that mean for development? All those kinds of things that need to support the faculty making this happen. I don't think they know that yet. And to be fair, I don't think anybody really truly knows yet.

The growing pains of institutional support were given some attention. Peter commented that the infrastructure systems such as timetabling were not able to adjust to the needs of online teachers. Casey felt it was unfortunate that administrative support was not yet strong enough in recruiting new online teachers from the faculty. Liz and Janice indicated that release time to develop courses was not always adequate. Nevertheless, all participants felt positive about their involvement in online learning and intended to continue promoting implementation in their colleges.

The need for strong institutional support (Boe, 1989; Carey, 1993; Olcott & wright, 1995; Valdez, 1989) was echoed by the participants in this study. However, the findings indicate that support must build on and be responsive to individual innovative effort. This type of support is one of the fundamental principles in Fullan's approach to teacher development, integrating bottom-up and top-down strategies (1995).

Summary

The comparative analysis revealed several common patterns among the participants. Although the educational background and subject areas of participants varied widely, they had all voluntarily chosen to use CMC and their use of conferencing tended to be similar, with most of them structuring their online courses to make discussion an integral part of the course. They used conferencing because they believed group interaction was important for learning in their subject areas. Only one participant did not use conferencing at all, and two were still experimenting with it as an adjunct to face-to-face courses. Within the group of six men and four women, no strong patterns of use emerged according to gender.

The most common concern was an initial worry about students' ability to adapt to the medium, but these concerns had generally been resolved over time for the more experienced teachers. Some participants had early fears about cheating but, for the most part, had either found ways to deal with potential problems or found cheating was a minor concern. Concerns about the amount of work for the teacher and the physical toll of long hours at the computer were common and had not been resolved. To some extent, concerns about administrative and technical support were being resolved over time as support had increased since the early days.

All participants indicated that they had experienced change at some level with online learning. Most had created new materials for online use, and all had used new methods. Some reported that they were pleased that they had found a medium that facilitated a more learner-centred approach, although they did not necessarily use that term, and all participants welcomed the increased student independence. Only four participants reported change at the belief level, and this change involved the confirmation of beliefs acquired mainly through exposure to learning theory. These teachers saw students learning successfully in a more independent way and were thus reassured that moving out of the traditional role of content provider into learning facilitator is both possible and effective. There was a strong theme of convergence between a belief in active learning and the methods made possible by CMC.

Changes were influenced by personal inclination toward experimentation with technology and new learning, exposure to learning theory, and need for career renewal. Renewal was found through a deeper understanding of teaching and also through the enjoyment of learning a new technology that seemed to be effective. For some, specific training for online teaching and experience as an online student had enhanced their learning.

The enabling effects of CMC fell into the following categories: flexibility and accommodation of differences, deeper relationship with students, a sense of community, empowerment of students through building self-confidence, independence, critical thinking skills, and life-long learning habits. The sense of improved teaching led to a strong feeling of personal reward for the teachers. A deeper relationship with students also provided a sense of reward.

The implementation of CMC occasioned a large amount of learning, much of it assisted by collaboration and mentoring. This learning occurred from the early days of implementation, and several of the participants had gone on to provide both informal mentoring and formal training for peers. The comments from both mentors and receivers indicated that the mentoring process was effective and satisfying. In two of the colleges, the mentors were actively promoting learner-centred principles in their work with others. Some reported frustration at the resistance to change by other faculty.

The role of administrative and technical support was perceived to be important. Some participants observed that support was growing but was not always adequate. Important components of support were technical infrastructure, appropriate policies, and release time for teachers' learning and mentoring activities. The interplay of teachers' innovations and administrative support for online learning brought about continuous, integrated change in the institution.

Chapter Six
Conclusion

This discussion draws on both the individual analyses and the comparative analysis. The individual analyses and member checks ensured depth and accuracy. The comparative analysis facilitated the identification of common patterns. The chapter ends with implications for practice and for further research, along with a statement of the significance of the study.

The individual stories of ten community college teachers combined to create a larger picture of real change and teacher development as defined by Fullan (1993a, 1993b, 1995). The interviews revealed conscientious practitioners who were enthusiastic about the potential of CMC to improve student learning at the college level. Across all of the interviews, participants described the enabling of more learner-centered methods, the necessity and desirability of collaboration among college staff, and a strong sense of reward and professional growth. Although these teachers perceived administrative support to play an important role in the technical implementation of online courses, individual teacher change was associated mainly with their experience of the medium, their exposure to learning theory, and their stage of career. It is important to note that the participants' personal characteristics were typical of innovators and early adopters of technology (Rogers, 1995), a group that tends to be inclined towards change in general.

The results provide insight into how the characteristics of conferencing can contribute to changes in a teacher's approach. Gunawardena (1992) and Boston (1992) reported that they saw their roles differently as a result of conducting classes via this medium, and similar changes were reported by one teacher in the pilot studies for the present study (Frank, 1998). In the present study, teachers reported substantial change at the materials and strategies levels (Fullan & Stiegelbauer, 1991) in the context of designing and facilitating online courses, and some reported that their view of learning had been affected. Most participants expressed a sense of greater congruence between their methods and beliefs they had acquired mainly through exposure to learning theory. Fullan and Steigelbauer (1991) stated that teachers may adopt a new method without understanding the underlying principles, but these teachers were integrating philosophy

and practice as they experimented with CMC. They were "behaving their way into new ideas and skills, not just thinking their way into them" (Fullan, 1993a, p 15).

Some participants had acquired considerable knowledge of adult or constructivist learning through degrees in education, and some had been exposed to learning theory by other means. Those who reported changing beliefs, Jay, Casey, Janice, and Allan, talked about the role of CMC in their movement toward a more learner-centred approach. Their experience of a different kind of relationship with students via CMC, along with a sense of successful student learning in this medium, appeared to confirm their belief that the teacher's role should be to facilitate rather than control learning. Peter and Liz indicated that they had always sought to teach in learner-centred ways and expressed delight in the characteristics of CMC that facilitated their approach. Max found CMC to be a welcome tool that fit well with his changing philosophy in very late career. Max's changing views were rooted in his embrace of Native teachings and writers in the education field. Ann, who had taken a series of courses in adult learning, said that her philosophy had remained the same and she found CMC's greatest value to be the community and active learning that it allows in distance courses. George, and Douglas, whose exposure to learning theory was limited, did not feel their thinking had changed much but saw the medium as enabling them to better achieve long-held goals of encouraging student responsibility and independence.

The perception of greater congruence and improved teaching was similar to that found by Sleightholm Cairns (1993) among university professors, thus showing that it is not limited to the university setting. Cairns' participants felt they were enabled to teach in a more learner-centred style to which they had paid only lip service before. The feeling of "catching up" with their changing beliefs was loudly echoed in the present study. Most teachers had initially chosen the online medium for its potential for more flexibility and active learning. They had not been disappointed in this respect.

A common theme was the way in which the teacher was forced to give up the control that one had in a face-to-face environment and to move away from the traditional role of content deliverer. Like Gunawardena (1992), some participants said that working with students in a conference did not allow them to retain a lecture approach or to control discussion. The perception of successful student learning in this environment reassured

teachers that letting go control is both possible and desirable. Reduction of teacher control of the learning process is a central principle of learner-centredness, common to both its adult learning (Knowles, 1984) and socio-constructivist roots (e.g. Phye, 1997).

Although the participants in this study accepted loss of control, some suggested that most teachers find it difficult to accept, indicating they had had observed this reluctance in colleagues. Their perceptions recall McDougall's findings (1997) that loss of control was a challenge for mathematics teachers who found their role changing as they began to use geometry software in their teaching. McDougall recommended mentoring support for dealing with this challenge. In the present study, some mentoring was reported that addressed this issue, occurring both informally and through training sessions.

An important finding was that, through experience, all of the participants in this study found online learning to be empowering for students. Davie and Wells (1991) described empowerment of students through conferencing by encouraging a sense of mastery and community. The teachers in the present study felt that such empowerment was indeed occurring and were pleased by the sense that they were achieving this goal through online learning. The benefits of CMC mentioned most often were the facilitation of confidence and independence, active learning, critical thinking, and lifelong learning habits. The perceived enabling effects of CMC also included flexibility for students, accommodation of their differences, and a deeper relationship with students.

Participants' comments on the role of conferencing in building a sense of community among learners were consistent with other research (Sleightholm Cairns 1993; Davie, 1988; Davie and Wells, 1991). The value to the teacher of a deeper relationship between teacher and students is of particular interest. The five teachers who commented on the deeper relationship with students were very pleased by this effect. They valued the relationship for its benefits to both teacher and students. In essence, they felt themselves to be more a part of the group than in face-to-face classes. By interacting with students one-to-one via e-mail, seeing a great deal of their writing, observing interaction in the conference, seeing each student's name attached to each comment, and generally joining in with the student group, they felt that they gained a better sense of students as individuals and a deeper understanding of their needs. Words used to

describe the value of the relationship between the teacher and the students in the online environment were "a gift," "you're part of the group," and "quite personal and interesting."

The concerns expressed by the participants matched the concerns found in the pilot studies. Most participants were worried in the beginning about the impact of the technology on students, a Level 4 concern that normally occurs later in the implementation process, according to the CBAM model (Hall & Hord, 1987). The early concerns mentioned by these teachers were not, as the CBAM model predicts, Level 2 self-concerns. This, of course, does not mean they didn't have any early self-concerns but that concerns for student impact were prominent in their thinking. The self-concerns that appeared later related mainly to the overwhelming workload and physical toll of facilitating online courses. It is possible that the early focus on student impact may be related to the voluntary nature of adoption in the case of these college teachers. None had been forced to use CMC, whereas innovations are often imposed in elementary and high schools where the CBAM research was conducted. Perhaps early self-concerns are stronger when one doesn't have a choice.

Concerns about student impact had largely been resolved. Max and George, who had recently begun using conferencing as an adjunct to face-to-face classes and had not yet made online discussion an integral part of their courses, felt disappointment that only a few students voluntarily chose to participate. However, they were devising strategies to motivate and engage students. The more experienced participants had resolved their student impact concerns and were motivated enough by their perceived success to influence others to use the medium. On the other hand, self concerns were not resolved for some people, indicating that change agents who wish to help teachers implement this technology need to be aware of a possible variation in pattern from the CBAM model and the particular difficulties of teaching via CMC.

The extent of the participants' knowledge of learning theory challenges Thorpe's findings (1997). He found that community college teachers did not have enough time or awareness of learning theory for effective application of computer technology to address learning directly and that they tended to adapt innovations to their preferred style. In contrast, most of the participants in the present study had considerable exposure to

learning theory and were consciously applying it in their teaching. This understanding of learning theory contributed both to the decision to use conferencing and to the changes they experienced.

The difference in findings from Thorpe's study may be related at least partially to differences in purpose and sampling. Focussing on computer use in general, Thorpe selected participants by asking administrators to name faculty whom they considered representative of a wide range of instructional computer use. Thus, the teachers in this study may have had a myriad of reasons for various uses of technology. The participants in my study were a more homogeneous group, despite the wide range of subject areas, in that they had chosen to work with the same computer application. With one exception, they had made a conscious choice to use an application designed for student-student and student-teacher interaction. My findings show that community college teachers sometimes do have the time and the exposure to learning theory to apply learning principles directly to the implementation of technology.

As expected, the participants in this study displayed personal characteristics that Rogers has shown are typical of innovators and early adopters (1995). Some had been early pioneers, at first working almost completely independently, some were slightly later adopters, and others were in the next small group being assisted by these innovators and earlier adopters. According to Rogers, early users of technology should be supported and encouraged because others follow their lead. This study revealed an interplay of individual innovation and growing administrative support. This interplay is also consistent with Fullan's position that real change cannot be mandated but must arise from a combination of bottom-up and top-down strategies (1993a).

The patterns of individual and institutional change described by the participants provide examples of the continuous, integrated change processes described by Fullan (1993a, 1993b, 1995). First, the innovators had moved ahead with little support in the beginning. As they pushed ahead with online teaching, they interacted with others in the college. As more people adopted the technology, more support was required. For instance, Liz had insisted that computer lab access be provided for her newly developed online course. She counted on the administration's commitment to the principle of online learning to prevail in this issue. Casey, having become a mentor, expressed the need for

more administrative support for recruiting new online teachers. Jay, also a mentor, appreciated the growing support from administration but felt it was limited by an understandable lack of knowledge of what is needed by online teachers. All three teachers were active advocates of online learning in their institutions. Ultimately, the growth of online learning appeared to come out of the interplay between teachers' needs and the growth of administrative and technical support in each college.

The theme of career renewal that is prevalent in the findings indicates that the participants were seeking a renewed sense of purpose and better teaching methods, and they found it in online teaching. There was a sense of accomplishment, and even excitement, in using a new technology in mid to late career, a technology that they perceived was making a difference to their effectiveness. The career renewal in evidence here, along with the interdependent growth of online learning described above, coincides with Fullan's concept of continuous teacher development, both contributing to and supported by organizational change (1991, 1993a, 1993b). The participants' experience of career renewal is also consistent with Huberman's conclusion that positive renewal is most likely to happen with teachers who have experimented over the years within their area of control (1989). Thus the findings supports Huberman's recommendation that teacher development efforts should be grafted on to teachers' natural experimentation.

The teachers in this study were involved in the four stages of teacher development according to Fullan's definition: personal vision building, inquiry, mastery, and collaboration (1993a, 1993b). Some participants were deeply engaged in reflecting on their purpose and the meaning of teaching, and all of the teachers in this study were seeking information, acquiring new skills, and consolidating their learning through the experience of teaching online.

Personal vision building is crucial for an effective educational institution. Change in an organization requires, first and foremost, that individuals make personal meaning of their experience and develop a sense of moral purpose. A teacher who is involved in personal vision building periodically reflects on these questions: Why am I teaching? What am I trying to achieve? The results of this study demonstrated that becoming an online teacher can contribute to reflection about the nature of teaching and learning. The

use of CMC technology was accompanied by a renewed sense of purpose and enjoyment, which was often expressed in assisting other teachers to implement the technology.

The second component of continuous teacher development is inquiry. Personal vision building must be fueled by information and ideas in the environment. Furthermore teachers must be life-long learners in order to stimulate students to be the same. In order to work with an entirely new medium, all of the teachers in this study had expended considerable effort in learning about the technology itself. Some had sought to establish a philosophical base for its use, and some had attended courses on how to implement on-line learning. Some had made a point of enrolling as a student in online courses themselves to access the student experience.

The third component of teacher development is mastery. Fullan's concept of mastery requires that, beyond exposure to new ideas, teachers need to know where they fit and become skilled in them. The participants in this study were attempting to establish an understanding of optimal use of conferencing. One important context for their understanding was the perception that a teacher should prepare students to function in the information society. Several were experimenting with variations in discussion structure, as well as over-all Web course structure and evaluation methods. A common theme was the enjoyment of continuing to experiment with the medium.

The fourth and final component of teacher development is collaboration. A universal theme in this study was the necessity of collaboration when teachers are learning to use the online medium. Although all of the participants were comfortable experimenting with technology, they usually required help from technical staff and other teachers to successfully implement the technology. The participants enjoyed the collaboration and felt it contributed to the quality of their work.

Fullan (1995) stated that, in order for teacher development to occur, teachers themselves must be expert in the change process; they must know how to create collaborative cultures and how to create shared visions over time through action. This phenomenon can be seen in the four mentors who were actively promoting their vision of learner-centred teaching via online technology in their colleges and in so doing, contributing to broader change.

Implications for Practice

The results of this study have implications for the achievement of more learner-centred colleges and for the effective implementation of CMC. First, since the participants were, for the most part, the initiators of their involvement in CMC delivery and went on to share their learning with peers, support should be provided for teachers who take the initiative in using CMC. The important components of support were perceived by the teachers to be technical infrastructure, appropriate policies, and release time for teachers' learning and mentoring activities.

Collaboration with staff in various parts of the college was very much needed from the outset by these teachers and should be encouraged. Barriers to interpersonal contact and cooperation should be minimized to allow teachers to easily obtain timely assistance from individuals with appropriate expertise.

For most in this group of teachers, the processes of personal vision building, inquiry and mastery were founded on learning theory, leading to a rewarding sense of convergence of methods and beliefs. The importance of awareness of learning theory to changing beliefs and methods suggests that training and coaching for technology implementation should be learning theory based. The goal of professional development should be greater congruence between beliefs and methods. As much of the awareness of theory was acquired through degrees in education earned outside the college system, teachers should be supported in pursuing knowledge of learning theory through higher education. It is apparent that such knowledge is often shared with peers in the context of CMC implementation. According to the participants in this study, important components of support were technical infrastructure, appropriate policies, and release time for teachers' learning and mentoring activities.

The similar pattern of informal mentoring that occurred in all three colleges indicates that mentoring should be supported, and it is important that supportive policies do not hinder the naturally occurring processes. In other words, mentoring should not be over-institutionalized. At the same time, the involvement of several of the participants in formal leadership roles shows that early users can function as consultants and trainers in planned professional development activities, and that experienced online teachers can be

part of a team of advocates for change. An added benefit is that teachers may gain a strong sense of reward from becoming leaders both formally and informally.

Recommendations for Further Research

The results of this study give us a better understanding of how faculty culture changes, how new technologies affect them, and how the technology may be value-added for them (Moore, 1995). This understanding provides a basis for further research into effective implementation of CMC in the community colleges.

While this study indicates that administrative support is important in the effective implementation of the technology, it does not directly address the question of administrators' roles in this process. An important question remains as to how decision-makers view the potential of online learning, and their own role in creating more learner-centred institutions. How can administrators support the teacher development processes that can occur through online teaching and mentoring? How important is administrative understanding of, and support for, learner-centred principles as opposed to the technology itself?

Given the findings that early users of CMC went on to provide mentoring and some used it as an opportunity to advocate learner-centred practice, an in-depth investigation of mentoring processes in CMC implementation, as originally suggested by Davie (1995), would be useful. How is the design of new courses affected by mentoring, possibly using Mason's typology of online courses (1998)? What role does a mentor's awareness of learning theory play in the mentoring process? To what extent are new online teachers' beliefs and practices influenced by mentors' advocacy?

It would also be very useful to investigate the students' point of view. Are teachers' perceptions of improved teaching shared by their students? Do the students' perceptions match the teachers' perceptions of increased learner-centredness and student empowerment in the online environment?

Since teachers perceived that the medium helped them encourage such skills as critical thinking and independent information retrieval, investigating student performance outcomes in specific skill areas would be a valuable next step. For instance, the participants felt that CMC enabled students to find information themselves easily and

also to share it with other students, thus making them less dependent on the teacher as content provider. Students' performance of such tasks could be documented. Examination of transcripts of conferences could provide information about students' engagement in using declarative, procedural, and structural knowledge in the online environment. (Phye, 1997).

Significance of the Study

This study demonstrates that teacher development processes occur as college teachers implement CMC. The participants felt that they had learned a great deal and grown both personally and professionally. In particular, they found CMC enabled them to use more learner-centred methods. Implementation of CMC was perceived to be a large amount of work and at times seemed overwhelming, but the participants all experienced a strong feeling of satisfaction. These teachers reached a new level of learning in mid to late career. Working with students in a new medium, they became students themselves again.

These findings support Fullan's model of teacher development (1991, 1993a, 1993b, 1995) by documenting how teacher development processes occurred in three community colleges when teachers used CMC. Substantial individual changes were occurring at the materials and strategies levels and to some extent, at the belief level. Through the process of CMC implementation, teachers were involved in personal vision building, inquiry, mastery, and collaboration.

Collaboration was an especially strong theme throughout all interviews, providing ample evidence that community college teachers learn from each other. The participants independently sought out information sources and support, both inside and outside the college, and they felt themselves to be part of a team with other like-minded teachers. However, it is apparent that this process works best when there is appropriate administrative support. Technical and administrative support was perceived to be growing in the colleges, and this support appeared to increase partially in response to the needs of the participants. This finding is consistent with Fullan's observation (1995) that both bottom-up and top-down strategies are necessary for real change, even though some

participants experienced a slow reaction by administrators in understanding online teachers' needs.

The findings also helped to answer the questions posed by delegates at the Third Distance Education research Symposium-Conference (Moore, 1995) of how faculty culture changes, how new technologies affect them, and how the technology may be value-added for them. The teachers' enthusiasm for CMC could leave no doubt that it added value to their lives. Their experience also demonstrates that enabling effect of CMC and an increased sense of congruency is not limited to university professors teaching graduate students (Sleightholm Cairns, 1993) or lone individuals in the colleges (Boston, 1992). The characteristics of CMC can help community college teachers move away from traditional methods of content delivery.

This study demonstrates the importance of learning theory in college teachers' effective use of the learner-centred characteristics of CMC. In doing so it shows that, despite previous findings (Thorpe, 1997) college teachers do sometimes have the time and awareness of learning theory to apply it to their use of technology. This knowledge was acquired mainly through advanced degrees in education but also sometimes through professional development offerings within the colleges.

The question of the utility of mentoring in CMC implementation posed by Davie (1995) is addressed by this study. Both formal and informal mentoring played a very important role in teacher development in the three colleges. Rogers' theory of the diffusion of innovations (1995) was illustrated here by the mentoring activity by innovators and early adopters of CMC technology. The earliest users of CMC went on to provide mentoring and some of these mentors assumed advocacy roles to help bring about wider change in the institution.

Finally, this study provided more information about the role of community in online courses (e.g., Davie & Wells, 1991), particularly the value to the teacher of deepened relationships with students. Not only did the teachers feel students benefit from the sense of community; they found this aspect of conferencing to be enjoyable and to help them understand their students better.

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Appendix A

Letter for Administrative Consent

Dear _____:

Thank you so much for your willingness to assist me in my doctoral research. I am requesting your college's permission to conduct educational research between February and June 1999. I am a faculty member at Georgian College and am pursuing my Ph.D. in Computer Applications in Education at the Ontario Institute for Studies in Education at the University of Toronto. The focus of my study is the experience of community college teachers in using computer conferencing to facilitate courses. In-depth interviews with online teachers from several Ontario community colleges will form the basis for my doctoral thesis. I expect that my thesis may provide useful information for colleges who are implementing online courses, and I will make a summary available to you on request.

Measures will be taken to protect the anonymity of both the college and the individual teachers. In the report, pseudonyms will be used for the participants, and the names of colleges will not be given. In addition, great care will be taken to omit any details that might identify individuals or colleges. Only the researcher will see the raw data. The interview tapes and transcripts will be kept confidential and then destroyed when my thesis is completed.

Your co-operation is most appreciated. I would be happy to answer any questions you may have. I may be reached at Georgian College 705-728-1968, extension 1467, or at home at 705-835-3921. My e-mail address is cfrank@bconnex.net. If you require further action from me for the permission process, please let me know.

Sincerely,

Chris Frank

Appendix B

Participant Consent Form

Dear _____:

Thank you for allowing me to interview you about online teaching. I am now formally requesting your written consent to proceed with the interview, which should last about an hour. Along with several other interviews with teachers from Ontario community colleges, your interview will be the basis for my doctoral thesis at the Ontario Institute for Studies in Education at the University of Toronto.

To protect your anonymity, I will not reveal that you are a participant. I will provide you with a summary of the interview for any corrections and additions you may wish to make. In the report, a pseudonym will be used, and the name of your college will not be given. Only I will see the raw data. The tapes and transcripts will be kept confidential and then destroyed when my thesis is completed. Eventually I will be sending a summary of my research to all participants and to people who have assisted me in the colleges. In my summary articles, I will take great care to omit any details that might identify you or your college.

Please be aware that you place yourself under no obligation to participate in the study by signing this form, and that you may withdraw at any time. It probably makes sense for you to fax this back to me at 705-835-6026 just after our interview tomorrow, so I can be sure to have the line free. You may reach me at 705-835-3921 or by E-mail at cfrank@bconnex.net. Thanks so much!

I agree to participate in an audio-taped interview on the topic "Teaching by Computer Conferencing" and to allow the use of the interview as described above.

Signature _____ Date _____