LEARNER CONTROL AND USER-INTERFACE INTERACTIONS IN
CMC COURSES

by

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A thesis submitted in conformity with the requirements for the degree of Ph.D.

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ABSTRACT

This was a qualitative study that explored the concept of learner control in computer-mediated communications (CMC) settings, as well as the importance of the user-interface for learner control. The purpose of this study was to see how the user-interface, and the way teachers have fashioned the user-interface, interacts with the teacher's interventions, the course content, and the student's learning process to further or hold back a perceived sense of learner control in CMC courses.

Garrison and Baynton's distance learning (DL) framework was the theoretical basis for this exploration, and structured the discussion around three aspects for achieving learner control - the learner, support and freedom. Interaction within the framework is between the content, the teacher and students, but a fourth mode of interaction - user-interface interactions - was proposed as an addition to the DL framework. Six teachers were interviewed, and their students were invited to complete a learner control questionnaire. Instructional materials were also analyzed to support the teachers' perceptions.

The teachers in this study all described themselves as facilitators of learning, and always had a rationale for giving or not giving learners a control option. Learner control was a central theme for both teachers and students, and the user-interface was found a
factor in the students' capacity to take control of their own learning. The addition of user-interface interactions to the DL framework is recommended based on my findings. Students responding to the learner control questionnaire had less confidence in the freedom aspect of the DL triad than the other two aspects. This finding is consistent with another researcher's results.

A theoretical proposition based on the results of this investigation is that teachers who see themselves as facilitators of student learning demonstrate their conviction to that philosophy by being able to account for their learner control decisions. Helping learners take control of their own learning was seen as a goal, and there was a trend toward increasing learner control over time. However, the teachers described the need for balance in giving learners control options, and their reasons were aligned with the freedom, support and learner aspects of the DL framework.
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CHAPTER 1

Introduction

Many students in an online, asynchronous, computer-mediated communication (CMC) learning environment, struggle without the usual context and support of a traditional face-to-face (FTF) classroom and teacher. Taking an online course for the first time certainly presents a number of challenges to the adult learner. One approach to finding the right mix of instructional and institutional strategies for learner support can be studied using the concept of learner control. Baynton (1992) writes that learner control is a good organizing concept for adult education and distance learning:

Its use reflects positive consequences for individuals (e.g., locus of control studies); it is applicable to and descriptive of situations involving interpersonal communication (Beniger, 1986); and, when used in a learning situation, involves not only variables in the environment (choice of presentation styles, pace of learning tasks) but also the characteristics of the learners themselves (learning styles, abilities, etc.) (p. 17).

Learner control, which is the opportunity and ability to influence, direct and determine decisions related to the educational process is a good model for study because it allows examination of the distance learning experience wherever and however it occurs (Baynton, 1989). Learner control is not just a psychological process; it can be a comprehensive approach to the study of all aspects of online teaching and learning (Maehr, 1976, p. 447). Learner control is aligned with constructivist views of knowledge building because learners are seen as actively controlling the sequence of knowledge
(McLoughlin & Oliver, 1995, referring to the work by Esland, 1971). Indeed, learner control may only make sense from a constructivist stance.

This research is also about user-interface interactions in computer-mediated communication (CMC) environments. It is believed that control of the learning process is negotiated through interaction between the teacher, students, the content and the user-interface (Garland, 1994). The addition of the user-interface as another mode of interaction, and as an element in learner control in CMC courses, has not been previously studied.

Conceptual Framework for This Study

Garrison and Baynton's (1989) distance learning (DL) framework states that there needs to be a balance among three variables to achieve learner control:

1. the learner
2. support
3. freedom.

The communication or interaction between students, teacher, the content and, as proposed, the user-interface, encompasses the learner control variables in a broader context (Hillman, Willis, & Gunawardena, 1994; Moore, 1991). Garrison and Baynton (1987) write, "control of the educational transaction provides a richer, more inclusive concept for understanding distance education" (p.13). Students' needs vary to achieve this balance, and to be in control of their own learning. If learners have few skills, they will need more support or they will flounder and feel overwhelmed. Conversely, if students are not given enough choice in the learning environment, they may feel stifled and lose interest or motivation. Learner control is a product of the educational transaction, and interaction is the means. (NB -- the original drawing (Garrison & Baynton, 1987) has been modified.)
The micro level of Garrison and Baynton's distance learning (DL) framework describes the balance needed for the learner variables of freedom, the learner – his or her competence, characteristics and attitude, and support, both human and non-human. But at the macro level of the framework, the course content and context, and the interaction between teachers, students and the user-interface sets the stage for achieving the micro level balance between the learner, support and freedom to achieve learner control. Therefore, it is the communication in a DL course that fashions the opportunities for learner control. McLoughlin and Oliver (1995) write that teachers giving opportunities for learner control is like an instructional or educational conversation; they recognize the role interaction plays between teachers and students in giving learners control. Likewise, the learner, support and freedom components of the DL model interact to give learners more opportunities for control.
The labels in the triangle that represent variables in Garrison and Baynton’s framework have undergone some transformation; here’s an historical overview of the changes made by me and by Garrison, starting with the original terms:

- Independence -> Freedom (Cook)
- Competence -> Proficiency (Garrison) -> The Learner (Cook)
- Support -> this label has not changed.

The reason for the changes relates to confusion over definitions of the terms. Garland (1994) notes that there are semantic problems with the terms control and independence. Restricting the labels in the model to one word adds to the simplicity of the framework, and makes the model a handy heuristic. A more detailed description of the labels that explain the three variables in the distance learning triad is below:

1. the learner – attributes, proficiency or competence; expectations and motivation to learn, values and attitudes – psychological dimension
2. support – teacher-student and student-student relationships; both human and non-human resources; psychosocial as well as academic support -- structural dimension
3. freedom – choice available; autonomy and independence; flexibility and timing -- philosophical dimension.

I propose that the DL framework is not stagnant over time, and varies with each situation. Students at the beginning of the term require more support and may flounder if the choices are overwhelming; conversely, at the end of the term, those same students may benefit from increased amounts of freedom now that their online skills have progressed and support needs have diminished.
Definition of Terms

constructivist theory
The various approaches to constructivism define a broad framework and philosophy where learning is seen as an active process of knowledge construction. Reflecting on our experiences, we make new meaning based upon our own mental models or rules. Learning is a process of altering our cognitive thought processes to incorporate new experiences. Constructivism is often contrasted with objectivist models, such as behaviorism, in which learning is a process of conditioning, and the mind is seen as an empty vessel that is passively filled with knowledge (Murphy, 1997).

CMC:
Acronym for computer-mediated communication; computer-mediated communication is a process of human communication via computers, involving people, situated in particular contexts, and engaging in processes to shape media for a variety of purposes (December, 1997). Courses taught using FirstClass conferencing as the means of interaction is an example of a CMC environment.

distance education:
Education characterized by the non-contiguous two-way communication between or among students and teacher mediated by technology (Baynton, 1989, p. 6).

FirstClass:
Computer conferencing software produced by Centrinity (formerly MC² Learning Systems/SoftArc) headquartered in Markham, Ontario (http://www.centrinity.com). Originally designed for a large public school board in suburban Toronto, FirstClass is used widely in a variety of educational settings, including the British Open University and OISE/UT. Access to the FirstClass system is via a web browser or a free client.
freedom:

Giving students choice implies that teachers grant students the freedom to choose; having choices or options available means some degree of freedom exists. Freedom or liberty lies along a continuum from complete absence of restraint to simply an awareness of not being unduly hindered (NA, 2000). Academic freedom is defined in ERIC (NA, ND) as the “right of teacher or student to be free from external or institutional coercion, censorship, or other forms of restrictive interference in academic matters.” This type of freedom lies outside this discussion.

learner control:

“The opportunity and ability to influence direct and determine decisions related to the educational process (Baynton, 1989, p. 6)”. In a broad sense, learner control is the authority learners have to direct their own learning experiences. It is important to note that simply giving learners control options does not necessarily lead to positive feelings of control over the learning experience. There needs to be a balance; learners must have adequate support as well as confidence in their own characteristics to handle the freedom they’ve been given. When the characteristics of the learner and variables in the environment are sufficient, then having control over their own learning can be a rewarding experience for learners (Doherty, 1998).

learner control option:

Learner control options are when students are given “opportunities to analyze their own comprehension and needs, and to use instructional components according to analyzed needs (Jo, 1993, p. 4).” Allowing students to choose their own group partners is an example of a learner control option.
**online course:**

A course offering that does not involve regularly scheduled face-to-face meetings, and is delivered using communication technologies over the Internet.

**TopClass:**

A course management tool that is accessible from a web browser. TopClass is very similar in features and capabilities to other well-known systems, such as WebCT and Blackboard. TopClass is produced by WBT Systems (http://www.wbtsystems.com).

**user-interface interaction:**

Hillman, Willis and Gunawardena write that user-interface interaction is "a process of manipulating tools to accomplish a task." A user-interface is described in the ERIC thesaurus (NA, ND) as keyboards, mice, joysticks, light pens, command languages, menus, display screens, and other devices used for interactive communication between users and computers. The learner develops a mental model based on his or her interpretation of the interface's actions and structure. This learner-interface paradigm is an important part of the distance education transaction, and the learner who cannot interact successfully with the interface will be inhibited regardless of his proficiency in other domains. For example, a student who has difficulty navigating folders and sub-conferences may miss vital instructions. It is proposed that the user-interface is more than just the mediation that occurs in all communication between sender and receiver; it is an independent fourth mode of interaction in CMC environments. The learner must devote mental resources to using the interface, and the mental resources used could detract from the effort expended on course content. Students new to CMC distance education are really taking two courses - one that teaches the content and the other teaches the user-interface.
**WebKF:**

WebKF is an online conferencing tool accessible via a web browser, and boasts some features that go beyond standard web accessible discussion forums (http://www.learn.motion.com/lim/webkf/WebKF1.html). For example, WebKF allows for co-authoring and editing, and choice in viewing and sorting notes. WebKF was developed by researchers at the Ontario Institute for Studies in Education of the University of Toronto. The idea was to create a product that allows for greater collaboration among students.

**Purpose and Background**

The purpose of this study was to see how the user-interface, and the way teachers have fashioned the user-interface, interacts with the teacher's interventions, the course content, and the student's learning process to further or hold back a perceived sense of learner control in CMC courses. In this study, how teachers use conferencing software in online CMC courses, and if they fashion the user-interface to help learners be more in control of their own learning processes is described. Teachers may believe in and be aware of the potential benefits of giving learners control, but may not know of specific strategies for helping learners assume control of their own learning. I was curious about whether teachers take full advantage of the features of the user-interface, and, if not, do they miss opportunities to help their learners use the control variable. Alternatively, teachers may be introducing expectations that prevent learners from taking full advantage of the freedom allowed by the user-interface. The DL framework described by Garrison and Baynton (1987) defines learner control for this study.

A student of mine, who had been having difficulty in the early weeks of an online CMC course, stopped by my office and shouted "Kathryn, I've got it! I'm in control!" He was delighted to be on top of things, and now that he was in control he had the self-efficacy to successfully complete the course (Meraska, 1999). Garland (1994) writes that
"being in personal control of their learning situations means that learners are in a position to assume responsibility and to be self-efficacious" (p. 55). Helping students use the learner control variable is realized by balancing three components of the DL framework - support, the learner and freedom. Teachers need to provide both human and non-human support, design learning activities to either develop or make the most of students' attributes, and give students appropriate amounts of freedom to make choices in the learning environment. In addition, the learner control triad also allows for consideration of the student's personality and expectations regarding learning, as well as for a broad view of the CMC transaction.

One academic question related to this study is whether or not media can influence learning. The user-interface in a CMC environment is one aspect of the computer network medium of computer conferencing. Clark (as cited in Kozma, 1994) has sparked debate in education by stating that "media do not influence learning under any conditions" (p. 7). Kozma (1994) writes that Clark uses a delivery truck analogy to describe educational media - media are merely vehicles for distribution of course content. However, Kozma points out that in Clark's behaviorist point of view; the media are seen as stimuli to which students respond. Lacking in this delivery truck perspective is any discussion of the cognitive, affective or social aspects of the learning process (Kozma, 1994). Many educators now believe that learning is not a passive response to the delivery of instruction. The learner actively and socially constructs knowledge. Kozma (1994) writes "we will understand the potential for a relationship between media and learning when we consider it as an interaction between cognitive processes and characteristics of the environment, so mediated" (p. 8). It is this interactionist or constructivist perspective that helps distance educators use the capabilities of media to influence learning, and is aligned with the orientation of this study.

Baynton (1992) writes that learner control is a good organizing concept for adult education and distance learning, because helping students exercise control over their own learning has positive consequences. Garland (1994) writes that the key to distance
education “is being responsive to the individual adult learner, treating each as a valued customer, and enabling him or her to exercise personal control over learning” (p. 57). Furthermore, the learner control paradigm involves variables in the environment like pace, presentation style, and user-interface, as well as characteristics of the learner, such as, self-efficacy, locus of control, self-directedness and motivation. Control is also included in other conceptual frameworks of distance learners (Herrmann, 1988). Therefore, the construct of control is a broad approach to CMC distance learning experiences.

Baynton’s (1989) thesis on control of the learning process in distance education surveyed students rather than teachers, but she found that the teachers’ knowledge, skills, attitudes about education, and beliefs about control of the learning process were significant factors for the students. Implications for future research from her thesis included further examination of the teacher-student relationship in distance education, and “its potential for the enhancement or inhibition of learner control” (Baynton, 1989, p. 136). This same idea could be applied to the user-interface because she also believes her learner control data could be used to measure and compare the amount of control experienced by learners in different delivery modes (Baynton, 1989).

McKinnon (1993) studied CMC online courses. Although this researcher was primarily interested in the use of learning contracts to “break the isolation and to humanize the learning process while studying independently at a distance” the results showed that CMC is an effective way to increase student completion rates compared to other distance learning methods (McKinnon, 1993, p. iii). McKinnon (1993) defines computer conferencing as “a method of interactive communication between two or more persons” (p. 9). It is possible that the more interactive CMC design in McKinnon’s study accounted for the improved completion rates in the computer conferencing class section. More to the point, McKinnon’s work is support for the effectiveness of pacing devices, such as learning-contracts, that are specifically employed to further student’s choice in a CMC environment. Thus, I observed the use of pacing devices and whether they were a
strategy teachers used to give students more freedom to choose -- one of the components of the learner control triad.

Locus of control is often linked to the concept of learner control (Baynton, 1989; Rotter, 1966). There are many examples of educators who have tried to shift locus of control toward internal direction. One study described a way to shift locus of control and enhance learner control or self-direction by focusing on achieving meaning and satisfaction from learning rather than mastery of a discipline (Edelson, 1995). Stone (1992) successfully tested the hypothesis that regular telephone tutoring would ameliorate the effects of an external locus of control. Stone's work reinforces the idea that support strategies can be employed to overcome barriers related to an external locus of control. Finally, Mink and Watts (1973) implemented a special program -- called the Advanced Studies Program (ASP) -- at a community college. With this program they attempted to internalize the external orientations of non-traditional students. Although this study is 27 years old, they claim success in shifting students to greater internal locus of control with their ASP program, and that grade point averages also improved.

A student's anxiety level may also be related to learner control variables. Louise Uba (1997) writes that researchers "recognize the pervasive effects of anxiety and self-doubt characteristic of many students, and see these individual attributes as among the variables which commonly influence student learning." Stanton (1982) was able to increase internal direction of locus of control scores by using experienced relaxation, suggestion and imagery (RSI) techniques. Schuster and Prichard (1979) also successfully used suggestive affective methods to shift locus of control toward internal. Also Marso and Pigge (1991) found that student teachers that are more anxious about teaching, and believe they have less control over their environment -- that is an external locus of control -- have lower self-ratings of future success. Thus, I looked at whether counseling, RSI techniques and other strategies aimed at reducing anxiety and building self-esteem will give students the ability to increase their sense of control.
Metacognitive strategies are seen as necessary for learner control (Collins, 1994). Metacognition is defined in the ERIC thesaurus as "knowledge or beliefs about factors affecting one's own cognitive activities — also, reflection on or monitoring of one's own cognitive processes, such as memory or comprehension (NA, ND)." Vermunt (1996) did a phenomenographic qualitative study that focused on metacognitive aspects of student learning — their regulation strategies and their mental models of learning. There are three basic instructional strategies teachers can use to influence students' use of learning activities: (1) strong external control — taking over, (2) shared control — getting students to engage in some thinking, (3) loose external control — maximizing student's thinking ability. Vermunt (1996) argues that instructors need to teach students how to learn and think independently in today's society — loosen external control. Furthermore, he argues that learning style is not a personality attribute, but the interplay between personal and contextual influences. Like Vermunt's research, this study looked at how contextual influences — the user-interface — are used to help students perform learning functions they would otherwise have thought the responsibility of instruction, and may not have performed on their own.

Newbold and Rice (1998) provide an excellent example of what can be done using FirstClass software by incorporating metacognitive learning strategies like linking the known to the unknown, and requiring students to engage in re-thinking, reflecting, and re-visioning activities. The authors write that learning all the intricacies of FirstClass is not so simple for students, and they used learning activities to "reinforce the technology, and the technology . . . to reinforce the content." They observe the impact of the user-interface interactions on student learning, and write "because of the medium, the concept of text became much more flexible for students." These teachers demonstrate deliberate use of the user-interface to foster metacognitive development, which in turn helps their learners be more in control of the learning process.

Problem-based learning (PBL) is a popular instructional strategy that is all about giving learners ownership or control of the learning situation (Savery, 1995). PBL is
aligned with constructivist thinking, and has seen an explosion in its use over the last decade (Camp, 1996). Camp (1996) observes that it is difficult for teachers to give up control of the learning process, which means implementations of PBL strategies sometimes "keep the teacher 'in charge' of what is learned." But PBL is student-centered, as is the idea of learner control. Teachers who employ PBL strategies are likely to be in favor of giving learners control.

Justification of the Study

Distance education technologies are growing at a rapid rate, yet the technologies are so new that teachers are struggling to deal with this new environment for teaching and learning (Sherry, 1996). This study explores the distance learning component of using communications technologies to help learners control their own learning processes in CMC environments.

Working with faculty to "integrate information technology into instruction" was the most important information technology (IT) challenge identified by nearly 40% of 550 American colleges and universities (Green, 1999). Faculty integration ranked first of the IT issues -- up from 33% in 1998, and 29% in 1997. There is a growing awareness that integrating IT is a people problem, not a product problem. So it is important to study teachers' understanding of the user-interface as well as learner control issues in online courses.

Another reason to study learner control in CMC is that learner control links closely related variables such as self-directedness, self-efficacy, life-long learning, locus of control and motivation (Kerka, 1994). Snow (1980) observes that "there is much to be said in favor of giving learners increased control over the conditions of their own learning" (p. 152). Thompson (1998) writes, "the desire for learners to be independent and exercise control of their learning is a common theme in education" (p. 7).
Furthermore, helping learners use control options promotes a learner-centered approach to teaching and learning (Kerka, 1996).

Garland (1994) does not agree that learners should be given the freedom to choose learning goals, learning activities or forms of evaluation. Although she is generally supportive of Garrison and Baynton’s framework, she rejects the freedom (formerly, independence) aspect of the triad. However, not all agree that teachers are the only ones who can know the correctness of the course content. Teachers can learn from students, and can discover knowledge in conjunction with students. Thus, in a more egalitarian view of education, freedom to choose is rightly given to students because teachers are not the only ones who know what is important. Tappan and Brown (1996) argue for this moral approach to education -- one that addresses the relationship between forms of educational discourse and power. They describe traditional education, where students have no choice, as a "banking metaphor -- where teachers deposit knowledge into the empty vessels that are students' minds (Tappan & Brown, 1996, p. 106)." However, when students are intellectually challenged the teacher is also learning and engaged in critical dialogue with students. By rejecting the student's right to choose learning goals, learning activities and forms of evaluation, Garland is giving all power and authority to the teacher. But when authority rests on the side of academic freedom, learners have choice and can assume control of their own learning.

It is from a constructivist philosophy, which embraces the construct of learner control, that learners are seen as actively searching for meaning and encouraged to take responsibility for their own learning (Matusevich, 1995; Murphy, 1997). Murphy (1997) included learner control in a checklist of constructivist characteristics; her checklist was derived from a summary of constructivist literature. Learner control in constructivist environments is also exemplified in the techniques used for student assessment, for example, when grades are contracted with students (Jonassen, 1991; Matusevich, 1995). In constructivist settings, students are given choices in evaluation methods, and freedom to choose is a critical component of the learner control triad.
During a CBC Radio One call-in program on the topic of online learning (November 23, 1999 from 1 to 2 p.m.), one caller, who recently completed an online course, said he did not expect to have to spend so much time learning the technology, and that the teachers did not know the "methodology" of an online course. Although this is anecdotal, it does describe the significance of teacher training in online pedagogy as well as teachers and students' expectations and familiarity with the user-interface. Moore (1994) writes that although new technologies have made distance learning much less lonely and individual, "distance educators still face the important challenge of engaging with individual students in ways that build on and develop personal learning autonomy" (p. 2). He continues this discussion with an insightful side comment - "I assume the technologies work!" His parenthetical comment inadvertently illustrates the importance of communication technologies in a distance learning environment. Moore (1991) also adds, in a discussion about types of interaction in distance education, "the most important of these is the medium of communication" (p. 3).

Research Questions

Here are specific questions that relate to learner control in CMC courses and the importance of the user-interface for learner control:

1. In what ways do teachers give students choice of learning activities, content, assessments or pace in CMC courses?
2. What is the importance of user-interface interactions for learner control in CMC courses? And what are the conditions for using the interface to promote learner control?
   - For example, what percentage of time is devoted in the course to teaching specific operations of using the conferencing software?
   - And how is the user-interface orientation organized? For example, by feature – red flags, message history -- or conceptually – teaching the mental model.

3. Do teachers use the user-interface in CMC courses to promote student control, and if so, how?

4. What techniques or instructional strategies do teachers use to help students be in control of their own learning processes in CMC courses? For example,
   - Do teachers help students develop metacognitive strategies that give students more control over their own learning? If so, what are the metacognitive activities?
   - Do teachers use any pacing devices, like planning contracts, to help students exercise more control in a CMC environment?
   - Do teachers use any relaxation–suggestion–imagery (RSI) techniques to orient students to the user-interface or to help the student become more internally directed?
   - Are teachers incorporating problem-based learning (PBL) strategies as a way to shift responsibility to the learner for his or her own learning?
5. What are students' perceptions of the mechanisms for learner control that teachers have provided in CMC courses?

Explanation of Research Questions

This research is about whether and how teachers who are using computer conferencing in their courses help their learners exercise control in CMC environments using features of the user-interface. Interaction (communication) in Garrison and Baynton's DL framework is the means for integrating and balancing the components of the triad for giving learners control. Saying this in another way, control of the learning transaction is negotiated by dialogue (Garland, 1994). And the dialogue in CMC courses is between teacher and student, among students, with the content, and as proposed here, with the user-interface.

Garrison and Baynton's DL framework is comprehensive. This framework enabled a description of how much and to what degree each part of the learner control triad -- the learner, support and freedom -- teachers used to help learners be more in control. Current practice is described, and a more detailed heuristic has evolved for using the DL framework in CMC environments.

There are three types of interactions originally described in Garrison and Baynton's model, but I added a fourth type to the original DL framework -- user-interface interactions. Hillman, Willis and Gunawardena write that most discussions of distance education interaction, like Garrison and Baynton's model, typically include only three modes of interaction: (1) with the content, (2) with the teacher and (3) with other students (1994; Murphy, Drabier, & Epps, 1998). Hillman, Willis and Gunawardena propose a fourth dimension -- user-interface interactions -- because the learner-interface paradigm is a very important part of the distance education transaction, and the learner who cannot interact successfully with the user-interface will be held back regardless of his or her proficiency in other areas. For example, a student who has difficulty navigating folders
and sub-conferences in FirstClass may miss vital assignment instructions. Learning to use the conferencing interface requires some mental exertion that could reduce the time and energy available for learning the course content. Students are really taking two courses - one that teaches the content and the other teaches the user-interface. Teachers can help learners control the learning process in CMC courses, and one way to do this is by using the conferencing software -- the user-interface -- to support students, give freedom of choice and foster their personal development.
CHAPTER 2

Literature Review

Definition of Learner Control

The term learner control has a diverse history (Doherty, 1998). Learner control is usually described as students being able to regulate their own learning — exercising choice over the sequence, pace, and form of instruction (Baynton, 1989; Chung & Reigeluth, 1992; Doherty, 1998; McLoughlin & Oliver, 1995). In Goforth's (1994) meta-analysis of learner control research, he proposes that learner control is "the power to manage the interaction between learner and learning materials, and is divided between the program and the learner" (p. 19). However, his definition is narrowly confined to tutorial computer-aided instruction (CAI). Indeed, since the 1980's, research in learner control has been largely confined to its use in CAI (Doherty, 1998).

Learner control is often associated in the literature with other psychological variables such as locus of control (Rotter, 1966; Santiago & Okey, 1990) and self-directedness (Garrison, 1987); an important determinant of self-directedness is locus of control (Kerka, 1994). However, many authors (Eaton, 1996; Goforth, 1994; Reeves, 1993) agree that a precise accepted definition of learner control is lacking. Learner control is also seen as existing along a continuum from total teacher-control to complete learner-control (McLoughlin & Oliver, 1995; Reeves, 1993). Doherty (1998) has suggested that the definition of learner control "has evolved over time to include the characteristics of new learning paradigms as well as new technologies."

Learner control is also implied in theories of adult learning, or andragogy. Cross's principles of adult learning include challenging adult learners to advance in their personal development, and to give adult learners as much choice as possible (Kearsley, 2000).
Secondly Malcolm Knowles emphasizes that adult learners believe they will take responsibility for their own learning, and that they are self-directed (Kearsley, 2000). But Kerka (1994) suggests that one myth of self-directed learning is that self-direction is an all-or-nothing concept. She describes a continuum between learner direction versus other-direction, which is analogous to a learner control versus teacher control continuum. Adults differ in their willingness or ability to assume personal responsibility for learning. The freedom of choice over goals, objectives, type of participation, content, method, and assessment is an important element of this continuum.

Other terms frequently seen or closely associated with learner control in the literature include empowerment, life-long learning, self-efficacy, self-directed learning and problem-based learning (PBL). I conducted searches for learner control in CMC on ERIC, Dissertation Abstracts International and PsychInfo databases as well as university library holdings and the Internet. Search strategies included combining the following terms: CMC, learner control, learner-controlled instruction, teacher control, distance education, distance learning, empowerment, locus of control, and self-directed learning.

What learner control does not mean.

This study is about learner control in CMC learning environments; it does not focus on the narrower, more commonly encountered definition of learner control that is part of the human computer interface in computer-aided instruction (CAI). This is a key distinction since much of the literature on learner control describes the importance of giving learners control within a specific software application. For example, in a CAI lesson learners may be given control over how long to work on a lesson (pacing device) or which lesson to do next (sequencing control) (Reeves, 1993). Learner control in the context of this study is an attempt to move beyond the micro level of instruction within an individual CAI lesson (Williams, 1993). Learner control is about the student's "opportunity and ability to influence and direct the course of events (Garrison, 1989, p. 27)." Active learner participation involves giving control over higher-order activities, not
just low-level events such as clicking a mouse button to proceed (McLoughlin & Oliver, 1995). Within this broader, distance education context, learner control emphasizes the "learner's freedom to choose their learning activities to suit their own individual preferences and needs (Williams, 1993, p. 3)." This review focuses on the literature related to giving pedagogical control to learners in a CMC environment.

An important reason for not pursuing learner control in CAI is that the research in this area has not been consistent in showing much benefit to learning by giving learners control (Chung & Reigeluth, 1992; Goforth, 1994; Klein & Keller, 1990; Reeves, 1993; Williams, 1993). Yet learner control is one of the most heavily researched aspects of CAI (Reeves, 1993). What kind of control learners should be given as presented in the CAI research literature, seems at odds with the view that learner control is really just a question of achieving a balance for students in a given learning situation (Klein & Keller, 1990). The CAI research on learner control is narrowly defined, and basically examines a learner's response to a stimulus in a CAI program. But the concept of learner control can embrace so much more, and there is little research based on a broader view of the construct. In a review of reviews, Niemec et al. (1996) conclude that "designers of primary studies . . . may benefit in future from general theories of learner control that extend beyond the limited CAI research on the topic" (p. 169).

Reeves (1993) argues that not only is the lack of a precise definition of learner control and inconsistent research results a problem, but more importantly, there is little theoretical foundation in CAI that can explain why students should have some control over the learning process. Reeves (1993) believes that researchers "lack a sound theoretical basis in quantitative studies of CAI and learner control, and have avoided theoretical research" (p. 41). He makes a plea for qualitative research in learner control as a new beginning because we should observe learner behavior in-depth, and "relate the observations to meaningful learning theory that may later be susceptible to quantitative inquiry (Reeves, 1993, p. 44)." Reeves believes qualitative inquiry will help educators identify meaningful learner control hypotheses.
The Importance of Learner Control

Moore (1977), intrigued by the move to a more learner centered approach to teaching, reviewed 2,000 papers to develop a definition of independent study, distance teaching and learning, and a conceptual framework for the field. Moore (1977) writes that "the more literature we searched, the more clearly the variable of Learner Responsibility became evident" (p. 13). His definition of independent study and distance learning, formulated after an extensive literature review, includes the proviso that the "learner has an influence at least equal to the teacher in determining goals, resources, and evaluation decisions (Moore, 1977, p. 14)." In other words, teacher control cannot be greater than learner control when learning is separated from teaching by time and place. Learner control is lost if the structure of a distance learning program is too high. Moore quotes from Knowles (1970) who writes that teachers often freeze adults into "a self-concept of dependency", and educators must help these adult learners overcome previously acquired fears of being self-directed. Finally, Moore developed a brief classification of what he called independent study programs by asking the following questions:

1. Is the selection of learning objectives in the program that of the learner, or the teacher?
2. Is the selection and use of resource persons, of books, and other media, the sequence and pace of learning experiences, the decision of the teacher, or the learner?
3. Are the decisions about the method for evaluation and criteria to be used made by the learner or teacher?

This classification scheme can be extended to include CMC environments.

In an article by Milheim and Martin (1996), three possible theoretical bases are provided for examining the learner control literature: motivation, attribution and information processing. These authors present a framework for research in learner
control, and structure a conceptual review of learner control. Here are the three theoretical bases for learner control research proposed by Milheim and Martin:

1. motivation theory -- giving the learner choices thus increasing motivation.
2. attribution theory -- increasing a learner's expectation for future success, for example, an internal locus of control.
3. information processing -- allowing the learner to organize information in a way that is meaningful.

In addition, three types of learner control variables are discussed with reference to the theoretical bases: (1) pacing, (2) sequence and (3) content. The learner control variables Milheim and Martin discussed are not as encompassing as the DL framework because only choices made by a learner during a particular lesson are described. However, I see a connection between their three theoretical bases of learner control and the DL triad: (1) freedom to choose correlates with motivation theory, (2) the learner - his or her skills and characteristics parallels attribution theory, and (3) providing learner's with support depends upon how learners process information. Milheim and Martin’s conceptual framework of learner control is presented in Table 1.
Some educators have made a strong call for learners to take control of their own learning. Warren (1999) writes “distance students themselves must take some responsibility in addressing their own needs. Perhaps it is best if this is explicitly communicated to learners. For example, distance learners must:

1. assume greater responsibility for their own learning
2. become more active in asking questions and obtaining help
3. be respectful of the flexibility required by other students
4. be prepared to deal with technical difficulties in the two-way flow of information.”

Table 1

Mihlem and Martin’s Conceptual Framework of Learner Control

<table>
<thead>
<tr>
<th>learner control variables</th>
<th>motivation</th>
<th>attribution</th>
<th>information processing</th>
</tr>
</thead>
<tbody>
<tr>
<td>pacing</td>
<td>allows a rate of presentation that personally suits student needs</td>
<td>increases feelings of personal control over the learning environment</td>
<td>influences rate of encoding</td>
</tr>
<tr>
<td>sequence</td>
<td>allows control of sequence that is personally relevant</td>
<td>success is based on perceived personal control and is believed to be controllable</td>
<td>influences order of encoding and development and use of schema</td>
</tr>
<tr>
<td>content</td>
<td>allows learner to choose information that is relevant to past experience of future needs</td>
<td>success is based on perceived personal control and is believed to be controllable</td>
<td>influences order of encoding and development and use of schemas</td>
</tr>
</tbody>
</table>
Asking learners to take responsibility for learning is also supported by Garland (1993). Here is what she wrote:

Adult students should not be allowed to remain in their own comfortable ways of thinking... conveying practical knowledge per se is NOT the purpose of tertiary education... removing barriers to persistence in distance education [ensures] students have help in making these shifts in their understandings (p. 196).

McIsaac and Gunawardena, (1996) in a review of research in distance education, write that much of the early research was about comparing delivery modes; they contend that these studies are not of much practical help to educators. They also write that researchers should examine other factors, such as learner control, which will account for a difference in level of performance. Similarly, Verduin and Clark (1989) encourage distance education researchers to understand the learner so that course presentations can be modified. One such understanding is the degree of control learners can exercise in distance education, which must have an effect on their ability to be self-directed. Baynton notes that distance education students are expected to carry out much of the learning on their own (1989). This facet of distance learning environments is growing. Pennay (1996), in a compilation of distance education trend reports, describes an increasing focus on the student as client with more self-directed learning as schools shift from face-to-face (FTF) methods to asynchronous computer-based delivery.

Schieman and Jones (1995) discuss certain design challenges for distance educators: (1) learner issues – learning style, isolation, feedback, pacing, learner control, and interaction; (2) motivation; (3) access to reference/resource materials; (4) obscure or non-existent course objectives; and (5) the impact of technology on distance learners. Although the discussion is a comprehensive review of strategies for distance educators, today's computer conferencing technologies may attenuate many of the earlier distance learning challenges. The following are some reasons why things have changed:
• isolation is far less a problem in computer-conferencing and video-conferencing environments than traditional print-based distance education courses (Moore, 1994).

• access to reference materials is less of an issue with the availability of Internet accessible resources and teacher-authored websites.

• feedback can be immediate when using online testing software; e-mail exchanges between teachers and students certainly reduce turn around time for feedback.

One interesting conundrum raised by Schieman and Jones is the problem of pacing, and how distance educators often pace materials as if presented in a traditional school setting. The authors point out that one reason for not giving distance learners more control over pacing is that teachers need to keep cohorts of students more or less together -- an essential element for any collaborative group work. In other words, there may be good reasons for not giving learners more control.

In a CMC environment, student-student interaction and writing for participation are fundamental course activities, and courses delivered by computer conferencing require more active learning (Harasim, Hiltz, Teles, & Turoff, 1995). It seems somewhat surprising at first that there is more interaction between students and teachers in computer conferencing (Boston, 1992). Wells (1992) wrote, “the accessibility of the online environment can facilitate and sustain a level of intensity that is rarely achieved in FTF classes” (p. 20). One possible outcome of CMC learning environments is that the greater opportunity for active writing for interaction in CMC gives learners more opportunities for control of their own learning.

McComb (1993) writes that the very nature of CMC environments increases learner control. One reason for this is that students can initiate a conversation more easily in a CMC environment -- they don’t have to wait for a nod from the teacher to begin a conversation, and the teacher has no megaphone to call attention to his or her position of authority. A second reason is that paper documents and course materials that were lost or not readily at-hand are easily found again online, however, students must learn to find the
online documents on their own – be self-directed and in control. Finally, in a CMC environment the teacher loses some control because it is not as easy to force a student response when the teacher is not physically present.

Davie and Wells (1991) discuss CMC learning environments and student empowerment. Empowering learners is something that needs to happen before learners can exercise control. According to Davie and Wells, here's how CMC environments can empower learners, and thus allow for learner control:

- everyone gets to speak in an online classroom -- democratic environment,
- help-seeking behavior is encouraged, and students act as helpers,
- interactions can be based on competence, not on visual cues,
- the permanent written record challenges students to be accountable,
- reflecting on earlier notes may help with sense of accomplishment.

Burge (1994) interviewed students in an early qualitative research study of CMC environments. The students said "feeling in control was a motivating drive for how [we] acquired information, selected what was relevant, organized it, linked it to immediate life tasks and existing knowledge schemata" (p. 34). Burge goes on to describe the student's drive to be in control as strong, and that control needs are facilitated by a resource rich environment, psychological and ergonomic comfort, intellectual challenge that is accessible, and cognitive freedom to interact with peers within limits that delivered them from information overload. Her conclusions about learner control seem to be nicely aligned with the idea of balancing support needs, the learner's profile and freedom to choose in Garrison and Baynton's DL framework.

User-interface interactions in CMC may be important for learner control because learning to use the conferencing software that mediates class interaction is a significant component of taking an online CMC course. Hillman et al. (1994) proposed a fourth dimension of interaction in distance education – user-interface interactions – because the technologies used are an important part of computer-mediated distance education. Learners who cannot interact successfully with the interface will be inhibited regardless of
their proficiency in other domains. In CMC courses, the learner must devote mental resources to using the interface, and the mental energy used could detract from the effort required to learn the course content. Students must take control of two distinct challenges in CMC courses: learning the content and learning the user-interface. Thus, it is important to include user-interface interactions in discussions of learner control in CMC because of its significance in the distance education transaction.

In two more recent articles, Garrison (1992; 1997) extends his thinking about the theoretical DL framework -- the learner control triad: freedom, the learner and support. He discusses theoretical bases for self-directed learning and critical thinking, and how these two constructs relate to student responsibility and learner control issues. The discussion is very encompassing and draws on a large body of adult education literature. An important aspect of Garrison's view is that control must be shared and realized through continuous and critical dialogue between the student and teacher. He adds that collaboration using computer conferencing is one way to give "learners control to take responsibility for their own learning (1997, p. 10)." It is because of the sustained discourse possible in CMC that a community of learners builds knowledge.

McLoughlin and Oliver (1995) report on research that was designed to produce a guide for teachers to help learners better and more effectively control tele-learning environments (tele-learning is an audiographic or educational television context). They build on previous research that shows students feel more positive about learning tasks when given some control. Taking a constructivist stance, which they describe as a communication model of knowledge construction, the authors conclude that achieving a balance between learner control and teacher direction is the real issue. Learner control is defined as regulating one's own learning, and is seen as a continuum from total teacher control to total learner control; the degree of learner control that is appropriate depends on the student's ability and motivation. McLoughlin and Oliver's research results showed a strong trend toward teacher control and didactic models in tele-learning environments. CMC environments, which are thought to be more learner-centered by nature, did not
exhibit a similar tendency in this study. Although McLoughlin and Oliver developed a framework to help teachers create opportunities for learner control, I decided not to use their framework because the functions are not self-explanatory, and the model seems clumsy for routine use.

Baynton's (1992) research is the first study of control of the learning process in distance learning, based upon the distance learning (DL) triadic framework described by Garrison and Baynton (1987). The purpose of her study was to see if the student's experiences were congruent with the model's concept of control in distance learning environments. She used a Likert type survey questionnaire, which also had five open-ended questions, to conduct a factor analysis of the distance learning triad. Her analysis supported the original dimensions of the triad -- support, the learner and freedom, but three new sub-factors emerged from her research: flexibility under freedom, value orientation under the learner, and demarcation of the support category into academic and psychosocial support with teacher-student interactions as a significant component. Baynton's work resulted in a survey instrument that could be used to describe students' perceptions of the learner control mechanisms provided in their CMC courses.

Thompson (1998) also used Garrison and Baynton's model of learner control in his research on nursing students. He investigated learner autonomy among nurses returning to college to complete a baccalaureate degree. The students in Thompson's study were enrolled in both traditional and distance education programs. In his thesis summary, Thompson (1998) states that Baynton's model of the learner control triad is supported by his research findings.

**Learner Control and Supporting Students' Learning**

In this section, the learner control literature that relates to the support variable in the learner control triad is described. The non-human support needed to give learners control is found in the instructional design of course materials. In an industrial model of
distance learning, this was traditionally print based materials created on a mass scale by
distance education production houses (Garrison, 1997). Much emphasis is put on this
aspect of learner control (Reeves, 1993), and is further evidenced by the proliferation of
instructional design departments and support staff hired to produce these non-human
resources for online courses. However, there are many multi-media production systems
within the capability of ordinary teachers to use: CD-ROMs, CAI, PowerPoint
presentations, Web pages, etc.

Ming (1988) reports considerable success developing a well-organized set of
supports for a traditional correspondence course, including regular telephone calls. It is
not known if the students in her report -- working librarians -- were taking required
courses necessary for their careers. Ming chose to include a mandatory orientation
package with paper-based support materials, and completing this package was part of the
student's assessment. Although completion rates vastly improved, this is a highly
structured, teacher directed method of providing support. Are high completion rates the
aim of education, or is it fostering life-long learners? Perhaps less teacher direction will
have a negative effect on completion rates, but push some students toward the less
tangible but desirable goal of furthering life-long learning. Garrison (1990) warns us
about the myth of the industrial model of distance education, where a teacher and fellow
students are no longer required for interaction, and the learner is able to succeed in
isolation with well-designed pre-packaged materials.

Large (1995) writes that the hypertext environment of the World Wide Web gives
a lot of control to the learner. Not all students benefit from this amount of control; there
is a need to balance and support learner control facilities for students of varying ability
and motivation. El-Tigi and Branch (1997) suggest learner control can be enhanced with
good web design and the use of frames, image maps and tables. In a recent review of the
learner control literature, Schnackenberg and Hilliard (1998) challenge the usual
interpretation of learner control research that high-ability students are better off under
learner control conditions, and low-ability students are better off under program control.
They propose that new media and free-access navigation, like that available on the Web, is something learners of all abilities commonly encounter these days, and this may account for the changes in recent learner-control research findings.

Human support is available to students in a variety of ways: teachers, computer help desk staff, other support staff hired to assist students in on-campus computer labs, and toll-free phone numbers. Baynton (1989) found in interviews with DL students that the teacher/student relationship is of particular importance. She writes that a teacher's competence "addresses not only what the teacher brings to the learning situation in terms of knowledge, organizational skills and teaching ability, but the attitudes toward education and the students as learners (1989, p. 120)."

The learner control continuum between learner control and teacher control is the basis for some of the learner control research (McLoughlin & Oliver, 1995). Fishbein, et al., (1992) attempted to compare teacher and learner control conditions using a more authentic learner control procedure than previously studied. The authors cite some interesting aspects of previous research in this area; for example, under learner control, high knowledge students tried to get information about areas of weakness and low knowledge students repeated topics they already knew. The results of Fishbein's empirical study showed no difference between teacher control and learner control conditions; however, students in the learner control group were able to articulate the rules of the game much better. Since this was an empirical study, the researchers did not inquire about which group -- learner control or teacher control -- found learning the game more meaningful, although this would have been an interesting question from a constructivist stance.

Griffon (1993) used Garrison and Baynton's DL model to describe control of the learning process from the perspective of teachers using audio-teleconference techniques. She identified three factors that relate to control of the teaching process in audio-teleconferences: contingency, competence and comfort. Teachers react to various contingencies in their distance learning classes, and their level of competence using the
technologies is a significant factor. Finally, there is an affective dimension to the teacher's control of a distance learning environment — comfort. Griffon concludes that teacher training and other institutional supports are important for a teacher's control of the DL environment.

Metacognition.

Learners need to use metacognitive strategies in order to control their own learning. Helping learners use the control variable and become life-long learners is a worthy aim of education and instructional strategies (Thompson, 1998). Moore (1994) writes, "learner autonomy should be a goal of distance education" (p. 2). He believes educators should tap the potential of learners to be self-directing, and devise strategies to build on the learner's ability. Blakely and Spence (1990) also write that "learning how to learn . . . is a major goal of education." These authors go on to list six strategies teachers can use to develop metacognitive behaviors in students and foster life-long learning:

1. identifying what you know and what you don't know
2. talking about thinking
3. keeping a thinking journal
4. planning and self-regulation
5. debriefing the thinking process
6. self-evaluation.

These metacognitive strategies provide teachers with a guide for incorporating learner control options into the curriculum.

Metacognitive thinking is a particularly important skill for learners in CMC courses, and may serve as direct evidence of learner control. When learners exhibit knowledge or beliefs about their own thinking it is a signal they are assuming control of the learning process. Collins (1994) writes that metacognition involves "the conscious control of one's learning." Metacognitive thinking is important in CMC courses because learners depend on reading and writing to learn. Reading to learn means the reader must
know how to use metacognitive strategies (Collins, 1994). Collins also states that metacognitive development precedes control of the learning process. Thus, metacognition has an important role when learners control their own learning processes.

Marland et al. (1992) studied distance education students' thinking while they were studying text; the authors were not impressed with the quality of the metacognitive processes students engaged in. They conclude that textual study materials can be written to invite metacognitive thinking by making study strategies explicit (Marland et al., 1992). This advice about instructional strategies relates to the support variable in the learner control triad. When teachers have instructional materials or handouts that clearly outline study strategies students could use, this suggests that teachers are promoting learner control through metacognition.

Neill (1998) emphasizes that it is easy to fall into a "telling as teaching" mode in distance learning, yet according to research on the way the brain learns it is even more important in distance learning environments not to succumb to this form of teaching. Neill also observes that well designed learning activities can promote critical thinking and provide opportunities for metacognition. Furthermore, Gunawardena and Zittle (1997) believe that teachers/moderators of online discussions can impact the student's perceptions of interaction and social presence in CMC. It is the teacher's skill and technique that makes the greatest difference. That is why, as in this study, it is important to describe the teacher's methods when looking for evidence of metacognitive strategies for giving learners control.

Looking at the metacognition -- learner control connection from the opposite direction, Jo (1993) writes that learner control can be used to enhance the metacognitive strategies students use in problem solving. Jo (1993) states, "Learner control provides learners with opportunities to analyze their own comprehension and needs and to use instructional components according to the analyzed needs" (p. 4). Control options are when students are given "opportunities to analyze their own comprehension and needs
and to use instructional components according to analyzed needs (1993, p. 4).” There are four recommendations for using learner control options:

1. label control options clearly
2. give immediate feedback on progress as well as summaries of how the student is using control options available
3. require learners to learn about instructional components
4. train learners to use control options of a learning system.

To summarize the metacognitive – learner control connection, metacognition is necessary for control of the learning process. Conversely, giving learners control options is a way to promote metacognitive thinking. Metacognitive thinking is particularly important in CMC environments where students are reading and writing to learn. Finally, evidence of metacognitive strategies could be an indication that teachers are using learner control variables as a teaching strategy because these two constructs are so closely linked.

Learner Control and the Learner

The second aspect of the learner control triad is the learners -- their skill and aptitude to do what is required, as well as their motivation and expectations. Baynton (1992), who completed a factor analysis of learner control in distance education, found that the student competence variable accounted for the greatest variance in the learner control triad. The variable with the highest loading was study skills (.81), followed by motivation (.68) and thirdly, confidence (.63) (Baynton, 1989, p. 61). Altogether, the student competence variables accounted for 20.4% of the overall variance. The discussion of students' level of skill and ability leads naturally into a psychological profile of the learners.

A notable psychological variable is locus of control, but also closely related are the psychological constructs of self-directedness, self-efficacy, and students' expectations. Each of these attributes will be discussed in relation to learner control.
The concept of learner control is often associated with self-directed learning in the literature (Garrison, 1987; Long, 1990). Guglielmino (1977) developed the Self-Directed Learning Readiness (SDLR) instrument. The SDLR scale's main use is for predicting and advising students contemplating self-directed learning experiences. Eight factors in self-direction in learning are contained in the SDLR: openness to learning opportunities, self-concept as an effective learner, initiative and independence in learning, informed acceptance of responsibility for one's own learning, love of learning, creativity, future orientation and ability to use basic study skills and problem-solving skills.

Guglielmino currently works in this area, and has a commercially available survey called the Learning Preference Assessment. On her website (http://www.hdcp.com/2011.htm) she writes, "some people have a low level of self-directed learning readiness because they have consistently been exposed to other-directed instruction." Following this logic, teachers can become skilled at giving learners more control as a means to improve their self-directedness.

There are many references in recent literature about promoting self-efficacy in technology dependent educational settings. An Ontario community college professor wrote this about his experiences using technology-mediated delivery:

Surveys of student opinion reveal that while they were initially uncomfortable with a new course delivery method, resistance will dissipate with experience. A very important indirect benefit of the system was that our students gained a new sense of accomplishment by participating in something unconventional and innovative. The distance education experience also provides advantage in preparing community college students to be independent, to act on their own initiative, to accept more responsibility, and to meet unexpected demands. These are strengths much sought, and well-rewarded, in the work world (Lemiux, 1993).
Locus of control.

There is much educational literature on locus of control (LOC), and the concept is related to the study of learner control (Baynton, 1989). Locus of control is seen as an important variable for learner success and lies along a continuum from internal to external control (Rotter, 1966). Learners with an internal locus of control see themselves as contributing to their own success or failure, for example, “I didn't study hard enough to get a good mark.” Learners with an external locus of control believe outside factors determine achievement, for example, “I didn’t pass the test because the teacher doesn’t like me.” There is definitely support from many other educational researchers to study locus of control “because of its influence on achievement as a predictor of persistence in higher education” (Visor, Johnson, Schollaert, Good Mojab, & Davenport, 1995). It makes much sense to include LOC as an important characteristic when describing learner control variables. However, King (1994) cautions that the relationship between learner control and LOC is complex, and it is premature to draw any conclusions. Also Baynton (1989) notes that LOC is more of an individual characteristic than the concept of learner control, which encompasses learners' attributes as well as the learning environment.

Rotter (1966) writes that an individual with “a strong belief that he can control his own destiny is likely to . . . be more alert to those aspects of the environment which provide useful information” (p. 25). For example, internally directed students are more likely to observe the fact that they have the ability to choose online delivery over traditional classrooms than externally directed students. This alertness in internally controlled students is relevant to many aspects of an online learning environment.

The Pathways to School Improvement web site (Barell, 1995) http://www.ncrel.org, notes this about learner control:

Research helps us understand the important role played by self-confidence and a feeling of being in control. For example, research suggests that students perform at higher levels if they have confidence in themselves (Pressley, 1987), and that personal efficacy is a matter of internal locus of
control. Students with more internal locus of control attribute their success to their own abilities and not to luck or chance, as do persons with an external locus of control (Thomas, 1980). When students realize that their thoughts control their actions (i.e., their locus of control is internal), they can positively affect their own beliefs, motivations, and academic performance (McCombs, 1991).

Locus of control is also linked to self-efficacy in psychology literature. One important determinant of self-efficacy is one's locus of control. Self-efficacy is described as our belief about self-competence and effectiveness. "People with self-efficacy are likely to be more successful and persistent, and less depressed and anxious than others (Gecas, 1991, p. 171)." Thus, locus of control is an important indicator of self-efficacy that may describe a student's willingness to risk choosing a non-traditional delivery mode, as well as to persist in the new learning environment.

It seems logical that an internal locus of control, which is believed to be a determinant of self-efficacy, is also a factor in self-directed learning. Kerka (1994) wrote that self-directed learning is associated with an internal locus of control. Martin (1996) noted "one effective approach to lifelong learning is to become a self-directed learner by taking control of both the methods (means) and content (objectives) of one's own learning." Psychological control is the essential component to self-directed learning according to Long (1990). In addition, Kinzie (1990) adds that locus of control is an important measure in the study of continuing motivation. Some of the theoretical discussions are ongoing in terms of self-direction and alternative delivery modes (Uba, 1997), but there seems to be general support for the idea that an internal locus of control, self-efficacy, and self-directedness are related variables, and are important elements of student success in online courses.

Kothare (1993) writes "the development of positive self-esteem, self-reliance, and increased internal locus of control are desirable goals at all levels of education." He used a
"feedback-loop approach" to attempt to decrease students' locus of control scores (become more internally directed). The results of Kothare's study strongly predicted that by "pre-announcing precisely stated and measurable learning objectives, and providing immediate feedback of achievement of these objectives/outcomes, . . . [resulted] in a significant decrease in scores in the direction of less external locus of control, as measured by the Rotter I-E Scale." Kothare also noted that an improvement in a student grade was proportional to a student's locus of control score becoming more internal. Although the data supported Kothare's research hypothesis, the approach seems very teacher directed -- based on a transmission philosophy of education. Furthermore, improved quiz scores were used to measure student achievement, and it seems inevitable that rote learning of teacher-controlled content would improve with these behavioral interventions. Rote learning does not necessarily mean gains in less perceptible goals of students becoming life-long learners. Once the teacher controlled structure and content is removed, students have not necessarily advanced in their ability to be self-directed and in control of their own learning process.

Despite the benefits of teachers giving control to learners, researchers have found that externally motivated students require more teacher direction (Klein & Keller, 1990). Stone (1992) also concluded that externally motivated students require more contact and interaction with tutors. However, a limitation of his study is that there was no distinction made between teacher initiated and student initiated contact, so we don't know the amount of autonomy students felt they had for controlling their own learning.

Students' expectations.

Another aspect of learner control is the student's expectations regarding the amount of control that is appropriate. Some students may believe that control of the learning situation is the teacher's responsibility. I have heard students complain that they are not getting their money's worth in online courses because the students have to do all of the work. One way to view this attitude is that a student's locus of control will affect
the degree of learner control the student is willing to accept. Externally directed students will expect more outside direction, and internally directed students will be happy with less teacher direction. So it is a question of finding a balance between the student's locus of control and using learner control variables.

Burbach and Wagoner (1974) examined the relationship between school variables, including achievement, and control over context-specific environments in an urban high school. In their report they indicated that feelings of control correspond to a positive orientation to education even when the effects of sex, race, and socioeconomic data are removed. They say that earlier research findings show that feelings of control over the environment is one of the most important variables explaining student achievement, and this can be generalized to include context-specific situations, such as a school setting. They conclude that feelings of control not only relate to achievement but to the student's overall orientation to education. It follows that students' expectations of how much learner control is appropriate would also relate to their overall orientation to education.

Field-dependence or independence is another way to describe students' comfort level with how much learner control is suitable. In a pre-World Wide Web research study about the concept of field-dependence versus field-independence, researchers described a field-dependent learner as needing to be with others, externally motivated and needing more explicit instructions or definitions of performance outcomes (Thompson & Knox, 1987). Field independent learners, on the other hand, desire autonomy in their learning, want to control pacing, and require less structure and fewer interactions with teachers and students. Field-dependence/independence is not related to IQ. The researchers hypothesized that field-independent students would be more likely to enroll in distance education courses, and the research findings supported this claim. However, a second hypothesis that field-independent learners would be more persistent in distance learning was not supported by the findings. This unexpected result is explained by the fact that the entire study population was skewed toward field-independence, and also by the belief that field-dependent learners who sign-up for a traditional distance education course are
aware that interaction will be minimal. Thus, these students are less sensitive to the usual characteristics of being field-dependent learners. It is not known if students have similar expectations about online CMC courses. Perhaps students new to CMC courses have an expectation of low levels of interaction based on their preconceptions about distance learning.

Pugliese (1994) thought that a student's academic and social integration were important for student success, so he looked at the psychological constructs of loneliness, dyadic communication apprehension, communication competence, and locus of control to see if any of these variables affected persistence in telecourses. (Telecourses in this study are one-way television broadcasts of educational content delivered to community college students.) Interestingly, Pugliese included the student's past behavior pattern in the number of withdrawals and failures from other courses when analyzing his data. The results did not support any of the hypotheses, and the author came to the conclusion that "telecourses apparently minimize the assets and liabilities of social skills (Pugliese, 1994, p. 34)." One explanation is that the normally stronger, more socially skilled, internally motivated student is distracted in a socially impoverished telecourse environment, and this tends to cancel out the academic disadvantages for the less motivated, socially inept, and externally motivated students. Also noted is the fact that students have lower expectations in telecourses -- they know upon enrollment that this type of course has little opportunity for social interactions. Since both Thompson and Pugliese explained results based on student expectations of a distance learning environment, it would be interesting to discover if students had similar beliefs about online CMC courses.

From a constructivist point of view, students' expectations can also be viewed through their mental models of the user-interface; mental models are what they use to make sense of the CMC environment. A mental model is described as the user's expectation about what will happen when using a computer system as well as his interpretation of system feedback (Hueyching & Reeves, 1992). Hueyching and Reeves (1992) write that even though it makes sense that learners' understanding of the structure
and function of a system will help them navigate, use, and learn from a system, there's little research to support this claim. Learning styles and prior learning experiences are thought to have the greatest relevance for human-computer interface (HCI) issues in interactive learning systems. Hueyching and Reeves found learner characteristics that promoted learning include field independence, learner control, reasoning ability, and direction following. These authors believe the study of mental models plays a critical role in HCI, and that when learners have an adequate mental model of a system they are less likely to get lost and more likely to learn. The learner's mental model "is the source of the user's expectations about the effects of actions (Hueyching & Reeves, 1992, p. 45)" and is probably most important when first learning to use a system. Their work demonstrates the importance of student's expectations about the user-interface, and that user-interface interactions play a role in student learning. Thus, these authors provide further support for the inclusion of user-interface interactions as part a comprehensive DL framework.

**Learner Control and Freedom to Choose**

Garrison and Baynton (1987) write that a third variable in the learner control triad is giving students "the freedom to explore possible learning objectives" (p. 9). King (1994) writes that the "balance between freedom and structure has been a key element in effective learner control treatments" (p. 169). Others note that giving freedom to students of low ability or motivation is not always effective because they lack the ability to make appropriate decisions (Chung & Reigeluth, 1992). Kerka (1994) asserts that elements of self-directedness include the degree of choice over goals, objectives, type of participation, content, method and assessment. Thus, the learner's degree of self-directedness is determined to some extent by his or her ability to control the learning environment (Kerka, 1994). Self-direction is a psychological construct that is an antecedent to the students' level of independence — their freedom to make choices. But
the degree of freedom also depends on the choices teachers make available to their learners.

Gerald Grow (1991) has developed an interesting model for matching a student's ability to self-direct with teaching style. He contends that as students become more self-directed, both the teaching style and the curriculum can become less controlling. Self-directed learners can handle more freedom. Students who are not self-directed do best in a lecture format, while students who can be self-directed do independent projects with the teacher functioning more as a consultant. Although Grow doesn't extend his model beyond that of teaching style, a CMC learning environment in some ways exacts a less controlling teaching style. Thus, Grow's model can be applied to CMC environments to help us understand the student's degree of self-direction relative to the amount of freedom teachers give to their learners.

Looking at freedom from the perspective of course resources and materials, Shaw and Taylor (1984) write “undue structuring of learning materials may displace the interaction with study materials that produces learning from the learner to the teacher or designer” (p. 284). In other words, rigid and prescriptive distance learning materials will take control away from the learner and give it to the teacher because freedom to choose is essential for learner control. Carrier and Schofield (1991) note that CMC distance learning environments by their very nature give students more control over pacing, and facilitate choice in student support modes. However, Baynton (1989) observes that traditionally distance education courses have been tightly structured, and that teachers need to find ways to build in more freedom for distance learners.

**Conclusion**

Learner control can be defined as the “opportunity and ability to influence, direct and determine decisions related to the educational process (Baynton, 1989, p. 6).” Control is seen as a need, as a belief or perception, or as something that impacts one's
expectations (Baynton, 1989). Yet control is not something we can see; it's something we feel. Baynton (1989) writes that the concept of control "has been used extensively at both a micro and a macro level in a number of related disciplines including psychology, sociology, communication and organizational theory" (p. 11). In psychology, the belief that one has some control over events and outcomes is a positive adaptive response; conversely, a sense of defeat – learned helplessness – often results from the belief that one has no control. The concept of control is also a key aspect of the study of interpersonal communications, and an important goal of adult education is to develop a sense of autonomy in the adult learner (Baynton, 1989; Knowles, 1975).

A search of ERIC and other relevant databases revealed that there is a large body of literature on the subject of learner control in CAI and on locus of control. But there is much less written about learner control in distance education, and even less for CMC learning environments. Yet Garrison and Baynton's theoretical model of the distance education experience using the construct of learner control aptly describes not only variables in a CMC environment, such as pacing, resources, and presentation styles, but characteristics of the distance learner – ability, learning style, motivation, anxiety, locus of control, etc. Giving learners choice and options is essential for experiencing control of the CMC learning environment, and learner control has positive consequences for the student (Baynton, 1989). Teachers need to find ways to make it possible for learners to experience control to the best of their ability.
CHAPTER 3

Methodology

This is a qualitative study in which I investigated how instructional strategies, user-interface interactions, and the way teachers have fashioned the user-interface act together with the teacher's interventions to promote or constrain the student's control of the learning process. CMC is by nature a learning environment that gives learners control (McComb, 1993; Murphy et al., 1998). Thus, it is particularly interesting to study learner control in CMC courses. To my knowledge, researching learner control in CMC environments has not been previously attempted. It is the interaction between the factors in the DL model, and how they are connected that is the focus of this study.

My beliefs are centered on a constructivist philosophy of education – we learn by reflecting on our experiences and constructing our own mental models of our world (Murphy et al., 1998). Akyalcin (1997) sums up my thinking very well:

The constructivist model of learning is about discovery and participation.
It's about the journey of learning where mistakes are part of the road to investigation. It's about the learner learning how to learn and an educational culture whereby students are encouraged to be autonomous.

It could be argued that the construct of learner control only makes sense from a constructivist stance.

This research also follows the interpretivist or qualitative paradigm. Many have recommended qualitative research on learner control in distance education (Baynton, 1989; Reeves, 1993; Thompson, 1998). It is time for educators to try post-positivist methods, especially because quantitative approaches to learner control have not been entirely successful (Reeves, 1993). Furthermore, qualitative methods can be used to help discover relationships with instructional media in a class (Kozma, 1994). Reeves (1993),
who is critical of much learner control research to date, describes the predominantly quantitative approaches as "pseudoscience" because they fail to live up to the rigors of a true empirical approach. Here are the reasons he believes quantitative learner control research to date is pseudoscience: (1) the definition of learner control is not precise, (2) a theoretical basis for learner control research is lacking, (3) there are technical and methodological irregularities that invalidate many learner control studies, and (4) there are analytical problems that result from small sample sizes, large attrition rates, and failure to eliminate certain subjects. Based on these fundamental problems with learner control research in the quantitative paradigm, Reeves argues that the time has come to build a theoretical foundation in learner control, and this can best be accomplished with qualitative research. Moore (1991) also asks educators to observe the learner control conditions in distance learning, and relate these findings to learning theory.

For this study, teachers delivering online courses or required CMC components of courses were interviewed about their experiences using computer conferencing software as well as their beliefs about providing learner control options. In addition, students currently enrolled in the teachers' CMC courses were asked to complete an online learner control questionnaire. The student survey supplied data on the students' perceptions of any learner control options provided by their teachers.

In this study I described what is happening in CMC classes using the DL framework, as well as some other factors that emerged from the data analysis, as a basis for interpretation of my findings. I looked at whether the user-interface is an important element for learner control in CMC courses. The research focused on whether or not teachers fashion the user-interface to help their learners take control of the distance learning process, and whether the teacher's interventions further or hold back a perceived sense of learner control for students. Wise architects sometimes wait a year or more after constructing a new building to pave the walkways. The reason for this delay is that the architects want to see where people create natural paths in the grass before paving the walkways (Alexander et al., 1977). Qualitative research of distance learning using the
Internet is analogous to this since it is the users that define the pathways; this research study will not attempt to pave the way, but rather observe what is evolving naturally.

Research Design

This is a generic or basic qualitative study about whether or not teachers fashion the user-interface in CMC courses, and if so, how they shape the user-interface. This study is also about the process of giving students a sense of control in a CMC learning environment. The study is heuristic because it enlightens the readers' understanding of the phenomenon, is richly descriptive, and focuses on a particular process (Merriam, 1998). My research is classified as a basic or generic qualitative study, which according to Merriam (1998) is the most common form, because it “simply seeks to discover and understand a phenomenon, a process, or the perspectives . . . of the people involved” (p. 11).

Participants

Ethical approval was obtained from The Student Education Ethics Review Committee (Human Research). Six teachers, one of whom was female, were interviewed for this study. All but one teacher was selected from a list obtained through my contacts at Centrinity (formerly MC²/SoftArc) — the makers of FirstClass. The vendor sent out an e-mail asking the teacher's permission before giving me his or her name. Then I followed the leads from Centrinity, and contacted the teachers directly via e-mail. One teacher, with whom I was not previously acquainted, was recruited when I attended a provincial conference. The time and place for the interview, as well as sharing letters of consent were negotiated via e-mail. The consent form was signed at the time of the interview. See Appendix A for samples of the consent letters signed by the teachers, and e-mailed to the students.
The aim of the sampling strategy was to obtain a homogeneous sample. When this approach is taken researchers are able to describe a phenomenon in greater depth (Glesne, 1999). Since the research questions were about learner control and the importance of the user-interface in CMC, and not about the teachers themselves, there was perceived to be some benefit in minimizing the variability among the teachers.

Although the purpose of this study did not include evaluating different user-interfaces, there are reasons why I chose FirstClass as the predominant user-interface. First, as the researcher, I am very familiar with the FirstClass interface, and have used FirstClass to deliver online courses for five years. I have taken courses in FirstClass administration, managed a FirstClass server for seven years, and have been employed to train teachers on its effective use. Second, FirstClass is widely used in education. A 1995 book claimed FirstClass to be the most prevalent conferencing system in education (Bates, 1995) quoted in (Murphy et al., 1998). This is probably no longer true with the current market domination of WebCT and Blackboard (Franz, 2000). However, FirstClass is not a course management tool like WebCT or Blackboard, it is a communication tool, and as such focuses the CMC environment for this study on the interactions in distance learning. It is the dialogue between teachers, students, the content and the user-interface that is the topic of this analysis – not how students get test results or how teachers record marks. I have also administered a TopClass server for three years, and have participated in three courses that used WebKF as the conferencing tool.

Four participants used FirstClass to deliver their courses, one used TopClass, and the other used WebKF. Four teachers were delivering true distance education courses, and two used the communications software as a required component of their traditional face-to-face classes. Of these two, one teacher weighted the CMC component as 40% of the final mark, and the other gave the online discussions 10% of the final mark.

Overall, the teachers could be described as very experienced educators, except for one, and all were very knowledgeable about education. See Table 2 below for a summary of their profiles. Two teachers had PhD's in education, two were working on PhD's in
education, a fifth taught in a post-diploma educational assistant program, and the sixth teacher had over ten years of teaching experience. Most had at least several years of experience delivering online courses, and because this type of delivery has been commonly available for only a few years, this is considerable online teaching experience.

Table 2

Summary of Teachers' Profiles

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Overall teaching experience</th>
<th>Online teaching experience</th>
<th>Education</th>
<th>Type of course and student profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Over 24 years</td>
<td>2 years</td>
<td>M.A., Developmental Psychology, completed Ph.D. coursework</td>
<td>Students enrolled in a 1 year post-graduate educational assistant diploma program</td>
</tr>
<tr>
<td>#2</td>
<td>1 year</td>
<td>1 year</td>
<td>M.A. in British Literature, enrolled in Ph.D. in Education</td>
<td>1st year university students taking a required English course</td>
</tr>
<tr>
<td>#3</td>
<td>11 years</td>
<td>3 years</td>
<td>Ph.D in History</td>
<td>1st and 2nd year university students taking a history elective</td>
</tr>
<tr>
<td>#4</td>
<td>35 years</td>
<td>3 years</td>
<td>Ph.D in Education</td>
<td>Community college students taking a general education elective</td>
</tr>
<tr>
<td>#5</td>
<td>19 years</td>
<td>11 years</td>
<td>Ph.D in Education</td>
<td>Students in 1 year B.Ed. program (final year of Baccalaureate)</td>
</tr>
<tr>
<td>#6</td>
<td>25 years</td>
<td>3 years</td>
<td>Enrolled in Ph.D. in Education program</td>
<td>Community college, mature students, taking a required English course</td>
</tr>
</tbody>
</table>

Teacher #1 taught in a one-year Educational Assistant post-diploma program at a community college with approximately 45 students. Post-diploma means the students had a college diploma or university degree before entering the program, so her students were probably more independent than students just beginning a college program. An Educational Assistant has knowledge of teaching and learning generally, as well as
information about special education, augmentative communication, educational technologies and adaptive technologies used in schools. Although Teacher #1 did not have an advanced degree in education, her many years teaching in a program about education gave her the knowledge and experience to converse fluently about educational theories. Teacher #1 chose Web Knowledge Forum (WebKF) because she felt something was lacking in classroom discussions. When she discovered WebKF, she immediately recognized the potential of this software to enhance student-student interaction.

So I was always looking for things that would enhance education and learning, and I saw this software software... [because] they [students] never got to the collaborative learning... And then I discovered that it was actually based on the work of Marlene [Scardamalia] and Carl [Bereiter]. So I knocked on Marlene's door and said "Hi I think this is really neat I want to know more about it."

Using WebKF, teacher #1 integrated an asynchronous CMC component into the Educational Assistant program for the last two years, and she was very enthusiastic about the impact it had on student learning.

Teacher #2 was the least experienced of the participants, with only one year's experience. He taught one semester in a classroom, and the following semester in an online course, so he did have some basis for comparison between the two modes of delivery. The online distance course he taught was a required undergraduate English course for about 45 first year university students. He had no input into the type of software used, which was FirstClass. Teacher #2 was currently enrolled in a doctoral program in education at the university where he taught.

Teacher #3 was the only participant with no advanced theoretical background in the field of education. He had a Ph.D. in history, and taught Canadian History in an online distance education course to over 100 first or second year university students. This was his third time teaching this course, and he was enthusiastic about teaching online.
Teacher #3 was a tenured professor, and he did have some choice in the platform he used, which was FirstClass. He rejected other course management tools available to him because he was very satisfied with FirstClass. “I’ve used FirstClass, but I’ve also used a web based small group discussion format. And I like FirstClass much better. I just find it a friendlier atmosphere to teach and learn in.”

Teacher #4 was the most experienced educator with 35 years of teaching experience. He also had a Ph.D. in education, and a full teaching load doing online distance courses for over three years. Teacher #4’s courses were delivered via FirstClass to over 100 community college students taking a general education elective. His students were able to choose their general education electives from a list of possibilities, and his online classes were in high demand. “I know that my online courses, for good, bad reasons, are full 24 hours after online registration opens. At that time the average gen ed has seven in it.” Teacher #4 was enthusiastic about FirstClass, and was resisting administrative pressure to switch to Blackboard.

It [FirstClass] has an implicit pedagogy towards facilitation rather than lecture. And that’s why I like it. And that’s why I don’t like Blackboard. Blackboard does this far less well – it’s been designed in a much more stodgy way to humor the lecturers who are using it as a support for lecturing.

Teacher #5 had 19 years of teaching experience, and was a tenured professor in a faculty of education at a university. His students were fourth year Bachelor of Education candidates, and he used FirstClass as a required component of a FTF class. Teacher #5 had a long acquaintance with CMC, and had used text based conferencing systems in the late eighties. He was very supportive of the FirstClass system in use within his department, but pointed out that he was already committed to computer conferencing before he knew about FirstClass. “So I kind of learned FirstClass along the way, but I’ve learned something about conferencing before. I mean for me it was just a question of learning the technical aspects of FirstClass.”
Lastly, Teacher #6 was also a very experienced educator who taught at a community college for 25 years. He was currently enrolled in a doctoral program in education. Teacher #6 taught an English course that was required by most programs areas. His students did not, for the most part, elect to take his course, but they were able to choose online versus classroom delivery. At the time of the interview he had only ten students enrolled. He began delivering the course online three years ago, but only used TopClass for the last year. He was grateful to have the TopClass system after doing things from scratch in the first years of his online teaching experience. "I set the course up before we had TopClass or anything. I literally was carving it out of web pages before I knew how to DO web pages (laugh)." Teacher #6 also knew FirstClass quite well and made some comparisons to TopClass, which I will describe later.

Because of the information contained in the preceding paragraphs describing each teacher, I decided not to identify individual quotes by teacher number. I believe it would expose my participants too much if I labeled each quote. Many of the participants are in unique situations, and identification would not be difficult by those who knew of their work. If I were to expose the teachers further by identifying who said what, I believe I would have crossed the limits of my ethical review.

Data Collection

These data were collected from the participants using three methods:

1. audio-recorded teacher interviews
2. student learner control questionnaire
3. teaching materials, resources, hand-outs, and instructions voluntarily offered by the teachers.

The primary data consisted of transcripts from recorded interviews with the post-secondary teachers using FirstClass or other conferencing software for courses where
CMC is a requirement. In qualitative research, data are normally collected by in-depth interviews (Johnson & Christensen, 2000).

Students enrolled in each teachers' courses were invited to give a description of their perception of the learner control mechanisms their current teachers provided using Baynton's Learner Control (BLC) questionnaire. Permission to use the tool was granted by Dr. Baynton -- see Appendix B. The questionnaire was available via a web browser, however, the online survey service used is no longer available. See Appendix B for a print example of the online questionnaire as it appeared to students completing the form.

All of the teachers gave me printed copies or electronic access to their course materials, and assignment instructions. Five of the teachers gave me access to their course conferencing system. The only teacher who did not give me access was not asked for that privilege. In his situation, teaching assistants led the online discussions, and the teacher's assignment instructions, course materials, and class announcements were posted on a password protected web page, which was accessible to me. I decided that what little information I might glean about this teacher's beliefs by entering the conferencing system was not worth my invasion of the teaching assistants' and students' privacy.

Instruments

Interviews with teachers took a central role in data collection. Fetterman (1989) notes that interviews are the most important data collection method for qualitative researchers. The interviews were standardized and open-ended (Fraenkel & Wallen, 1993). The following are some characteristics of this method:

- the wording and order of questions is determined in advance, and each participant is asked the same questions in the same order.
- a strength of this type of interview is that answering the same questions helps make data analysis more systematic and comparable among subjects. Also, this
approach reduces somewhat the effect of interviewer bias because questions are identical.

- a weakness of this type of interview is that there is little flexibility allowed in wording and sequencing, which may stifle responses from each participant, and limit the scope of teachers' answers.

Using Baynton's Learner Control questionnaire and the DL framework as a guide, questions were developed for the teacher interviews. Two community college teachers teaching online courses were interviewed as part of a pilot study to check the appropriateness and usefulness of the interview questions. Conducting the pilot interviews helped refine the interview questions. See Appendix C for a list of teacher interview questions with bulleted notes for the interviewer.

The BLC was developed to measure the extent to which students experience the three factors in the DL model (the learner, support and freedom), as well as the extent to which students believe these dimensions are a priority in distance learning (Baynton, 1992). I decided to offer the questionnaire over the Internet, rather than using paper and pencil in a face-to-face setting. I felt that students taking an online course would find it easier and more convenient to complete a questionnaire online. Furthermore, an online survey respects online students' freedom to interact at any time and from any place -- in online courses students are not normally expected to meet FTF. Furthermore, some students would probably find it physically or geographically impossible to participate in a FTF interview or paper and pencil questionnaire.

The BLC has been used twice previously in doctoral theses (Baynton, 1989; Thompson, 1998). The BLC is a seven point 28 item Likert type questionnaire with seven open-ended questions that measure the degree to which learners experience freedom, the skills they need, and the support provided in a distance learning environment. Because the BLC was conceptually designed around the DL framework, it was very suitable for this study. Eight items in the BLC address the issue of freedom (independence); nine items relate to the variable of support and 11 items to the variable of the learner. Content
validity was originally established by pilot testing and consulting expert reviewers (Baynton, 1989). Further pilot testing, as well as inter-rater reliability measures, were established by Thompson (1998). He reports the Cronbach's alpha coefficient was .81 and Cronbach's alpha estimate for reliability was .83 (1998, p. 52). Thompson pilot tested the BLC with 330 teleconference and home study students. Thompson (1998) concluded, “all correlations among the three sub scores had significant, positive, and strong relationships” (p. 73). My own reliability analysis with 120 responses showed a reliability coefficient alpha of .8564, which is high (see Appendix D). The BLC also had a high level of internal consistency. Finally, two students volunteered to complete the BLC in my presence and talk aloud about each item. From what they said to me, none of the items appeared to be misinterpreted by the two students.

The BLC questionnaire is scored separately for each subscale - support, the learner and freedom items -- and by adding up the total score on all items. There is no reverse scoring (Baynton, personal communication, quoted in Thompson, 1998). The scores range from 0 to 42 for support, 0 to 66 for the learner, and 0 to 42 for freedom; the total overall score is 0 to 168 for 25 items that were included in the final analysis (Baynton, 1989).

The BLC was developed with five open-ended questions as well as the 28 Likert items. In addition to the original five open-ended questions in the BLC, namely questions 2 - 6, students were asked to comment on whether they thought the user-interface was a factor in taking control of their own learning and on the importance of peer support (questions 1 and 7). All seven open-ended questions that accompanied the BLC are listed below:

1. In what ways does using the conferencing software (FirstClass or Knowledge Forum) help or hinder your feeling in control of the learning process? (NB – Knowledge Forum was replaced with TopClass during the time period TopClass users completed the survey.)
2. Please list 5 things that give you control over your learning process (for example, choice in assignments).

3. What personal characteristics or abilities do you have that enable you to control your learning process (for example, self-motivation)?

4. What kinds of learning materials/resources need to be available so that you can be in control of your learning process?

5. What can a teacher do to increase a learner's control of the learning process?

6. What can the college do to increase a learner's control of the learning process?

7. In what ways are your fellow students a factor in your feeling in control of your own learning?

Data Collection Procedures

The teachers were interviewed in person. The length of the interviews ranged from one to one and a half hours. I feel that I had good rapport with the teachers during the interviews, and their cooperation with the student survey and other matters following the interviews provides some evidence of this. The interviews were audio recorded and transcribed by me. I believe that doing the transcriptions myself gave me an opportunity to become better acquainted with the data. The resulting text files were coded and analyzed using Atlas.ti – a qualitative data analysis software product. The intent was not to evaluate the teachers, but to describe their commitment to learner control, and their use of the user-interface to give students control options.

Baynton’s learner control questionnaire (BLC; see Appendix B) was introduced by the teachers to their own students. Neither the teachers nor I knew who completed the
survey. However, two of the teachers offered their students bonus points for completing the survey, and accepted students' self-reports as evidence of completing the BLC.

Teachers were interviewed in May and June 2000. Three of the teachers did not have online students at the time of the interview, so their students were not surveyed until later in the fall. I thought that the teacher's beliefs about teaching and learning were unlikely to change profoundly within the period between the interview and collecting students' BLC scores. I believe that the time gap between these two events probably did not affect the outcome. Also, because I had access to their online courses in the fall, I was able to observe anything that might have changed from the time of the interviews. The other reason for surveying students later was to give students time to become familiar with the user-interface. At the beginning of the term, students are struggling to learn basic procedures, and minor technical hurdles may affect their reported experience of using the user-interface. Furthermore, it has been my experience that the workload in an online course is far greater in the first few weeks of the term. By mid-semester students can proceed more independently, and the teachers have more time as well.

Trustworthiness

Using Lincoln and Guba's (1985) criteria for establishing trustworthiness of qualitative data, the following is an assessment of my data collection techniques:

- two teachers were interviewed as part of a pilot study to assess the usefulness and appropriateness of the interview questions.
- interviews with teachers were recorded in order to improve accuracy of the data.
- field notes were also written during the interview period as corroboration.
- teachers' course materials, use of the user-interface and assignment instructions, which were available to me through online access to the teachers' courses, were an important way to triangulate data from the teachers' statements about giving learners' control.
- BLC survey data from students added to the thickness of description.
- peer-debriefing -- I consulted with my colleagues, who are experienced delivering CMC courses using FirstClass, on a weekly basis in the fall of 2000, about user-interface interactions and student control.
- member checks were done by asking for feedback from participants once the transcripts were prepared. I did not disclose my interpretations of the data, but I did give teachers an opportunity to change or delete anything that was said in the interview.
- I kept a reflection journal beginning with the start of data collection and continuing through data analysis.

**Limitations of This Study**

There are a number of potential limitations when considering the results of this study. One possible limitation of using triangulation strategies is that if data from two sources agree, we can't assume truth. Mathison (1988) writes one assumption about triangulation is that bias is somehow cancelled out when using a variety of sources and methods. Triangulation helps the researcher find evidence that may make sense of a social phenomenon, but triangulation strategy does not do this on its own. I tried to keep in mind that when data from different sources are in agreement, the explanation of that convergence is just as important as clarification of inconsistent and contradictory data. The real reason for triangulating is not for technical validation, but to make the researcher accountable for explanations of the phenomenon under investigation.

Another limitation is the limited number of interviews. This may produce a tendency toward over-simplification, reliance on the skills and abilities of the researcher, researcher bias, and issues of reliability, validity and generalizability (Merriam, 1998). All of these limitations were kept in mind when interpreting the findings.
Thirdly, students may not take the learner control survey seriously, and simply click the radio buttons to complete the questionnaire as quickly as possible. Any survey depends on a degree of integrity on the part of participants. It is hoped that most participants will not cheat, and give the survey their full attention, but there is no guarantee this will happen.

Fourth, even though I was careful not to introduce the topic of learner control during the interviews, the teachers may have realized its importance in my study. The teachers were given the website address for the online survey so they could preview the instrument if they were interested to see what questions were being asked of their students. The title of the questionnaire as well as the wording of the items was obviously about the topic of learner control.

Fifth, for three teachers the time of the interview did not coincide with the delivery of the online questionnaire to students. Although not likely, it is possible that teachers changed their thinking over the summer, and that this was reflected in a new approach to their online course. Furthermore, it could be that the highly educated sample in this study gave more thought to learner control issues.

Finally, a limitation of the BLC is that a factor analysis accounted for just over half of the total variance (Baynton, 1989). Baynton (1989) writes, “this could be a result of under-estimating the complexity of the phenomenon” (p. 135). She speculates that increasing the delineation of some of the trivial factors might increase the total variance explained. Also, the survey has not previously been tried with community college students, although about a third of Thompson’s (1998) sample had not yet achieved a baccalaureate. The strengths of the BLC questionnaire are its reliability and validity measures. Finally, there is no other similar instrument reported in the literature (Thompson, 1998).
Data Analysis Procedures

Transcripts from the teacher interviews were coded using qualitative data analysis software (Atlas.ti). Teaching materials were collected, saved and coded after the teachers gave me access to their online courses, course outlines, syllabi and other course related materials. Finally, students' answers to BLC Likert items were scored, and the open-ended questions in the BLC survey were coded using Atlas.ti.

I began by looking for quotations in the transcripts that related to the research questions or the DL framework, and coded them accordingly. I did not start with pre-defined codes, but rather added them as I went along where the text supported a certain aspect of the research questions or theoretical framework. Then I re-coded the transcripts to check for accuracy and consistency. I also decided to expand on codes that related to using or not using the user-interface, and for codes that related to using or not using learner control options in order to distinguish the different directions teachers took. Once the coding was done, recurring ideas were sought from the text, and several themes emerged.

A number of themes emerged from the data that related to the research questions. The data showed the teachers' enthusiasm for the construct of learner control. The importance given to the user-interface as an instrument for learner control in CMC courses was explored as well as the teacher's role in relation to the user-interface. Additionally, instructional strategies teachers used to give learners control, such as, metacognitive strategies, RSI techniques, and pacing devices were noted. The DL framework was used to help structure the resulting descriptions, and provide a theoretical foundation.

Data from the BLC survey were scored and then the range, means and standard deviations were calculated. The survey data introduced a potential problem of reconciling apparently dichotomous research paradigms. However, the survey data is not dominant
in this study, and using this method can “help us know and understand different things about the world (Glesne, 1999, p. 8).” Howe (1985) also believes that the debate between qualitative and quantitative approaches is counterproductive, and feels educational researchers should be freed from choosing solely between the two methods.

After the coding, my next step was to create four code families from the list of individual codes — learner control, user-interface, instructional strategies used for learner control, and the DL framework. A code family contains any number of codes that are a subset of the family, and are all related to each other. Using the Query tool in Atlas.ti to search for all the quotations in a particular code family, I reviewed the collection of quotations and wrote memos about learner control decisions and user-interface decisions that I found in the code family quotations. The memo titles were based on and derived from my research questions. The following chapter is a discussion of my findings as a result of this coding and memoing process.
CHAPTER 4

Findings

Following the process of creating memos in Atlas.ti from the coded quotations, central themes emerged from the data, and these were organized in the following order. The first theme, learner control is a central theme, was that learner control is an important subject for all of the teachers in this study. The second theme, ways teachers give learners control, captured the means that teachers used to give learners control. The third theme, why teachers give or do not give learner control options, focused on the reasons teachers did or did not provide learner control options. The following themes describe the importance of the user-interface for learner control, and the problems teachers had using the user-interface. After this I synthesized the findings from the teacher interviews around the DL framework. Next is a description of my analysis of the instructional materials that teachers provided. I conclude this chapter with a description of the BLC scores, and the students’ perceptions from the open-ended questions.

Learner Control is a Central Theme

There are many references in the transcripts to the “learner control” code family - more than in any other code family. One code called “giving learners control” provided numerous examples of teachers deliberately giving learners a control option, for example, choice of assignment topics or learning partners. Here are a few selected quotes from teachers that illustrate the importance of learner control from the teachers’ perspectives:

“He [a teacher] said that they learned so much more because they [students] were directing- following their learning.”
"I want to subtract myself as a teacher as much as possible and allow the students to teach themselves."

"If you [students] choose not to take control of and if I refuse to let you take control of it, then learning is going to be eternally fortuitous."

This first section describes some general observations about learner control that the teachers discussed with me, or that I noted in the transcripts, in the student open-ended questions and in the instructional materials. First, teachers and students made many references to what I labeled "old school" thinking, where teachers assume control and are transmitters of knowledge that students passively receive. "Students are conditioned to traditional format teaching... students would be there with pen and pad in hand saying basically here I am, show me what I will do." A student wrote, "what is with this control. I should not be controlling this class. The teacher should." Another student commented, "a learner should not control that [their own learning]. They are taught what to learn."

The teachers remarked that this old school thinking prevented learners from taking more control because they were so conditioned in the old paradigm from previous school experiences: "they've been conditioned that way for their whole school lives." Another teacher said this:

I think that depending on the student's background it's a real challenge to do [give learners control]. Because so many of them are- they're just afraid of it. And they have no experience with it and I think it would be really easy to do in grade one (laugh).

An old school mindset also made it harder for teachers to give learners control options because students might interpret the academic freedom they've been given as the teachers abdicating responsibility. "I left it really open, the screams were 'we want more control,
we- I mean we want more criteria, we want more blah blah blah, tell us the boxes, tell us the hoops.” And one student wrote, “I pay my professors to take control and tell me when things are due, assign me a grade and give me my diploma.”

Teachers recognized the need for structure and finding a balance between learner control and teacher control. “I think the teacher has to take some [control]. I mean presumably we have more knowledge than the students do (laugh) or they wouldn’t be taking the course. So I think you have to be able to structure things for them. If you totally leave it up to them, what’s the point of having a course?” “I mean I made the decision to offer all that complex choice. Now the extent to which a student actually chooses it to his or her own advantage does in a sense allow them involvement in what they do well or what they do badly. But it’s a limited involvement.”

Secondly, teachers talked extensively about various aspects of implementing learner control options. One teacher said, “[If] I take too much of an active role the students have a tendency to sit back. You don’t know what they think, you’re only teaching them what you know.” This view was expressed by most of the teachers. The teachers also showed that they were generally working toward implementing more control options: “the example I gave you earlier about trying to take their specific interests and structure the program around that. I don’t think we’re there yet, but that’s our goal.”

Teachers thought it was easier to give learners control in an online environment. One teacher said, “I think you [students] have more opportunities to learn at a deeper level in an online course.” And another teacher commented, “I manipulated systems in the classroom. Well I can manipulate, and give far more freedom here [online].” Lastly, another teacher said, “I find that FirstClass and online environments give students more freedom.”

Not only were students’ old school mindset a consideration for teachers, but also the learners’ profiles. Teachers used this information when they planned to put into practice a learner control option. “My students from more traditional cultures, especially my Chinese students more than anybody, they have real trouble with me not telling them,
that you must do this first, and then this and then this. They want it linear.” “I think online courses are better for certain types of students . . . particularly the more disciplined and self-starter type student.” One teacher even used the Myers-Briggs Personality Inventory to help make learner control decisions (Myers & McCaulley, 1998). “When somebody would say ‘Well Sir can we dot an I?’ And I’d say excuse me what type are you? IMSP? Do what ever you like, sure. ESPJ? No, no you can’t.”

An interesting twist related to implementing learner control options was that teachers believed they were willing to give students more freedom and choice than students were usually aware of – students did not ask for as much control as teachers were often willing to give. One teacher posted an assessment rubric based on previous student feedback, and then invited students to make further changes. However, there was no record of further input from students. Here’s how one teacher described the appearance of choice:

What I see that I’ve learned to do over semesters, which wasn’t so clear in the first one or two, is that I can put a patina of very structured linearity on a very lateral selection process. And a lot of them need that appearance of linearity. So [there is a] very heavy duty structure of the marking screen and the deadlines, even though there’s choice in it.

Another teacher said, “I give people all the structure that they can handle, and the smart ones figure out that my structure means that they can do practically anything they want (hearty laugh).”

In addition, one teacher noted that learner control options must be authentic to give learners control. He said, “By choice I don’t mean the legal right to choose this or to choose that. I mean an authentic choice . . . so that put the student in control to make choices.” Another teacher summed up implementation issues by saying that “actually helping the learner take control of their own learning, it’s a matter of the process- the process you use, the procedures you use to help them acquire that knowledge.”
Teachers have less work to do when students take control of their own learning, so this may also be a practical reason why teachers value learner control. "I mean by the second answer of a really good student I basically say, this is great stuff, do you want an A with distinction? Keep on making great comments on other people's answers and save me the trouble." In other words, students who were in control of their own learning process saved the teacher some time by taking the lead in online discussions.

As seen from the quotations so far, teachers made many statements that demonstrated how much they value learner control. In the next section, we will see that teachers described in detail the thinking process they used when searching for ways to give students choice in assignments, methods of evaluation, designing assessment rubrics, pace, and selecting learning partners. Giving learners control was also consistent with teachers' beliefs about learning, which I will describe in more detail later in this chapter. Lastly, teachers saw benefits to students that went beyond their own course – learner control gave students more options for their own lives, and for what students want to do as an end result of the learning experience: “my goal is to end up with a situation where the students get more options going out then they had coming in. Options about life, about what they want to do, how they want to do it.”

One of my overall observations was that teachers had reasons whenever they chose not to give learners a control option. I think that teachers would not necessarily bother to have reasons if giving learners control was not an important consideration. Before I began interviewing teachers, I did not want to assume that teachers were familiar with the topic of learner control or that they had thought much about learner control issues. However, this concern was quickly dispelled as the teachers talked about giving learners’ control. In general, I was surprised by the extent of teachers' thinking about learner control, and I interpret the data as confirming that giving learners control is an important theme for the teachers in my study. However, as stated in the limitations, there is a slight possibility that teachers only thought about the issue of learner control when they agreed to participate in the study.
Ways Teachers Give Learners Control

The teachers talked about the mechanics of giving learners control options. This area seems to fall within three broad headings: (1) instructional strategies teachers used, (2) types of choice offered to students, and (3) helping learners to succeed in taking control of their own learning. Instructional strategies, types of choice, and helping learners to succeed all relate to two aspects of the DL triad – freedom and support.

All of the teachers discussed the instructional strategy of providing more structure (giving less learner control) at the beginning of the term. There was a trend toward increasing learner control as the course advances through the semester. This was also observed when I logged into the teacher's online courses and reviewed their messages over the semester. This strategy of moving from more to less control was witnessed especially in online discussions.

Teachers preferred to keep a low profile in discussion areas, and as the semester progressed they may not even read or respond to everything students write in online conferences. All of the teachers were remarkably similar in their approach to facilitating online discussions. From my observations of their online teaching environments, the teachers sent messages encouraging discussion initially, but once the students started to participate the teachers dropped out of the conferences. There was not one example of a teacher actually engaging in a discussion issue in an online conference. That was left entirely to the students.

One teacher, describing the role of TA's in facilitating online discussions said, "students become dependent on only the teaching assistant's comments, or they get scared off by the teaching assistant . . . they've done enough I think to stimulate discussion but too much then it might shut down." Another reason cited was that reducing teacher domination of the discussions puts the responsibility for learning on the students by means of student-student interaction. One teacher said, "we learn by talking
to each other." And a student wrote, "I am somewhat amazed that some of my fellow students look to me for help/answers to their questions. In order to help or answer I have to learn more." Speaking generally about online discussions one teacher said, "I was absolutely astounded at how much better it [online discussion] was in terms of learning." However, teachers did ask discussion questions to help keep the online dialogue focused, and as a metacognitive strategy. For example, one teacher asked students for feedback on the value of the online discussions, and another teacher introduced each topic area with a few initial discussion questions. Here is a quotation from one teacher's class announcements that illustrates several of these points:

It has come to our attention that there may be some misunderstanding as to the nature of the tutorials. These are not meant to be places where you simply post your thoughts on the readings once each week and leave it at that--like a series of book reports submitted to the instructor at the end of each week. Like any "live" on-campus tutorial, the on-line tutorials in FirstClass are meant for discussion, albeit over a 7 day period (to better suit people's schedules). As such, you are expected not only to respond to the questions posed by your TA on each week's readings, but also to comments on points made by other students and to respond to their (or the TA's) comments in turn. This means checking into the tutorials every day or at most every other day, even if only for a few minutes. This dynamic form of intellectual exchange is the essence of the tutorial and, as I've said before, the most valuable part of the course by far.

Metacognitive strategies are particularly important instructional strategies derived from the data. The instructional materials contained study strategies, which suggests teachers were promoting learner control through metacognition. All but one teacher had a reflective assignment. Teachers also made prominent vital parts of an assignment by
styling text, asking students to think about how to approach an assignment, and providing schema to help students think about their answers.

I give them schema. I mean I give them Perry’s, a detailed - an expanded version of Perry — I used to give them a choice between Perry and Bloom. Sometimes both of the hierarchical ones, and then I give them DeBono’s six thinking hats.

Perry developed a schema of intellectual and ethical development that is used to assess critical thinking and collaborative learning (Perry, 1981). Bloom’s taxonomy classifies intellectual behavior important in learning, and is used to classify test questions (1956). Two teachers used DeBono’s six thinking hats, which is a framework designed to enhance critical thinking ability (DeBono, 1970).

The teachers also built in opportunities for student input into the course content: We only produce an outline for half of the year at a time, and we have these sessions built in where issues get raised. And on the basis of that we may either change the second half of that course or change the course that’s coming up after Christmas.

This is an example of one way teachers gave students choice of content in CMC courses.

Teachers believe that the assignments direct the learning in CMC courses. A very experienced teacher said “I mean the more I worked with online, to me- the assignments drive the learning.” Teachers generally structure the assignments to give learners maximum choice because the teachers think this increases the students’ chance of succeeding. One teacher described the choices he gave his students: “I try to build in a system which will give students success, so I’ve got linear questions, I’ve got research questions, I’ve got trial, wingy, lateral questions, I’ve got speculate outrageously and fantasize questions.” There are many types of choices that teachers offer to their students to give them more control. There is choice in assignment topics and mode of presentation, but the teachers in this study went beyond these obvious examples. One teacher summed up the choices he gave by saying “I just throw choice at them every angle coming!”

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Teachers also gave their students choice over pace in their courses. First, the teachers were flexible about due dates for assignments. There was evidence in the online materials that all of the teachers made adjustments to at least one due date because students asked. Being lenient about assignment due dates was one-way teachers gave students control over pace.

Secondly, teachers also gave students choice in assessment methods and criteria by using student authored questions on an exam and student authored assessment rubrics. “Sometimes we’ve actually negotiated those rubrics with the students.”

Giving students more content or assignment options than students needed to complete the course was another type of choice. This was done because it allowed students to focus more on what they’re interested in, but one teacher gave another reason: As one student said this to me, it’s, ‘Well thank-you for all this choice but now I’ve got to read ten assignments and read forty questions for each of the assignments before I can even decide where to start!’ . . . so the learning comes in even the filtering, before [the student] can even start. This is also another example of a teacher using metacognitive strategies.

Students also listed many kinds of choice in the open-ended questions. Furthermore, teachers noted that giving lots of choice accommodates students with different learning styles. “I think different people learn different ways . . . And so I’ve tried to blend in my teaching approaches as wide a variety of ways to learn as possible. So that by some means everybody’s going to learn.” One teacher nicely summed up the reason for giving freedom to choose by saying, “if you want to engage people in critical thinking and if you want to engage people, you have to give them the freedom to succeed at the things that they have confidence in.”

Sometimes teachers let students choose their learning partners for group work, but the teachers had mixed opinions about this. “No, we didn’t let them chose their groups. We thought about it . . . what’s the best [way] to structure groups? And we really don’t know the answer.” Alternatively, one teacher put up a quantity of potential group
projects, and then let students assign themselves to a project of their choice. Students in this class could in effect choose their own partners if they agreed on which topic to choose.

The third category in the ways teachers provide for learner control is helping learners to successfully take control of their own learning. Many students agreed that they had control of their own learning, and one student wrote, “I feel the class I took let me control quite a bit of my learning process.” Most of the teachers talked about scaffolding as a means to help learners take more control. Moreover, they talked about using scaffolds to gradually increase learner control. Here is one teacher’s description of scaffolding:

Again it’s scaffolded. At the beginning, the first writing assignment, this is it. The second one is a more personal- it’s a personal essay . . . so you know I’ll say why don’t you pick from this, this or this. And if- this will give me a clue so I can, you know, be on task when you ask questions. I want to know what it is you’re trying to create here. And then as we go along the- you know, more of an opening out of the kinds of things they want to do.

Once, again the concept of moving from more to less teacher direction is applied.

The teachers also arranged for students to have independent access to resources so that a lack of resources did not stand in the way of autonomous exploration of a topic by students. When asked about giving students independent access to resources one teacher responded “Oh yeah, I mean tons of them found all sorts of things on the ‘net . . . I mean we see it as our role to provide some basic things, but oh yeah definitely.”

Another helping strategy was to allow students to re-submit or do extra work to get a better mark. “So allowing any student to get an extra credit, even if they’re getting an A because I mean, it allows them to do extra writing.”

All of the teachers posted or gave out the assignments early in the semester so that students could work ahead; one teacher allowed students to do the assignments in
any order. "I would say a quarter of them have difficulty understanding that I don't care which order the assignments are done in." "I mean what I've taken to doing, for instance, against the advice of all kinds of people who say don't ever do this to students, is posting ALL of the assignments for the whole of the semester by the end of the first week."

Students could earn a 100% mark. One teacher structured the assignment marks and penalties in such a way that students could still succeed even if their contributions were not consistent over the time frame of the course. Here are the details:

Well let's go to the penalties . . . [there is a] penalty of 25% per time frame for assignments. And now, I'll give examples. Let's say you didn't even start until time frame 3 [the semester has 4 time frames]. Well the reason it doesn't fail a lot of people is, I only expect one assignment up by the end of time frame one. It's only worth 5%. So you lose 25% of 5%.

How crippling can this be?

Another teacher avoided being overly rigid in assignment details so that learning is not tightly controlled by course requirements and some flexibility is possible for individual students:

I guess I'm a little too leery of putting too much in writing. Cause I really don't want this to turn into a struggle about what I have to do, and what you said I have to do, and what I don't have to do because you didn't mention that . . . and I don't want to paint myself into a corner. You know I want to be free to say for instance, to this student who gave me the draft yesterday, that should have been done last week. OK I'll just look at it, now let's go on from here.

One teacher consciously adjusted the marking scheme so that failure rates and non-completion rates were no different than traditional FTF classes:

My completion rates and failure rates in online match what they are in class. And I made a point of that. To me it's just untenable that you would accept that the delivery method itself had a higher failure rate! I
don't understand why that flies as a concept? So, I dickered with deadlines until I found a formula, which maybe later that works for me. And I dickered with penalties for lateness until I found a formula that worked for me.

Finally, teachers helped students feel more in control by humanizing the environment. They were available to students by means other than CMC, for example, by telephone, or by holding office hours. Teachers deliberately tried to create a friendly safe online environment for students. One teacher mentioned that he tried “not to sound too clever” when contributing to the online conference. Reducing anxiety by using humor or sending don’t panic messages were also identified as ways to help students feel more in control of the learning process. “I always put up opening don’t panic messages.” Finally, teachers simply told students that the online conference belonged to them, and one teacher wrote in his introductory message to the class conference “it’s your special conference.” These examples show that teachers did use relaxation, suggestion and imagery (RSI) techniques to reduce anxiety.

Unfortunately, none of the teachers used problem-based learning (PBL) in their classes. Thus, for this study at least, there is no support for the idea that teachers used PBL to shift responsibility to the learner.

Why Teachers Give Learner Control Options

Two explanations encompass the reasons teachers gave learners control options. First this benefits the teacher, and second this is consistent with the teachers’ beliefs about the benefits to student learning. Teachers benefit from giving learners control options because teachers learn things from students when students are given the freedom to explore areas where the teacher may not have content expertise. “I have found that I learned a tremendous amount from students.” Giving learners control is also satisfying to teachers, and reduces demands on the teacher’s time. Here is one teacher’s comment,
which also once again reinforces the value of student-student interaction: “Yeah I love to see that [student-student interaction] . . . it’s great to see other people not necessarily correcting other people, but just adding to what other people have said . . . or even disagreeing with somebody else, so it forces that other person to justify their position. I think that’s how learning takes place.”

Four of the teachers also mentioned that student lead discussions could produce interesting developments the teacher had not considered:

Students have raised questions which lead to very interesting discussions. I mean it’s a wonderful way to different teaching strategies as opposed to asking them questions and having them ask you questions or the rest of the class. And let’s spin off from there! And sometimes that can be fruitful.

Another teacher talked about the benefits of letting students choose their own topics, and commented on an essay about French painters: “that is something which I never knew much about. So I mean that was interesting.” As previously quoted, giving learner control options gives students more chance for success, which is another benefit to teachers as well as students.

All of the teachers shared their beliefs about the benefits of learner control for student learning. First, teachers believe that students learn best when they have control of their own learning. One teacher said this about giving learners control: “I think it’s the only way that they learn.” Giving learner control options addresses social equity issues, and helps teachers meet the needs of students with different learning styles:

I think there tends to be a passion in our faculty for social equity. And that backs up the concept that one should teach in a variety of different ways, rather than in one way. I think there is a real concern to make learning accessible to the maximum number of people, and that particular barriers of sexism, racism and other isms be reduced in teaching and
learning, so as to give maximum opportunity to everybody to achieve their goals. With more learner control options students' opportunities to learn are maximized.

Teachers believe there are many benefits to online learning because students must express themselves in writing. "I mean- online courses are strictly reading and writing, you have to be able to read . . . On an online course there's much more accountability." The very nature of reading and writing demands a degree of learner control (Collins, 1994). A student wrote when asked what things give you control over your own learning, "more writing and reading." Finally, learner control options increased the likelihood students will learn from each other. "I think [of] it [online environment] as providing the freedom, the space for them to extend their discussions and to respond to each other in an unlimited way because they can go back to it later and add their own thoughts."

Why Teachers do not Give Learner Control Options

Giving learner control options is seen as a matter of balance, and the teachers in this study always gave reasons when they decided not to give learners a control option. The reasons given by teachers seem to fall naturally under the triad of the DL framework—learner profile, support, and freedom to choose.

The profile of the learner may place a demand for more teacher control:
Some loved it [learner control], and some were terrified . . . I mean for some it was like oh this is unreal, you know I do this on my own and I love it. And others were "ahhhh!" . . . tell me what to do, tell me how to think . . . tell me which line to read . . . they've been conditioned that way for their whole school lives.

Thus, many students were stuck in the "old school" paradigm with the expectation for a transmissive pedagogy. International students especially expected a didactic teaching style:
Another variable, which I think is important, more and more I get students who have lived in Canada for three years or less. Most of them come from much more traditional educational institutions. Their expectations of lecture tradition normality is more than it used to be.

Some students are not very motivated because they're taking a required course, which they simply want to pass, and be done with. “And some of them will say all I want to do is get a C and get out.” Other students don’t do the work, and get behind because of procrastination or because they are floundering in a technological text-based online environment: “they come and ask me and I open the message on the screen, and I read it to them, and then they seem to get it. But I didn’t add anything that the screen didn’t already have!”

Teachers as well as students need support, and that support need not be a reason for not giving learners a control option. For example, teachers need to keep the amount of marking spaced out evenly over the semester to help manage their own workload:

Sure, yeah, no I'm not a stickler [about due dates]. But no choice as far as deadlines go? That has more to do ah- well in part it's for their own good if they have a deadline and they work to it. Life is full of deadlines we have to work to, not just in school. But also . . . of course, to make it easier for marking for myself and the TA's.

So there were practical reasons why teachers needed to make deadlines for assignment submissions, and insisting on due dates also helps to keep students from procrastinating.

Sometimes it takes too much time for students to agree on minor issues in a CMC environment, so teachers support students by simply making the decision for them so that more time can be spent on other things. “To begin with I tried, you know, if you choose your group by such and such a date . . . that sometimes works, but it makes for a lot of hunt and peck work for students, so what I’ve tended to do now is to put up [potential group topics].” Lastly, teachers mentioned that they accept responsibility for giving the
final mark in an assignment because this takes the burden away from students when doing peer reviews. “But I’ll take responsibility for the grade, the final grade, when that moment comes.”

Another reason for not giving students the freedom to choose is that choice doesn’t always create the best possible learning environment. For example, when teachers do not let students choose learning partners, and teachers select group members by mixing students with varying degrees of experience and knowledge, the result may be a better functioning group. “We try to create groups that were complementary you know with somebody who’s really good reading and somebody who’s really good at writing you know that kind of thing, as much as we could.” The academic level can also be raised by limiting choice, for example, by insisting that students give a good reason for the Internet sources used in class assignments: “and by justifying it [Internet sources] it would force them to realize whether they’re scholarly or not.”

Students have also asked teachers to take away a learner control option, and teachers may respond to the request – in this way teachers are giving students the freedom NOT to have a choice! “Well we’re willing to put more structure in next year... they [students] asked for quizzes. So it would force themselves to read the work and we’re going to do that... I don’t know whether it will help or not.” Teachers also limit the scope and direction of peer reviews because students tend to be too harsh and nit pick or too lenient and superficial when critiquing each other’s work. “Where the students evaluated each other... there were specific guidelines on that because... students can be a little bit harsh.” Other teachers commenting on students’ peer reviews said, “they [students] give very generic positive comments” or “they’ll focus on the minutia.”

Sometimes the choices available in the user-interface (FirstClass) can promote silly behavior, for example, over use of cryptic fonts. One teacher advised his students to “be sparing of your use of obscure and annoying and hard to read fonts... don’t over do it!” Finally, teachers reported removing a learner control option because a previous experience giving choice resulted in a negative outcome for student learning. For

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example, "I tried letting people pick their own groups and sometimes it works really well and sometimes it's just a disaster. Cause they'll pick all their friends and they won't do anything."

Ways Teachers use the User-interface for Learner Control

In addition to general strategies for giving learners control, I also looked for ways the teachers used the user-interface to give learners more control options. User-interface features that were most valued by teachers, as indicated in the interviews and through observation of their online and course materials, include the following:

- message history
- changing font face, color and size
- synchronous chats
- creating sub-conferences and folders
- threaded discussion

Three broad headings emerged for a discussion of the user-interface features teachers used to give students control. They are (1) showing students how to use a specific feature, (2) manipulating the user-interface to give students more options, and (3) using the affordances of the user-interface to help learners take control.

If a student is shown how to use the user-interface in a way that gives the learner more options for control of the environment, this was interpreted as using the user-interface for learner control. Showing students how to use search tools was seen as an important feature of the user-interface -- knowing how to search gives students more control over the user-interface. "There was something that came up recently that I discovered and I did pass on to the students. I said by the way you might- if you're looking for something this is a good way to find it." In WebKF and FirstClass, teachers demonstrated or modeled how to change View Properties, and this shows students how to take control over the appearance of the user-interface. For example, when a teacher
shows students how to change View Properties, visual learners can select View by Icon to improve the online learning environment for their own learning style. Students were shown how to use the user-interface during orientation sessions or with online orientation materials. And in every case but one, support staff in a resource center provided technical support if students had questions about how to do something.

Teachers manipulated the user-interface in ways that gave learners more control over the learning environment. Teachers would create a conference for students if requested, and students can simply create their own Views in WebKF. "Basically anybody who wants a conference created can get one created." Students were also given the option of moderating a conference. But teachers do try to keep the structure of sub-conferences fairly simple to make it easier for students to control the amount of information in the online environment:

I try to keep it simple. I find that's another- I guess you could say it's part of my approach to online learning is to keep it simple as possible. The more links you have and the more boxes and links at levels, the more confusing it gets in passing through it. So I try to simplify, whether it's my web page or my FirstClass.

Teachers also demonstrated stylizing text in FirstClass and on course web pages, which they said may make it easier for students to digest written assignment instructions on their own. FirstClass was described as "a glorified e-mail system which allows all kinds of laterality and layering and message history and fonts and colors, without HTML, to me [that] is key." In WebKF and FirstClass teachers created folders for archived material – this was thought to help students manage the volume of messages, and reduce information overload. All of the teachers used images to add interest and variety to the presentation of materials: "I try to make my lectures lively, including images and sound, so some things like that."

Teachers using FirstClass were able to manipulate the environment to a greater extent than in WebKF or TopClass. One teacher even remarked that FirstClass "has an
implicit pedagogy towards facilitation rather than lecture.” In other words, this teacher thought the FirstClass interface was congruent with his beliefs about his role as a facilitator of student learning. On the other hand, TopClass “was easy to master, very simple interface . . . but limiting. So I would say easy and limiting.” The teacher who used TopClass was also familiar with FirstClass, and he had this to say about the two platforms: “TopClass itself is very simple, especially compared to FirstClass.” But later on he talked about when it might be appropriate to use a simple user-interface compared to a complex user-interface.

I like FirstClass very much though, but then again I'm used to it, I've used it myself. I can see where it might be really intimidating to a new student. If you were in a residential college setting and really immersed it's worth your time. But if for instance, the student we just spoke about -- there's a lot going on in that woman's life. And to say I want you learn this platform that's got all these features that 60 percent of which you'll never find a use for, but we don't know which 40 percent you're going to use, so we're going to teach them all to you. Ah- something like TopClass is probably what we need, where we are right now at least. You know the best of all possible worlds we could graduate them up, so if you're taking like advanced tech writing course, we'll go to FirstClass for that 'cause I-man we [FirstClass] just blows the doors off of that. That would be great. You know, they'd find TopClass very inconvenient. I've got students who've been through two three four online kind of environments at that point, and you know they're ready to move on.

An often-used feature of FirstClass is stylizing text, and teachers modeled this to students in their class announcements as well as in the teacher's choice of a default font face, color and size. In Figure 2, an example of a message posted in FirstClass by one of the teachers is shown:
Each of the icons above (called 'conferences' in this software package) is clickable.

Inside each conference you will find a 'Read me first' or 'What goes here?' opening message.

Read it.

Figure 2. Stylizing text in FirstClass.

In FirstClass teachers can also set privileges for sub-conferences so that some things are private, and some are public. Giving students a private area to work with their small groups gives them a sense of control over that space. Knowing that the online course environment is limited to a known group helps the students feel safe, and a secure environment gives students the confidence to take control of their own learning. “I feel it’s better to keep them in private space, where everybody who they know, that everything they write there is being read by the people that they know . . . they’re not going to have somebody coming out of left field criticizing what they say.”

Creating an area containing only teacher-authored messages with read-only permissions for students made it easier for students to locate the teacher’s assignment instructions on their own. Some of the teachers used the Auto-open feature of FirstClass messaging to draw attention to important announcements. All of the FirstClass teachers assigned different icons to sub-conference folders that related to the purpose of that folder (see Figure 3).
Giving students a visual clue about a conference's purpose might help them feel more in control of the environment. For example, by assigning an icon as well as a name to describe a conference purpose, students have the freedom to choose whether an icon or text makes navigation easier for them. Freedom to choose is one facet of the learner control DL model. This is a simple example, but helps to illustrate how the user-interface can be a factor in the type of choice offered to students. Finally, teachers thought the flexibility to login with either the FirstClass Client or a web browser also gave students more options. “When FirstClass went to a browser version from a downloaded version, initial connection became infinitely simpler.”

The teachers used the affordances of the CMC environment and the user-interface. All of the teachers required participation in online discussions. The students were asked to engage in meaningful student-student interactions, and this dialogue was seen as a means for students to take control of their own learning. “I give them schema of theories about what constitutes a good response . . . and I'm very specific about the structure of those kinds of messages, and the levels of intellectual engagement.”

Providing detailed descriptions of course assignments and activities online gave students access to this information anytime and from anywhere. A student wrote, “it [FirstClass]
helps me feel I'm in control because I get to choose when I go online and what assignments I want to do."

FirstClass teachers and the TopClass teacher (by means of ICQ) used synchronous chats to help students get more immediate feedback or help. The WebKF teacher and FirstClass teachers found the message history feature useful to identify at risk students who may need more teacher intervention to get going. Although one teacher observed, "I thought the message history . . . was useful. But it has a downside in that students are always checking to see who has read their note, and feeling upset if certain people have not read it." Finally, the teachers created a non-academic conference for informal discussions – "a Bistro" as one teacher called it. This gave students freedom to discuss non-course related things with their peers, and added to a sense of community.

**Importance of the User-interface for Learner Control**

Generally the teachers and students confirmed what is in the literature about the advantages of a CMC environment (Davie & Wells, 1991). For example, the online environment is not limited to time and space, and this removes barriers to participation. Here is one student's comment:

> I feel totally in control and independent using conferencing software. It is on me to log in and read announcements, etc. [I] can log in at any time of day or night make my own schedule instead of a set time (like classes) if I want to log on and do assignments at 3 am I can get as far ahead of schedule as I want (if I want to do 3 weeks of work in 1 weeks time I can.) Also, the written record in CMC courses allowed students to go back to something later on, and this gave them more control over their learning. Another student made this observation:

> When I post an answer, I can erase it and send another one in case I've made mistakes in the previous ones until I find it satisfactory, as long as
the teacher has not marked it. This is a big advantage over traditional classroom. Once you hand in a paper, you cannot ask it back.

The teachers and students both talked and wrote about the benefits of student-student interactions. One student wrote, "it [FirstClass] helps by allowing a forum for greater, in-depth discussions that could not occur in class due to time contraints [sic]. It also allows individuals to take part at the level that they wish to be involved at." Another student noted that the user-interface gives students "a chance to analyze everyone's opinion and think about it deeper than usually." Another student suggested, "personally I learn more from the students than teachers. I mean actual learning not listening." A teacher said, "I am also a very strong believer in positive discussions, and in the interactive component in particular of small group discussions. That perhaps pedagogically [is] the most important part of higher education." Indeed every one of the teachers made a comment at some point about the value of student-student interaction in CMC.

Students contribute more, and contribute more thoughtful responses through computer conferencing than they ever could in a classroom. A teacher made this observation:

I told them [students] one day that their contributions had been particularly good. And it was equivalent to having an 8 hour class because that's how long it would have taken for all of them to read out their things end to end. And I said, you know, that was an amazing class!

Computer conferencing expands the opportunities for students to contribute, and this makes the online environment more conducive to student ownership or control of the discussion. A student wrote, "it [FirstClass] gives me hands on control on interacting with other students." Also, the anonymity of CMC environments made it less of an effort for some students to contribute to the discussions. Here's how one teacher appraised online discussions:

And I find that FirstClass and online environments give students more freedom, for one thing they hide behind a monitor. Now that has some
advantages and disadvantages. One of the advantages is that you can get a person who would never raise their voice in class — it becomes painfully obvious if they don’t raise it an online environment. And hiding behind a monitor allows some of those students to feel free to participate in a way, which they wouldn’t in a classroom.

Not only does the online environment empower students, teachers find it simpler to assume the role of a facilitator of student learning. “It’s much easier to be a facilitator in an online environment.” The teachers also thought less effort was required to give students more freedom in an online environment. Another teacher compared freedom in an online environment to a traditional classroom by giving a detailed description of how choice was given in a traditional classroom:

Much greater [freedom online] . . . to give you an example of when I was still in class, the level to which I had moved for freedom of assignments. I mean there was one assignment per course where everybody could choose a different topic, but you’re handing around pieces of paper, and not everybody sees first. So somebody can choose first and the other people haven’t even seen the choice, or you can give it to everybody and they could shout out — nope, doesn’t work!”

Another reason for greater freedom is that the constraints imposed by a FTF meeting — time limits, one person speaking at a time, classroom decorum — are not needed. A student commented, “I can involve myself in the course regardless of who is online, at the time. Yet it is open for discussion just like in a traditional classroom setting.”

Interestingly, every teacher mentioned the “null curriculum” in an online course — learning to use the user-interface. “Online communication is something we’re forced to address in these courses, even though in a sense, it’s not what the courses are about.” This acknowledgement underscores the importance of the user-interface in a CMC environment, and lends support to its inclusion in the DL framework.
Problems Using the User-interface

Not using features of the user-interface can be described under three headings: (1) not knowing the user-interface, (2) hardware and other technical problems and (3) orienting students to the user-interface. First, teachers did not always understand how the user-interface works, nor did they take advantage of features that could help students. For example, none of the teachers knew about the Summarize Selected feature in FirstClass, although the ability of the software to condense several messages into one document could be very useful for reflection assignments. Other features of FirstClass that I find useful in my own online courses, but the other teachers did not use include FirstClass Protocol (fcp://) bookmarks, personal stationary and voice attachments. From my perspective as an experienced FirstClass user and administrator, I thought the teachers only made use of basic features of the software. WebKF and TopClass do not have the depth of capabilities, so a comparison on this point is not really fair.

Secondly, servers sometimes go down and this technical problem was noted by all of the teachers. A teacher remarked, “I’m not in control in as much as I can’t get the server up on Saturday if it’s down.” Students’ typing skills were of concern to some teachers, especially when engaging in synchronous chats: “typing skills is an absolute necessity.” A poor typist has to devote more mental energy to the mechanics of typing rather than to the learning process.

Next, the ease with which a feature is used seemed to determine whether or not it was employed. For example, FirstClass teachers and students stylize text liberally because the software makes it easy to do that, but in WebKF and TopClass knowledge of HTML is required to stylize text so this was not done. A student wrote, “a lot of time is spent manipulating the text once in Knowledge Forum. It is not as user friendly as <QUOTE>Word</QUOTE>.” Another student compared the ease of using the FirstClass client program to browser accessible programs:
It is good to have the option of sending massages to everyone including teacher and other students in an integrated browser [client] provid by firstclass [sic]. For every provided category sending massages in [is] so convinent that enccurage communication. I am sure it wasn't the same if I had to use Netscape or Explorer.

In addition, teachers were sometimes frustrated by not having the technical expertise or authoricy to help students. "A classroom never goes down. The equivalent of the server being down is that the lights don't work and the lock won't open."

Thirdly, getting students started using the user-interface presented many challenges for teachers. Some students enroll in online courses without having even very basic computer skills, for example, attaching files or copy and paste functions. "We wanted them to [be computer literate], and we asked them to, but a lot of them really didn't. I mean a lot of them . . . didn't even know how to save a file on to a disk." In addition, students are sometimes unwilling to persist when faced with technical difficulties, and one teacher reported a high drop out rate because of technical problems. He said, "I think in many cases the computing problem was the main problem, and the main reason for dropping the course."

The teachers recognized that a certain amount of floundering around with the technology consumes the first weeks of an online course, but they recognized it is important that students eventually learn to control the user-interface on their own. One teacher described the struggle this way:
Last term I said yeah, and then I'll copy it and post it myself. And I've decided I'm not going to do that anymore, they need to learn to do it. I'd rather give them you know a few days grace to deal with something that didn't come through right and try again, then to put it off. So I'm still struggling second writing, third writing even, trying to handle the technology.

The Distance Learning Framework

Table 3 contains a summary of the things teachers identified in their online learning environment that can be organized around the DL framework for learner control.
Table 3
Summary of Findings Based on the DL Framework

<table>
<thead>
<tr>
<th>Teachers' decisions about learner control options were based on the following:</th>
<th>The Learner</th>
<th>Support</th>
<th>Freedom</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• different learning styles</td>
<td>• amount of human support provided by technical staff, teacher and peers.</td>
<td>• students' freedom to choose assignment options.</td>
</tr>
<tr>
<td></td>
<td>• student's educational level and experience</td>
<td>• giving more support in the beginning than in the end of the term.</td>
<td>• student input on what content is covered.</td>
</tr>
<tr>
<td></td>
<td>• student's expectations</td>
<td>• supporting students' learning by providing some structure.</td>
<td>• student input on evaluation criteria.</td>
</tr>
<tr>
<td></td>
<td>• student's reading and writing skills</td>
<td>• supporting students' learning by providing choice.</td>
<td>• students' freedom to access resources independently.</td>
</tr>
<tr>
<td></td>
<td>• student's interest in the content</td>
<td>• giving feedback, e.g., responding quickly to student e-mail.</td>
<td>• negotiating assignment due dates with students.</td>
</tr>
<tr>
<td></td>
<td>• student's computer skills - operating system, word-processing and Internet</td>
<td>• providing scaffolding.</td>
<td>• students' access to computers and the Internet off-campus.</td>
</tr>
<tr>
<td></td>
<td>• student's typing skills</td>
<td>• providing detailed instructions online -- non-human support.</td>
<td>• giving students the option to re-submit an assignment.</td>
</tr>
<tr>
<td></td>
<td>• student's ability to follow written directions from a computer screen</td>
<td>• giving more feedback than in FTF courses.</td>
<td>• giving students the option to do an extra assignment.</td>
</tr>
<tr>
<td></td>
<td>• student's motivation</td>
<td>• arranging or providing an orientation to the user-interface.</td>
<td>• allowing students to self-select need for an orientation to the user-interface.</td>
</tr>
<tr>
<td></td>
<td>• student's locus of control</td>
<td>• reducing teacher bias online because of anonymity in CMC environment.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• student's confidence level</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• student's anxiety level</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• student's willingness to experiment and try new things</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• student's ability to project himself in written text</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>• student's time management skills</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• student's ability to concentrate on the course</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Using the user-interface to give learners control was described in the following ways:

<table>
<thead>
<tr>
<th>The Learner</th>
<th>Support</th>
<th>Freedom</th>
</tr>
</thead>
<tbody>
<tr>
<td>features of the user-interface can compensate for the learner's shortcomings, such as, spell check, consistency of conferencing software with other Windows programs, changing view properties, and asynchronous messaging, i.e., there is more time to respond.</td>
<td>features of the user-interface provide support, such as the flexibility of using a web browser or client to login, synchronous chats, and help files.</td>
<td>features of the user-interface give freedom, such as, search, changing font face, color and size, anytime and anywhere messaging, no need for immediate verbal response in online discussions, discussions are not limited by class time or volume of replies, assignment order doesn't have to be as lock step as FTF course, all communications are recorded for later referral, easier to do collaborative writing or peer reviews.</td>
</tr>
</tbody>
</table>

Analysis of Instructional Materials

As stated previously, I made notes describing each teacher's instructional materials, and then coded my notes. It was difficult to compare and contrast the teachers' materials because each situation was unique. Teacher #1's WebKF site and Teacher #5's FirstClass conferences did not contain any announcements or support materials such as course outlines, syllabus, etc. These teachers used CMC strictly for interaction between students and teachers. Both of these teachers had an opening welcome message for students, but tended to stay out of the discussion. They did, however, post resources for students to follow-up if a question arose, and gave praise and encouragement periodically.
Finally, both of them did occasionally archive messages in order to reduce the number of messages appearing in the main conferences or views.

Teacher #3 approached FirstClass differently than the other two teachers using FirstClass for distance education -- Teacher #2 and #4. Teacher #3 had an extensive website to support his distance learning course, and all announcements and course materials were available from that website. FirstClass was used solely for online discussions with TA lead student discussion groups. I did not observe this FirstClass site. Teacher #3 did stylize text, and use images liberally on the course website.

Teacher #2 and #4 used FirstClass quite comparably. Both created folders and conferences, and chose appropriate icons for them. All course materials were available in FirstClass, and there was no accompanying website for their courses. They both stylized text a lot, especially for class announcements or assignment instructions. Both teachers took a back seat in student discussion areas, posting only a welcome message for each conference and occasionally praising student work.

Teacher #6 used TopClass, and like Teacher #1 did not stylize text at all within the CMC system. Like Teacher #3, Teacher #6 created a website outside of the TopClass system for course materials and assignment instructions. The website did contain stylized text and images. He posted announcements on TopClass as well as on the course website. And like the other teachers, he posted a welcome message in each discussion area, but he replied infrequently once students became active posting messages. His replies contained resources for students, and encouragement for a job well done.

Some themes that emerged from the instructional materials have been incorporated into the previous discussion. However, here are overall themes that were predominant in the instructional materials of all of the teachers:

- valuing student-student interaction,
- moving from more to less teacher control during the term (scaffolding),
- making decisions based on student input,
- giving numerous assignment options and freedom to choose,
suggested study strategies that encourage metacognitive thinking,
- generally giving learners control.

Finally, there was no evidence at all that what teachers said in the interviews was contrary to what was observed in the online classes, the instructional materials and the course websites.

Results of the Baynton Learner Control Questionnaire

Response rates to the Baynton Learner Control Questionnaire (BLC) varied a lot between each of the teacher's students. Three teachers had over 50% of their students respond, probably because they offered students bonus points for completing the questionnaire. There were no responses at all from one teacher's students even though he asked his students to complete the questionnaire. Two teachers had only a few students complete the questionnaire.

Initially I compared the BLC Likert item scores for each teacher's students to see if there were any differences between the classes. One difficulty comparing scores for each teacher was that class sizes varied tremendously – from 10 students to well over a hundred. There was little difference between each teacher's students' scores; the largest difference between any two teachers' students' scores was only 7.74 points for all class comparisons. With a total possible score of 168, 7.74 points is only a 4.6% difference. A One-Way ANOVA test of the teachers' students' scores failed to reject the null hypothesis that the means were the same. Beside the fact that there were no significant differences between the means, the small sample sizes for some teachers precluded doing any descriptive statistics on the data from the teachers who had only a few student responses. For these reasons, I decided to look at the BLC scores based on the entire set of responses, including those obtained during the pilot study. This provided a total of 133 students who completed the BLC.
First, the BLC Likert items were scored for the entire data set. In Table 4, my results are compared with Thompson’s (1998, p. 61) BLC scores:

Table 4

Total BLC Scores

<table>
<thead>
<tr>
<th>BLC Score</th>
<th>COOK</th>
<th>THOMPSON</th>
</tr>
</thead>
<tbody>
<tr>
<td>mean</td>
<td>109.88</td>
<td>112.65</td>
</tr>
<tr>
<td>std dev</td>
<td>19.78</td>
<td>17.99</td>
</tr>
<tr>
<td>range</td>
<td>43 -- 150</td>
<td>66 -- 154</td>
</tr>
<tr>
<td>average score as percent of total possible</td>
<td>65.40%</td>
<td>67.05%</td>
</tr>
</tbody>
</table>

Thompson administered the BLC to 88 undergraduate nursing students; 33 were enrolled in traditional education and 55 were enrolled in distance education. Thompson reported means for both groups: traditional and distance learning students. The difference between Thompson’s two means was only 2.46 (a 1.5% difference), so I used his aggregate scores for further comparison. The majority of students in my study were attending community college – only 45 of the 133 responses (~34%) were from students attending university.

Secondly, I calculated scores for each aspect of the DL triad – the learner, support and freedom. I consulted Baynton (1989) in determining which item belonged to which aspect of the DL triad. In addition, Baynton removed three items from her final analysis – items 3, 25 and 26. Thompson also removed these items when calculating the subscores, so for comparison I too removed these items. In Table 5, the BLC scores are broken down for each aspect of the DL triad, and also compared to Thompson’s results.
Although Thompson's scores are generally a little higher, there is a lot of consistency between the students' BLC scores in my study and his. Even the breakdown between the three aspects of the DL triad was remarkably similar.

A general impression of the BLC Likert items is that students scored above average overall (~65%). One interpretation is that these students generally feel in control of their own learning process. The other interesting aspect of the BLC Likert scores is the difference between the three aspects of the DL triad. Students did not express as much confidence in the freedom aspect of the triad as they did in their own profile as learners, or in the support they received. Combining this with the strong desire for freedom and choice expressed in the open-ended questions suggests that this might be an area teachers need to address.
In Figures 4, 5, and 6 histograms showing a normal distribution curve of the learner, support and freedom items in the BLC are depicted:

Figure 4. Frequency distribution of items in the BLC that relate to the learner.
Figure 5. Frequency distribution of items in the BLC that relate to support.

Figure 6. Frequency distribution of items in the BLC that relate to freedom.
As can be seen from the figures, the fit under a normal distribution curve is quite good, although a little more skewed to the right for the learner and support items than the freedom items.

**Students' Perceptions**

The comments students made in the open-ended questions were quite similar for each teacher. Encouragement, support and feedback from the teacher are mentioned by about half of the students in answer to the question about what can a teacher do to increase a learner's control of the learning process. Students said things like this: “Encourage us. Encourage and promote learning more.” and “I think encouragement and positive reinforcement is the most important, giving of their time and making themselves available to help.” This finding is corroborated by Thompson (1998), who summed up his BLC survey results by saying, “teachers should remember the importance of showing support of their students, including being accessible, treating students as equals, and providing encouragement” (p. 78).

Choice and freedom to choose were by far the most frequently cited reasons related to taking control of the learning process. For example, one student observed, “I thought that allowing the students to come up with their own questions, then answering it, is a great idea that promotes additional thinking on a subject.” And another student wrote, “they [students] are given freedom, so they have to learn to take responsibility for themselves. I think that is the biggest obstacle of taking control of the learning process.” In fact, the idea of having choice was so prevalent in the open-ended questions that each student mentioned wanting choice more than once in their individual responses.

Students mentioned non-human resources, for example, access to library books, far more often than teachers. The following is one student’s explanation of a common concern:
Books, I prefer I can borrow the books of my college library. But most the time the book that we need for our study are not available, and if there is we can not borrow outside the library. I don't mean only online courses, but the price of books are so expensive for students and most of us have problem to afford it.

Students also frequently mentioned access to technology: “1. I need a computer. 2. I need a software.”

Most students valued student-student interaction, but a few did not. One student wrote, when asked in what ways fellow students are a factor in control of your own learning process, “they are not, they have no control over my feeling of the learning process.” Another student added, similarly, “to be honest they are not. I do my own thing with out any peers help.” However, only a small minority of students expressed this attitude.

There seemed to be a competitive element to students’ reasons for valuing student-student interaction. This was a reason none of the teachers identified. For example, 20 students said that the discussions motivated them to keep up with their peers – “the pushing from other students to do better.” Another student added, “I can also look at other people’s work and get ideas, or suggest something to them.” One student compared the advantages of student-student interaction in an online course compared to a FTF class: “besides I can look at other students assignments and compare my work and to find out about other students. Usually its not possible in in Class courses.”

Students placed emphasis on personal attributes needed to take control of their own learning, such as self-discipline, time management and motivation to learn. A student wrote, “I am very motivated in control my learning process, because I can tell my own opinion regarding something, and make decisions.” Time management was explained by one student this way: “I think we should [be] careful about time, because there is not class, and we will be behind if we forget the time management.” Another student thought online courses improved his or her time management skills: “I have taken
two on-line courses before and I feel that on-line courses help you to learn on your own and you must be able to manage your time efficiently.” One student commented on motivation coming from peers: “If you have low motivation, by seeing that others did so and so amount of work, you can get more motivated.”

Students appreciated pacing devices, but rarely asked for more teacher direction. One student thought the teacher should “send a email to remind what to do in the following weeks.” They saw having a schedule as useful, but mentioned repeatedly “flexible deadlines.” There was only one occurrence of a student wanting more teacher control: “give more direction as to what to be thinking about and working on next.” And a few students felt very strongly about being too controlled: “I don't feel I have much if any control over my learning process. I feel rather lead around by the nose!” Another student wrote this detailed comment:

Stop being so damn controlling. Traditionally, that is the job of the teacher. To take control of the class. You seem to think that these online conferences are somehow giving control back to the students, and I think that, by your definition, you're missing the point. Teachers still control, and they want to control. If they actually want to increase our control, I don't think it would be that difficult. Take the first day or 2 (heck, take a week), and have students design the course. Not only that, but they should be able to revise that design at any point. Alternatively, you could do all of the other mundane things to make students FEEL like they have more control. But, when a teacher controls grades, then who has the control over the learning process?

This student has obviously thought a lot about the issue of learner control, and seems to feel that it will never be completely possible, although desirable.

A new code (relate to/interest in subject) was developed during coding of the student open-ended questions because many students thought that their interest in and ability to relate to the course content was important. As one student stated, “If it's a
subject I like, I am very motivated.” Another student related interest level to taking control of his or her own learning: “It [learner control] is totally up to the student, and whether he/she is interested or not.” A student’s interest in the subject was something mentioned only once by one teacher.

Summary

The research findings were organized around main themes that emerged from the data analysis. The themes that were derived from the teacher interviews included the following topics: (1) learner control is a central theme, (2) ways teachers give learners control, (3) why teachers give learner control options, (4) why teachers do not give learner control options, (5) ways teachers use the user-interface for learner control, (6) importance of the user-interface for learner control and (7) problems using the user-interface. Findings from the teacher interviews were then organized around the DL framework, and an analysis of instructional materials was presented. Finally, the results of the BLC were discussed.
CHAPTER 5

Discussion, Conclusions and Recommendations

Discussion of Findings

McIsaac and Gunawardena (1996) observed that comparing delivery modes in distance education is not of much practical help to educators. This study went beyond looking at online delivery modes, and examined factors that might account for a difference in level of performance and satisfaction in CMC environments. This research was also an attempt to understand the learner, which may in future serve as a basis for modifying course delivery (Clark & Verduin, 1989). The importance of learner control as a central theme emerged from the data, and supported taking a broader view of learner control over the narrower approach to learner control found in much of the CAI literature (Doherty, 1998).

Because there is a lot of corroboration in the data for the DL framework, the discussion will be organized around the DL model. The teachers described the need for balance in giving learners control options, which is a significant feature of the DL framework. They also recognized that total learner control is probably not possible. Furthermore, their reasons for giving or not giving learner control options can be classified using the DL framework. The discussion will begin with general observations of learner control in CMC environments, followed by a more detailed look at each aspect of the DL triad.

Overall findings.

In general, the teachers confirmed what is in the literature about the benefits of a CMC environment (Davie & Wells, 1991). Students as well as teachers appreciated the
any time, any place advantage of CMC. Secondly, except for a small number of students (approximately six students), all participants in this study recognized the enormous value of student-student interactions in a CMC environment. Student-student interaction was seen as the most important aspect of the user-interface that gave learners control of their own learning. This view is in accordance with other writings that suggest student-student interaction requires more active learning, and hence more opportunities for learner control (Harasim et al., 1995; Wells, 1992).

It was noted in the literature that the very nature of CMC gives learners more opportunities for control (Carrier & Schofield, 1991; McComb, 1993). The CMC environment helped learners take control, and all of the teachers believed that it was easier to give students more freedom in an online environment. The teachers in this study saw themselves as facilitators of student learning, and also said it was easier to assume the facilitator role in an online environment. Thus, the participants in this study recognized that CMC environments helped them promote students’ control of their own learning. In other words, the nature of CMC environments gave facilitators more opportunities to let learners take control of their own learning. However, giving learner control options to students was something teachers struggled to achieve, but didn’t always find possible to do. Students expressed the least confidence, in terms of their BLC scores, in the freedom aspect of the DL framework. Yet, providing more learner control options was valued by students, and was a goal expressed by all of the teachers.

Giving learners control options was something that could happen more easily at the end of the term than the beginning. There was a trend toward giving learners more control over time. This is a very positive finding, and demonstrates the teachers’ desire to move in the direction of increasing learner control as well as their responsiveness to students’ desire for more choice. This desire to give learners control is also consistent with teachers who see themselves as facilitators of learning, and with constructivist philosophies of learning. Furthermore, the recognition by the teachers that it is desirable to move in a direction of increasing learner control is congruent with others who believe
that it is a worthy aim of higher education to help students learn to take more control of their own learning (Garland, 1992; Moore, 1994; Warren, 1999).

Learner control and supporting students' learning.

Learners can be supported through either human or non-human means. Non-human support was available to students usually in the form of tutorials or help files for using the user-interface. Problems encountered with the user-interface included not knowing the user-interface, hardware and technical problems, and orienting students to the user-interface. The latter two reasons were not usually within the teachers' control or mandate, and involved support staff and the institutional resources that were available. Lastly, four of the teachers published instructional materials on either a website or FirstClass conference; they used this means to make support materials easily accessible. Making instructional materials easy to get at is a way to increase control options for learners (El-Tigi & Branch, 1997; Large, 1995).

Providing human support was another way teachers identified that helped students take more control of their own learning. Teachers facilitated students' feelings of control by humanizing the CMC environment as much as possible using humor, being informal, responding quickly to questions, and giving students a means other than the CMC environment to contact them. Gunawardena and Zittle (1997) wrote that the teacher's skill and technique could make a great difference in the students' perceptions of interaction and social presence in CMC. Hara and Kling (2000) also wrote that poor practices managing online communication could add to students' distress in online courses. Most of the teachers recognized the importance of social presence, and specifically talked about creating a friendly atmosphere in their online environments.

A theme, not identified during coding of the teachers' interviews, emerged from the students' open-ended questions. This theme was that students valued encouragement and support from the teacher very highly. This finding is consistent with Thompson's
(1998) results, and was also noted by Baynton (1992) who found that the student teacher relationship was of particular importance to students.

Learners need to use metacognitive strategies in order to control their own learning (Collins, 1994). Metacognitive strategies such as identifying what you know and don't know, reflection assignments, making prominent vital parts of the assignment, asking students to think about how to approach an assignment, scaffolding, and providing schema to help students think about their answers were devices all of the teachers employed to some degree. Two of the teachers mentioned using specific schema, such as De Bono's six thinking hats, which were designed as metacognitive strategies. Teachers also manipulated the user-interface as a metacognitive strategy when presenting assignment instructions. Thus, the use of metacognitive strategies by the teachers was interpreted as another way they supported learners to take more control of their own learning.

Learner control and the learner.

As described in the literature review, students' locus of control may be related to students' willingness to accept learner control options. Klein and Keller (1990) wrote that externally motivated students expect more teacher direction. Perhaps the externally directed students could be compared to those identified by the teachers in this study as being stuck in the "old school" paradigm. The teachers believed that these students were conditioned from previous school experiences to a transmissive pedagogy. This is also consistent with Guglielmino's (1977) finding that students may have a low level of self-directed learning readiness when they have been exposed to other-directed instruction for a long time. The teachers noted the difficulty giving these learners more control options because students in the old school paradigm expected and sometimes demanded more teacher control. One way teachers responded to this was by generally moving in a direction of increasing learner control options over time.
Not only were the students' expectations an issue, but also their ability and motivation to learn was a factor when the teachers gave learners more choice. The profile of the learner was frequently cited as a reason for not giving learners a control option. Four of the teachers who taught required courses also mentioned that when students only wanted the credit, motivation was low. Learners differ in their willingness or ability to assume personal responsibility for learning, which is why there is a teacher control -- learner control continuum and learner control is not an all or nothing concept (Kerka, 1994).

Learner control and freedom.

There were a number of ways teachers gave students freedom to choose. Half of the teachers specifically mentioned giving students input into course content. Control over pace was usually accomplished by being flexible about due dates. All of the teachers offered choice in assignment topics, and most gave students more assignment options than students needed to complete the course. Several teachers also noted that they were willing to give learners more control than students were usually aware was available to them. Posting assignments early in the semester was another way to give students freedom by allowing them to work ahead. The teachers in this study avoided using tightly structured or restrictive assignments, which have been reported to take control away from students (Shaw & Taylor, 1984).

Students' perceptions of the learner control mechanisms and choices teachers provided were generally positive. BLC scores were above average, but students were not as confident in the freedom aspect of the DL triad as they were in the support they received and in their own profile as learners. This is an interesting result when viewed in combination with the strong desire expressed by students in the open-ended questions for freedom and choice. As mentioned previously, the finding that students did not perceive as much control over learning objectives and evaluation methods as they did for the
support they received and for their own learning abilities was also consistent with Thompson’s (1998) results.

Some reasons for not giving control to students were that more choice doesn’t always create the best learning environment. This was discussed by most of the teachers in relation to forming groups. Sometimes it was just simpler for the teacher to make a decision, for example, with collaborative learning tasks, so that students can spend more time on other things. One teacher also noted that the academic level could be raised sometimes in some situations by not giving learners choice. Finally, too much choice can lead to superficial behavior, such as, over use of cryptic fonts. This is in harmony with King’s (1994) result that there needs to be a balance between freedom and structure for learner control treatments to be effective.

Conclusions and Theoretical Implications

The teachers in this study saw themselves as facilitators of learning. As one teacher observed the facilitator role means helping “learners in their own learning.” Moreover, these teachers who were facilitators of learning, were always able to give reasons when asked about their decisions on what control options to give or not to give to students. To my knowledge, this finding has not been previously noted. It also seems that these facilitators/teachers devote considerable attention to learner control decisions. Becker (2000) found that teachers who use computers the most have consistently more constructivist philosophies than the average teacher. Giving learners control is a characteristic of constructivism (Murphy, 1997).

Another characteristic of constructivism is that the teachers’ role is that of a facilitator rather than a director of learning (Murphy, 1997). Furthermore, teachers who are facilitators of learning are also described as taking a learner-centered rather than a teacher-centered approach to education (Diaz, 2000). In a teacher-centered classroom, knowledge is passively transferred from the teacher to the student. But in a learner-
centered classroom, teachers facilitate students who are actively engaged in their own learning. Teachers who are facilitators of learning understand that at best they can only foster students' own learning because learning is up to the learners themselves to control. In other words, the learners regulate and control their own knowledge construction. Furthermore, it makes sense that in their role as facilitators of student learning, these teachers would find it troubling to make capricious or arbitrary decisions about removing learner control options. As noted by Doherty (1998), learner control "is a fundamental tenet of learner-centered education." Thus, the teachers' reasons for giving or not giving learners control are in a way a test of the strength of their own conviction that they are facilitators of learning.

Another way to explore the teachers/facilitators' ability to account for learner control options in a learner-centered classroom is to compare that to teacher-centered education. In a teacher-centered or traditional approach, students passively absorb information, and the teachers' mission is to fill their students' heads with knowledge the teacher decides is important (Tappan & Brown, 1996). Learning is accomplished through the teacher's control of the content, and students learn content that the teacher decides is important. As described by the participants in this study, students are often conditioned in this "old school" style of education. Teachers in this old school paradigm may have to justify their content and methods to their colleagues or superiors, but their content and methods do not necessarily have to be justified to students. Compared to a learner-centered classroom, in a teacher-centered classroom, learners have less power, and are more passive recipients of knowledge. Thus, in a teacher-centered classroom, there is less reason to give any thought to learner control of the learning process.

Facilitating student-student interaction was shown as a way to engage students, and also gave them more control of the CMC environment. All of the teachers kept a low profile in the online discussion areas, and their messages fell into the following categories: (1) a welcome or introductory message, (2) providing information about resources, and (3) praise for a job well done. It is somewhat surprising that there was not more variation
between the teachers in their facilitation practices of online discussions. Gunawardena et al. (1998) proposed five phases and related operations for a CMC interaction analysis model: (1) sharing/comparing of information; (2) discovery and exploration of dissonance or inconsistency among ideas, concepts, or statements; (3) negotiation of meaning/co-construction of knowledge; (4) testing and modification of proposed synthesis or co-construction; (5) and agreement statement(s)/applications of newly constructed meaning. Although the teachers encouraged students to engage in all five phases of interaction with other students, teachers limited their own involvement to (1) sharing/comparing of information. Their reasons for this were not explored, however, it is possible that teachers simply limited their engagement in students’ discussions because of time constraints and a heavy workload or because students were on track in their discussions.

The user-interface.

Many teachers and students saw the user-interface as helping students take control of their own learning. When the teachers showed students how to use a specific feature of the user-interface, this was interpreted as helping learners take control of the learning environment. I believe there is support from my data to include the user-interface as a mode of interaction in the DL framework for learner control. As proposed by Hillman et al. (1994), user-interface interactions represented a fourth type of interaction in the context of this study.

Although the user-interface has been identified as a fourth mode of interaction in CMC environments, it does not necessarily follow that students cannot learn without user-interface interaction. User-interface interaction is one type of interaction, and I have not attempted to estimate its importance relative to the other three types of interaction: (1) with the teacher, (2) with the content, and (3) with other students. If a student does not login to the user-interface, or fails to interact either with the teacher, or with other students, or with the content, learning can still take place. Although, it is difficult to
imagine any learning taking place if there was no interaction in any mode, in a distorted sense, the learner may still be in control of his or her own learning. In the DLM model, learner control is defined by the interaction or communication in any of these four modes, and interaction is the means for integrating the components of the learner control triad. A student who is successful interacting in all four modes would have more opportunities to balance the components of the learner control triad.

The teachers did use some features of the user-interface to give learners more control. However, for the most part, the teachers limited their use of the user-interface to commonly employed features of the specific interface. It is my interpretation that none of the teachers took full advantage of the user-interface, and lacked knowledge of specific features that could be used to give learners a sense of control. Perhaps this is an implication for professional development.

Bonk and Wisher (2000) wrote, in a recent review of research on Internet based distance learning, "instructors tend to employ simple tools online" (p. 38). Although they believe that most e-learning tools for interaction do not adequately support a constructivist learning environment, teachers do not take advantage of what is currently available. Another research team found that "the pedagogical approaches favored by educators and researchers for the development of valuable learning environments are still far from being implemented in most educational Websites (Mioduser, Nachmias, Lahav, & Oren, 1999)." Thus, my finding that teachers do not use the user-interface to its full advantage is consistent with other reports.

One approach to familiarizing teachers with the potential of the user-interface is to use role models who could provide examples of more in-depth uses of the user-interface (Bandura, 1971). Indeed, I felt that the teachers were very interested in my ideas about the using the user-interface during the interviews. They all wanted to know more when I asked them about certain features they did not know about. Alternatively, it is possible that teachers simply do not need sophisticated tools to help students become more self-directed. However, I do not support this view, and believe that using the user-
interface to its full potential is a means for giving learners more opportunities for learner control. Furthermore, I think this will become increasingly doable as teachers and learners generally become more savvy about the Internet and communications technologies.

Recommendations for Practitioners

Based on my findings, there are a number of strategies facilitators of learning may want to incorporate into their CMC environments. In a list of recommendations, Jo (1993) essentially asks teachers to be clear about the control options learners have available to them, and to train learners to use them. Since the students in my study valued freedom and choice, but did not demonstrate as much confidence in this aspect of the DL triad, it makes a lot of sense to follow Jo’s recommendation to give learners a better sense of what control options they have available to them. In other words, the students’ perception that they did not have as much freedom and choice as they would have liked, may be overcome by simply spelling out to them all of the options they actually have.

The issue of students’ weaker perception of the freedom they have can also be addressed by giving learners more support and encouragement. The findings in this study as well as in Thompson’s (1998) showed that students really value the encouragement they get from their teachers. It is a simple but perhaps often overlooked strategy to give students as much praise as possible. Confident students will be better able to handle the choices available to them.

Metacognitive thinking is necessary for students to take control of their own learning. Paying attention to learners’ metacognition is a characteristic of constructivist teaching (Murphy, 1997). Blakey and Spence’s (1990) list of strategies teachers can use to improve metacognitive thinking will also help students take control of their own learning. These strategies include being explicit about the thinking process as well as incorporating reflective assignments. Reflective assignments are something the teachers in this study
assigned to students even though they did not necessarily articulate this connection
between metacognition and learner control. Practitioners should continue to include
metacognitive activities as a way to help their learners take control of their own learning.

The balance that is needed between the different aspects of the DL triad in order
for the learner to take control is something teachers should always keep in mind when
designing the learning environment. If learners seem to flounder with the amount of
choice they've been given, then teachers should adjust the level of support they give and
reassess their learners' abilities. Conversely, students may be bored if they can handle
more freedom than they've been given. The three sides of the learner control triangle are
probably always changing, and it is the teacher who must respond to these changes over
time and over different contexts. When equilibrium exists between support, freedom and
the learner, then the learner is in the best position to take control of his or her own
learning.

Finally, the user-interface can be fashioned to give learners more opportunities for
control. But in order for this mode of interaction to reach its potential as part of the DL
model, teachers must be familiar with and must use the features available to them. An
example of how FirstClass can be used within the context of the DL model is available at
this web address: http://fcis.oise.utoronto.ca/~kcook/fcprimer.htm. I encourage
teachers to tap the potential of the user-interface they use, and think about ways to use
the medium within a constructivist learning environment.
Suggestions for Further Research

First, this was the third time the BLC questionnaire has been used by an educational researcher, and it has been proven to be a reliable and informative instrument. It would be interesting to see if students in other educational settings and academic levels continue to have similar results. In addition, finding out more about the fact that the students surveyed so far, by both Thompson and me, expressed the least amount of confidence in the freedom aspect of the DL triad might be particularly worthwhile pursuing.

Secondly, it would be theoretically interesting to explore further the notion that those teachers who believe in maximizing learner control options also see themselves as facilitators of learning. Although I have made a very general assertion that the teachers in my study fit this profile, it may not be as black and white as it appears. There may be a continuum between teacher as facilitator and teacher-centered approaches. Alternatively, there may be a distinct boundary – a fence to cross – which might mean it is not possible to be on two sides of these two dichotomous philosophies at the same time.

Another avenue to explore is the competitive element in the online discussions; about 17 students specifically mentioned this. Some of the students, who commented on this facet of online discussions, indicated that their sense of competitiveness increased their motivation. However, it's possible a sense of competitiveness could increase anxiety in some students. Others have reported similar statements by students (Hara & Kling, 2000), but no literature was found describing or elaborating on this phenomenon in CMC environments.

Of all the questions I asked during the teacher interviews, the series of questions based on Moore's (1977) classification were the most fruitful. The three questions he posed to describe the degree of learner responsibility allowed me to easily assess the teachers' stance on the teacher control – learner control continuum. His 1977
classification scheme pre-dates CMC environments, but I recommend adapting his ideas for future research in this area.

Finally, further discovery of the importance of the user-interface would be worthwhile. If the teachers received coaching or were given role models on how to employ specific user-interface features to give learners control, this may have benefited student learning. In other words, if more time was devoted to the user-interface in online courses, increasing students' sense of control over the user-interface may enhance student learning. Furthermore, a feature rich user-interface, such as FirstClass, seems to give teachers more opportunities to provide learner control options. More generally, the educational implications of different software products need to be investigated. Finally, an important question is whether or not each user-interface has an implicit pedagogy, and if so, what are the effects of the technology's pedagogy on the CMC learning environment.
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Appendix A
Sample letter to teacher participants:
[Name and Address inserted here]

Dear

I am a doctoral student at the Ontario Institute for Studies in Education of the University of Toronto, Canada; my thesis supervisor is Dr. Lynn Davie. My research is about teachers using FirstClass to teach online courses and about learners in online courses. As you know, contacts from Centrinity, the makers of FirstClass, gave me your name because of your exemplary use of FirstClass for online teaching and learning. So, I would like to talk with you, if you decide to participate in my research, about the kinds of things you do for your students using FirstClass.

For my research, I would like to interview you in person for 90 minutes; I am also asking your permission to record the interview session. Access to the recorded data is limited to my thesis supervisor and me, and will be stored in a secure location; the data files will be deleted one year after completing my thesis. You are not obliged to answer every question I ask. I will be conducting similar interviews with approximately five other teachers like you. I will show you the transcript of our interview so that you can check it for accuracy and ask me to remove any part of it you like. Also, I will use a label instead of your real name, and remove all references to your location and institution when writing about my findings. However, given your profile as an expert FirstClass teacher, it may not be possible to maintain your anonymity from everyone. The research results will be included in my thesis, and may appear in a scholarly journal in the future.

Secondly, I would like to invite your online students to complete an online survey about their feelings of control over their own learning. The survey consists of 28 Likert type questions, and 7 open-ended questions. The survey is available for you to preview at this URL: http://forms.flashbase.com/forms/BLC (the password is learner). I will inform the students that their teacher
will not know the names of students who completed the survey. The student survey is not meant to be an evaluation of your performance in any way, but it is possible students could completely misread the open-ended questions, and inadvertently evaluate your performance. Any comments about you as a teacher made by students will be omitted from the interpretation of my data; in any case, evaluation of your performance does not relate to my research questions.

If you are interested in participating in my study, I will be delighted to hear from you. Agreeing to participate at this time does not mean you are committed - you may withdraw at any time. However, I hope you will enjoy our discussion, and benefit from sharing insights about using FirstClass for teaching and learning. Please sign the consent form on the back of this letter, and return it in the stamped self-addressed envelope. I will contact you about setting up an interview time that is convenient for you. Feel free to contact me with any questions or comments.

e-mail: kathryn@online.georgianc.on.ca
phone: (705)-721-9265

Sincerely,

Kathryn Cook
172 Blake Street
Barrie, Ontario L4M 1K3

You can reach Dr. Lynn Davie at this number:
416-923-6641 extension 2355
Consent to participate in this study

I have read the letter by Kathryn Cook describing her research on using FirstClass and teaching in online courses. I agree to participate in the study under the conditions she explained in her letter.

__________________________________  ________________
Signature of the participant            date

__________________________________  ________________
Signature of the researcher            date

€ Check here if you would like to receive a summary of the findings of my research after the research is completed.

Please sign both copies of this form, and keep one copy for your own records.
Dear Student,

I am a doctoral student at the Ontario Institute for Studies in Education of the University of Toronto, Canada. My thesis is about using conferencing software and learner control in online courses. I will be delighted if you agree to participate in my research by completing an online questionnaire. Your answers will contribute to our understanding of the best possible learning environment for online students.

The online survey is about your feelings of control over your own learning. The survey consists of 28 rating scale questions, and 7 open-ended questions; I estimate it will take about 15 minutes to complete the questionnaire. The survey is available via a web browser at this URL: http://www.flashbase.com/forms/BLC -- the password is learner.

The results of my research will be included in my thesis, and may appear in a scholarly journal in the future. The survey data will be stored on a secure server, and only my thesis supervisor and I will have access to the data; the data files will be deleted one year after completing my thesis. Your teacher will not know if you completed the survey, and I will only know you by your e-mail address. Completing the survey is entirely voluntary; the only benefit to you is the knowledge that you contributed to our understanding of online courses. If you do fill-in the online survey form, I am assuming you consent to have your survey results be part of my
research data. If you would like to receive a summary of the findings of my research, please let me know, and I'd be happy to do that when my thesis is finished.

Feel free to contact me with any questions or comments - I'd love to hear your thoughts.

Kathryn Cook,
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LEARNER CONTROL QUESTIONNAIRE

The following questions refer to some learning situations in the course you are now taking. Please circle the number that best indicates the extent to which you presently experience this item.

Try not to spend too much time on any one item. Your first reaction will be most accurate. There are no right or wrong answers. Indicate your answers using this scale:

Not at all 0 1 2 3 4 5 6 To a very great extent 0 1 2 3 4 5 6

1. I am interested in the course I am taking........................................0 1 2 3 4 5 6
2. I have a "say" in how my grade is determined................................0 1 2 3 4 5 6
3. I have the financial support I need while taking this course........0 1 2 3 4 5 6
4. I have the study skills I need ..................................................0 1 2 3 4 5 6
5. I have input into what information/content is covered in the course0 1 2 3 4 5 6
6. I have the emotional support of family and friends while taking this course0 1 2 3 4 5 6
7. I have confidence in myself when I am learning..........................0 1 2 3 4 5 6
8. I have the opportunity to discuss with the teacher what I want to learn0 1 2 3 4 5 6
9. I have a teacher who treats me like a peer or equal..................0 1 2 3 4 5 6
10. I have the ability to motivate myself......................................0 1 2 3 4 5 6
11. I have a teacher who directs my learning...............................0 1 2 3 4 5 6
12. I decide how long it takes to complete the course.................0 1 2 3 4 5 6
13. I know what I want to learn from the course.........................0 1 2 3 4 5 6
14. I have access to professionals (other than the teacher) who can help
    with learning (for example, advisors or counselors)..............0 1 2 3 4 5 6
15. I have access to library books, audio/videotapes, etc., other than
    those supplied with the course........................................0 1 2 3 4 5 6
16. I have the ability to handle the course material........................0 1 2 3 4 5 6
17. I have the freedom to choose the deadlines for my assignments
    and/or exams ...........................................................0 1 2 3 4 5 6
18. I have access to other students for support or assistance..........0 1 2 3 4 5 6
19. I have the freedom to decide when and how often I have contact
    with the teacher......................................................0 1 2 3 4 5 6
20. I am able to handle my studying along with other demands on my
    time (work, family, etc.)............................................0 1 2 3 4 5 6
21. I am responsible for my success or failure............................0 1 2 3 4 5 6
22. I enjoy learning....................................................................0 1 2 3 4 5 6
23. I have a choice in what courses I take....................................0 1 2 3 4 5 6
24. I get encouragement/support from the teacher........................0 1 2 3 4 5 6
25. I work on my own with direction from the teacher..................0 1 2 3 4 5 6
26. I can get a hold of the teacher when I have questions I want answered....0 1 2 3 4 5 6
27. I have a "say" in what assignments and other learning activities
    I want to do in this course.............................................0 1 2 3 4 5 6
28. I have a teacher who encourages me to come up with my own ideas
    on things.......................................................................0 1 2 3 4 5 6

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March 16, 2000

Kathryn Cook
172 Blake St.
Barrie, Ontario
L4M 1K3

Dear Kathryn,

Thanks for your interest in my Learner Control Questionnaire. You have my permission to use the Learner Control Questionnaire for your research. In return I ask that you provide appropriate citations for the instrument, and include the label “© Myra Baynton 1992” on all printed or web published copies. I would also like a summary of your findings when your thesis is completed.

Sincerely,

Myra Baynton PhD
Coordinator, Office for Performance Improvement
King Faisal Specialist Hospital & Research Centre
Appendix C
TEACHER INTERVIEW GUIDE

For Learner Control and User-Interface Interactions in CMC

(NB - bulleted sub-points are prompts for the interviewer. If teachers ask for examples or explanation these will be offered. Also, if teachers omit examples, the interviewer will prompt the teachers, but only after the teacher has been given the opportunity to think of his or her own responses.)

1. How many students are enrolled in your online class? And how long have you been teaching online courses?

2. Have you ever encountered my website with various FirstClass resources?

3. Can you summarize your overall beliefs about teaching and learning?
   - is giving students options/choice an important issue for you?
   - paradigm shift?
   - does your subject area base the curriculum on any particular philosophy?

Questions about the user-interface in online courses

4. Describe your overall experience using FirstClass for an online course.

5. Did you offer any kind of orientation session or demo session for using FirstClass?
   - if yes, what kinds of orientation activities did you do to support your online students?
     (multiple)
     - FTF orientation or demo.
     - online orientation activities.
     - orientation letter.
     - provision of contact names, teacher's name.
   - technical support.
     - if yes, how was the training conducted?
     - if yes, how was the training structured (by features or by mental model)?
6. A) Do your students seek help from you on using FirstClass? and B) Do your students report to you that they asked for help from someone else?

7. (If yes to number 6) What kinds of FirstClass help did your students find most beneficial?
   - ask support staff in an on-campus Learning Center.
   - online tutorials and web pages.
   - scheduled demonstration sessions.
   - Computer Services' Help Desk.
   - sending a message to the teacher with a question.
   - a FirstClass quiz.
   - FirstClass help files.
   - inviting the teacher to a FirstClass chat.

8. Do you have any thoughts about your students' mental model of FirstClass? By a mental model I mean the user's expectation about what will happen when using a computer system as well as his or her interpretation of system feedback. For example, when students login to FirstClass, they may think
   a) the course interface in FirstClass is run by the software.
   b) unseen computer programmers create and manage the online course interface.
   c) or the course interface is designed and maintained by the teacher.

9. What skills or abilities do you think your students need most to use FirstClass effectively?
   (multiple)
   - know how to navigate their computer operating system.
   - familiar with the Internet.
   - being motivated to learn new software on their own.
   - value reading and writing as a way of communicating.
   - self-efficacy (belief in ability to succeed).

10. In what ways do you fashion FirstClass for your teaching and learning environment? [NB – if teacher is not using a specific feature, why not?] 
   - create sub-conferences for topic specific discussion.
   - give learners additional privileges or student moderated conferences.
   - use Search; teach students to use Search to measure their own progress (metacognitive).
• ask students to Summarize Selected as a reflective tool (metacognitive).
• create Public Chats to facilitate student-student interaction.
• use Message History for tracking.
• use FCP:// bookmarks for navigation.
• model use of default font and font color to humanize.
• use inline images and/or voice attachments.
• use custom forms and/or personal stationary for rubrics.
• share web resources using automatic hyperlinking.
• use Calendar Reminders rather than teacher authored messages to repeat instructions.
• use Auto-open and/or Urgent messages to draw attention to important instructions (metacognitive).
• use View Properties to customize Desktop appearance.
• etc.

11. What is the overall importance of using FirstClass in your online course?
   • probe to see if using FirstClass has an impact on student support needs, learner attributes considered necessary to succeed or freedom to choose?

Questions exploring teaching strategies in online courses

12. Describe the teacher’s role in an online course?
   • explore teacher’s stance on a teacher control ←→ learner control continuum.

13. How did you help your online learners acquire the skills & motivation they need to succeed in an online course? (multiple)
   • set entry requirements or prerequisites for online courses.
   • provide information profiling the successful online learner.
   • make available a skills inventory, for example, a Net-head quiz.
   • teach study skills, which learners need to regulate and control their own learning, such as time management.
   • encourage student to student interaction to break the isolation, and give them a sense of belonging.
   • student failure/completion rate.
14. How do your students react to the level of structure in your course, and what strategies do you use to provide direction?

15. Do you ever ask students to work in groups? If so, how are the groups formed?

16. What are your thoughts about learners having control of their own learning process?
   - how important is it to give learners control?

17. What kinds of instructional strategies do you use in an online course?
   - Do you use any strategies to help your learners think about their own thinking?
     - here are examples of metacognitive strategies:
       - advise students to break down a task into more manageable sub-tasks.
       - ask students to decide the order of sub-tasks.
       - make prominent those portions of assignment instructions that will help students meet the requirements of the task.
       - suggest students tackle school work when they are in a comfortable and relaxed environment.
       - encourage students to take mental stock of their progress.
       - ask students to identify what they know and what they don’t know.
       - create assignments that include self-evaluation and reflection.
   - Do you use any pacing devices?
     - for example, a learning contract where students set out the time frame for a project in advance.
   - Do you use any other techniques or instructional strategies to reduce anxiety?
     - RSI techniques, such as, use of calming colors, talking about personal comfort, humor, acknowledging computer anxiety, etc.

18. Describe any other approaches you have used or would like to use? add this — to give learners more control over their own learning process — only if answer to question 3 indicates interest in providing learner control options.
• what are the conditions needed to give learners control? (skills + support + freedom = learner control)
• detail the ways FirstClass is used to promote learner control.
• does the teacher provide options related to learning style?

19. How would you compare the amount of academic freedom you give students in an online course compared to a traditional class that you teach?
• there is less freedom to choose in an online course.
• the amount of freedom is about the same.
• there is more freedom to choose in an online course.

20. Which of the following things do you or your school do to give online students more choice?
• open-entry open-exit.
• input into what content is covered.
• choice of topics covered.
• a say in how grades are determined.
• assessment contracts.
• performance contracts.
• freedom to choose assignment due dates.

21. Do you plan the course structure differently when designing a course delivered by FirstClass versus a FTF course?
• yes or no.
• describe experiences designing a FirstClass course.

22. How is your online course structured in FirstClass?
• mostly an online version of a print-based distance course (didactic learning materials).
• course was written to tap potential for online discussion in a computer-conferencing environment (use affordances of CMC environment).
• use problem-based learning strategies to put more responsibility on the learner.
• other...

23. Reflecting generally on your experiences as an online teacher, what is your take on the following three issues that effect the overall design of online courses?
1. Is the selection of learning objectives in your course decided by the learner, or the teacher, or both?
   - explore if there are outside forces dictating learning objectives, such as, college requirements or licensing bodies.
2. Is the selection and use of resources (human resources, books, other media), and the sequence and pace of learning experiences, the decision of the teacher, or the learner or both?
   - do students have independent access to resources, both human and non-human?
3. Are the decisions about the method for evaluation and criteria to be used made by the learner or the teacher or both?
   - what happens when there is a conflict between the teacher and the student over evaluation methods or what an assignment is worth?

NB -- May I have copies of your notes to students -- assignment instructions, course syllabus, etc.?
Appendix D
Method 2 (covariance matrix) will be used for this analysis

Question key for identifying items in DL triad:
- LRN - Learner item
- FRD - Freedom item
- SUP - Support item
- OUT - item removed

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### Reliability Analysis - Scale (Alpha)

**Correlation Matrix**

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### Reliability Analysis - Scale (Alpha)

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### RELIABILITY ANALYSIS - SCALE (ALPHA)

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### Scale (Alpha)

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**Reliability Analysis**

- **N of Cases** = 120.0

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