

ATHABASCA UNIVERSITY

DEEP LEARNING AND COGNITIVE PRESENCE IN COLLABORATIVE WEB-
BASED LEARNING ENVIRONMENTS:
STUDENT AND INSTRUCTOR PERSPECTIVES

BY

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A thesis submitted to the
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DEDICATION


This thesis is dedicated to my wife Gail and my children, Mark and Lauren. They have watched me spend endless hours at the computer instead of with them.

They have shared in my journey and always helped me when the road was hard.

They have sacrificed as much, if not more, than I have. I hope this work justifies their support.

ATHABASCA UNIVERSITY

The undersigned certify that they have read and recommend to the Athabasca University Governing Council for acceptance a thesis DEEP LEARNING AND COGNITIVE PRESENCE IN COLLABORATIVE WEB-BASED LEARNING ENVIRONMENTS: STUDENT AND INSTRUCTOR PERSPECTIVES submitted by LEONARD OLSZEWSKI in partial fulfillment of the requirements for the degree of MASTER OF DISTANCE EDUCATION.




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ABSTRACT

This study examines the ability of online distance education courses using CMC and constructivist assessment tools to support cognitive presence and deep learning. Four online focus groups were conducted, three among graduate students and one among instructors who have respectively taken and delivered online courses in the Master of Distance Education program at Athabasca University. Transcripts of the focus groups were analyzed with the objective of developing a grounded conceptual model. The learning experiences, as described by the participants themselves, have shown that deep learning and cognitive presence are facilitated when learners have the opportunity to engage in learning activities with a high degree of relevance to their life worlds. Cognitive presence and deeper learning are also encouraged through the application of learning to the work or personal lives of the learners.

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CHAPTER 1

INTRODUCTION

Keegan (1996, p. 116) hypothesized that the separation of teaching and learning acts characteristic in distance education resulted in a diminished quality of learning in situations where the intersubjectivity of teacher and learner often absent in distance learning models was not reestablished through the integration of interpersonal communication in course design. With the development of sophisticated and accessible methods of computer communication facilitated by the internet in the 1990's, distance educators realized that communications mediated by the computer and the internet could contribute to a dramatic increase in the level and timeliness of communication between teacher and learner. With this realization many distance education designers began to incorporate Computer Mediated Communications (CMC) in their course designs.

The new technology, initially used for communication between teacher and learner, showed substantial potential to create a community of inquiry. As Garrison and Anderson (2003) state, "The technology of e-learning has both the capability to precipitate private reflection as well as public discourse within a community of learners" (p. 23). The process of transition between the private world and the shared world appeared to embed CMC into a constructivist learning paradigm capable of fostering deep learning. The element of CMC in an online course that provides teacher-learner and learner-learner interaction is what distinguishes today's fifth generation online learning from previous generations of online learning. Weigel (2002) amplifies Garrison and Anderson's

position when he states that, “We may well be in the initial stages of a revolution in learning that combines richness with accessibility and in so doing parts company with the dominant educational motif of surface learning” (p. xiv). The ability of CMC to allow for reflection and discourse, its ability to support deep learning, and its ability to increase accessibility make it an important topic for research in distance education. As in any revolution, arguments for and against abound. Yet the notion that distance education using CMC could provide a deeper learning experience than the traditional and predominant method of lecture followed by exam intrigued not only distance educators, but many traditional educators looking for a more effective way to encourage deep learning. Many researchers in education began to focus on the ability of CMC to create a deeper learning experience in distance education courses and mixed-mode courses where CMC and face to face interaction were both employed.

There is no doubt that the incidence of CMC used in higher education in courses delivered completely online and in mixed-mode delivery has increased dramatically and it is safe to say that the majority of online learning courses use CMC as an important element of course design. This alone demands that researchers examine the ability of CMC to foster deep learning in an online environment. Moreover, CMC would appear to be the one factor that now distinguishes online courses from correspondence courses. Therefore, the importance of examining the ability of CMC to support deep learning is palpable.

In the past five years, a significant number of studies have focused on the analysis of text as a methodology for understanding the impact of collaboration

on the construction of knowledge, the making of meaning and the depth of learning in online courses using Computer Mediated Communication as a core component of the instructional design. Garrison and Anderson (2003) have used this methodology to support their notion of e-learning as a potentially powerful tool in the creation and nurturing of what they have referred to as a Community of Inquiry, characterized by the intersection of cognitive presence, teaching presence and social presence in an online environment. This notion of Community of Inquiry reflects the outcome of significant thought about the quality of educational experiences that can be provided in an online learning environment. As Garrison and Anderson (2003) state, "If we are to understand how e-learning can change the conditions of the educational transaction, and yet enhance traditional educational values, then we must turn our attention to the understanding of the 'critical community of learners'" (p. 23).

Garrison and Anderson's (2003) conclusions, based on their research, have been supported by a number of other studies. McKlin, Harmon, Evans and Jones (2002) tested the ability of a neural network to undertake text analysis, searching for instances of cognitive presence in a computer mediated discussion. Schrire (2002) engaged in detailed analysis of the patterns of interaction in online conferences used in an online course in education. Fahy (2002B) and Fahy, Crawford, and Ally (2001) have used the Transcript Analysis Tool (TAT) to study transcripts of asynchronous computer mediated conferences in the hopes of identifying indicators of higher order thinking. All of these studies add support to the notion that CMC can create a Community of Inquiry and foster deep learning

among the participants. However, there were indications that though CMC supported a deeper level of learning, the learning might not have progressed to a point of resolution.

These studies have used indicators of cognitive presence which were developed by Garrison, Anderson and Archer (2000). They are related to four phases that learners are thought to progress through; a triggering event, exploration, integration and resolution. All of these studies have come face to face with results that beg further research. This is the low level of resolution messages in these conferences. Archer, Garrison, Anderson and Rourke (1999), Garrison and Anderson (2003) and McKlin, Harmon, Evans and Jones (2002) have offered various explanations for this phenomenon. These will be discussed in the literature review. These results, however, do point to the need for research methodologies that help better define the role of CMC in facilitating cognitive presence and deep learning, and in relating CMC to the other learning activities designed into an online learning environment.

A number of issues have surfaced with respect to the reliability and validity of many of these studies. Rourke, Anderson, Garrison and Archer (2001) examined nineteen content analysis studies related to asynchronous, text based computer conferences in an educational context. Their study pointed to a number of issues regarding the reliability of these influential content analyses with respect to the replicability of results. Almost a third of the papers did not mention reliability, while almost half reported only a percentage agreement and only three of the studies used Cohen's kappa to take into account chance agreement. Units

of analysis, variables investigated and research design were substantially different from study to study.

Rourke and Anderson (2005) point out that Quantitative Content Analysis (QCA) of asynchronous computer conferences in an educational context presents problems with respect to the ability to apply existing protocols to latent content. Surface content may not provide enough information to make reasonable inferences. Garrison and Cleveland-Innes (2005) and Sutton (2001) have hypothesized that vicarious interaction can result in higher order cognitive processes taking place. A vicarious progression through triggering event to resolution would not be captured using text analysis methods. Therefore the ability of these studies to measure indicators of cognitive presence related to latent content and vicarious learning is calling into question the validity of this methodology.

Purpose. The studies above have examined artifacts in the form of transcripts of conferences, and have undertaken taxonomic and pattern analyses in order to infer whether deep learning has taken place. There are, however, still doubts raised about the ability of these analyses to provide reliable and valid data to support whether deep learning has been achieved. In fact, some may argue that the data, due to the low incidence of integration and resolution noted in these studies, does not support the notion that conferences facilitate deep learning. The importance of further research is magnified by this potential weakness of the studies mentioned above.

As we will see later, the research methodology was chosen for its ability to

move towards a better understanding of latent attitudes, behaviour and learning in online courses by collecting data that went beyond inferences made from transcripts of conferences, and to provide a better understanding of the conditions that could potentially lead to or inhibit deep learning in an online course. Additionally, these studies did not examine the outcome of deep learning as a result of the totality of course design; the learning opportunities which had been designed into the course, the study guide and selection of readings and learning materials, and assessment techniques, as well as CMC.

Through probative discussions with learners and instructors, this would form the basis for further research and allow the beginning of generalizations based on the total learning experience and not just that related to CMC. As Anderson points out in the following open discussion transcript, there is a need for more theory in the field of distance education:

Terry Anderson: I would just like to respond to something that Jim said about the thing he liked was the emphasis on theory. Frankly, I didn't see it that much...I guess maybe it is a challenge for ourselves. I'm just as guilty as anyone else, I'm sure, but is to maybe read Glaser and Strauss about grounded theory work (sic). The experiment ends with some hypotheses that are at least testable or with trying to make some generalizations. We tend not to do either. (Duffy & Kirkley, 2004, p. 425)

Those involved in Distance Education are now seeing more research designed to develop a stronger theoretical foundation for the field. The intent of much of this research is to inform practices and to support the pedagogical strengths of this method of learning. This study was conducted to make a contribution to this body of theoretical knowledge.

Long (2000) highlights the importance of theory in education when he

states:

...we should be able to use theoretical knowledge to help us with applied areas and to go beyond everyday experience and understanding. Developments in education often lack this theoretical foundation and are frequently inspired by social processes or ideological beliefs, a fact that can lead to cycles of change as the general social climate alters (p. 6).

There is also a temptation to allow current influences in society, particularly in the use of technology in communication, to lead theoretical development. This is not a criticism, but it does require theory that is developed to compare itself against the phenomenon in question from the perspective of the learner and not the theorist. This study, through its focus group methodology, hoped to achieve this to some degree.

Research question. Previous research studies, despite issues with reliability and validity, have presented us with a body analysis, reflection and interpretation that appear to support the notion that deep learning does take place in online courses, and that CMC is a contributing design factor. The research questions outlined below were designed to add to the body of knowledge regarding the different learning tools used in online courses and what effects these were having on guiding the student towards deep learning experiences.

1. Under what conditions of online learning, supported by CMC and constructivist assessment tools, will students perceive that deep learning has occurred?
2. To what extent will learners perceive that they have progressed through an evolutionary cycle whose elements are defined by Garrison and Anderson (2003) as the categories of cognitive presence: i) a triggering event, ii) exploration, iii) integration, iv) and resolution.

3. To what extent will instructors perceive that course design has facilitated the progression through these four phases?

Assumptions. The primary assumption of this study was that learners, particularly at the graduate level, engage in meaningful learning through constructivist approaches. Garrison and Anderson (2003) suggest that “The third generation distance education system embraced constructivist learning theories...” (p. 37).

Howe and Berv (2000) state that,

Constructivist learning theory has its primary roots in the work of Jean Piaget and Lev Vygotsky. It is by no means a stretch to claim that John Dewey also held a constructivist theory of learning, indeed in a rather carefully developed form (p. 30).

The making and sharing of meaning were important antecedents of interpretation in this study and the works of Vygotsky, Piaget and Dewey have provided an important backdrop for the development of generalizations and theory. In other words, the researcher has assumed that creating a constructivist learning environment in higher education is a good way to encourage deep learning. This assumption accepts the notion that deeper learning and advanced knowledge acquisition is encouraged by a constructivist learning environment. Jonassen, Mayes and McAleese (2006) state that, “We believe that constructivistic (sic) learning environments are most effective for an advanced knowledge acquisition stage of learning. This stage is most consistently required in universities. Therefore, universities are among the most appropriate venues for implementing constructivistic (sic) learning” (¶ 1).

The second assumption, though no less important, was that meaningful learning is grounded in practical inquiry. This further linked the work of Dewey on

reflective thinking and practical inquiry with the interpretation of data.

It was assumed that the selection of graduate students in distance education as participants would result in an articulate and critically reflective set of data and that the comments made by the participants would be an honest reflection of their learning experiences. It was also expected that they would be interested in participation in the focus groups as a learning experience in itself and that they would be comfortable in a Computer Mediated Communications environment, since this environment has been an integral part of distance education delivered graduate study in general, and specifically the Master of Distance Education (MDE) program at Athabasca University.

Definition of terms.

CMC. Computer Mediated Communication (CMC) in this context is defined as threaded discussion groups addressing specific questions, problems or other mediating artifacts posed by the instructor or other students which require reflection.

Constructivist assessment tools. Neimeyer, as cited in Reeves and Okey (1996), suggests that Constructivist Learning Environments (CLE's), including virtual environments, situate the learner as an individual who explores, experiments and actively solves problems. Reeves and Okey (1996, p. 193) further focus on three types of constructivist assessment approaches; i) authentic assessment, ii) performance assessment, and iii) portfolio assessment. Applying these approaches would suggest the selection of courses for study that use, in addition to CMC and not limited to, case studies, essays, learning journals, virtual

presentations, critiques, reviews, problem solving and other tools which allow students, as Reeves and Oakley state, "...to apply knowledge in ill-defined, ambiguous contexts that demand judgment" (1996, p. 193).

Cognitive presence. Garrison, Anderson and Archer (2000) define cognitive presence as "...the extent to which the participants in any particular configuration of a community of inquiry are able to construct meaning through sustained communication" (p. 4). They further connect the notion of cognitive presence with Dewey's notion of reflective thinking in their development of the Practical Inquiry Model (which will be discussed in detail in the Review of the Literature, Chapter II). Garrison and Anderson (2003) have linked the three concepts of critical thinking, cognitive presence and the Practical Inquiry Model together in stating that "...we define critical thinking in terms of practical inquiry (Garrison and Archer 2000). Cognitive presence is seen to be defined and manifested through the practical inquiry model" (p. 58). This Practical Inquiry Model moves through four phases; a triggering event, exploration, integration, and resolution.

Critical thinking. Garrison and Archer (2000) focus on Dewey's discussion of reflective thinking when examining this issue; "Dewey (1933) uses the term reflective thinking in a manner consistent with what we now term critical thinking" (p. 63). Dewey (1910) addresses the nature of reflective thinking as a process that leads to conclusions based on the "...close study into facts, of scrutiny and revision of evidence, of working out the implications of various hypotheses, and of comparing these theoretical results with one another and with known facts" (p.

5). Conclusions are arrived at and judgments are made based on inquiry.

Deep learning. The Higher Education Academy (2004) defines deep learning as “Examining new facts and ideas critically, and tying them into existing cognitive structures and making numerous links between ideas” (p. 2). The Academy contrasts this with their definition of surface learning, that is, “Accepting new facts and ideas uncritically and attempting to store them as isolated, unconnected, items” (p. 2). The relationship between critical thinking and deep learning is highlighted in both these definitions. Garrison and Archer (2000) articulate this relationship when they state that “Critical thinking is, in essence, the process of learning in a deep and meaningful way” (p. 75).

Summary. These definitions and brief discussion provide an overview of the key concepts addressed in the research question; deep learning, critical thinking, cognitive presence, and the four phases of the practical inquiry model mentioned above. The key role of critical thinking as the process by which deep learning is achieved has also been established. These concepts and their relationship are further discussed in the Review of the Literature.

Limitations

Participants in this study were volunteers. As such, it must be recognized that the data derived from these respondents may in fact not reflect the data that might have been derived from non-respondents. It is possible that those interested in volunteering might have had a different set of learning skills already developed that might have enhanced their ability to negotiate their way through the four phases of cognitive presence.

The sample of courses and instructors was also limited by those courses offered the semester prior to the period of research which was fielded in December 2004 and January 2005.

The depth of response from participants was limited by the amount of time they wished to invest in the study and the level of engagement in the research question.

Delimitations

The decision to source participants from the Master of Distance Education Program at Athabasca University was influenced by the researcher's knowledge, as a student in the program, of the learning environment constituted by course material, study guides, assignments and conferencing. It is believed that this knowledge has enhanced the interpretation of the data. However, it must be noted that it is inappropriate to extend this research without qualification to other environments; either other programs at Athabasca University, or other universities.

The selection of Masters level students suggests an articulate group of respondents whose discourse was influenced by their study of educational subject material. The meaning they made included their understanding and application of the concepts being discussed. This higher level of sensitivity to educational theory in an online environment has no doubt had some impact on their response to the research questions which might have not been forthcoming with students not involved in an education program.

Significance of the study

To quote Goulding (1999), the significance of this study is "...to bridge the gap between theoretically 'uninformed' empirical research and empirically 'uninformed' theory, by grounding theory in data" (p. 6). The data has been derived from probing the actual participants in an online CMC mediated learning environment, moving from the observational techniques of transcript analysis to the more phenomenological technique of speaking directly with learners. Through this the analysis of the results has provided a series of relationships grounded in the learners' interpretations and perceptions of actual learning experiences. These relationships are discussed in detail in the results section of this study. Moreover, these relationships have been compared to existing concepts from the fields of education and development so that extant knowledge and theory, as Goulding (1999) suggests, can move conceptual thinking beyond the obvious and superficial.

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

The advent of CMC allowed for the creation of Communities of Inquiry which had been difficult to sustain in previous generations of Distance Education. To date, the majority of research into course design in DE has focused on the outcomes of the use of CMC in creating a Community of Inquiry that could lead to an identifiable cognitive presence and deeper levels of learning within the conference itself. The following Literature Review begins with an examination of the notion of Community of Inquiry and relates the purpose of such a community to the realization of cognitive outcomes through the interaction of cognitive presence, social presence and teaching presence theoretically created within the community. The review then focuses on the Practical Inquiry Model as portrayed by Garrison and Anderson (2003). The purpose of this review is to orient the reader with the background of several important issues related to the exploration of deep learning as a possible outcome of online courses. The notions of reflective thought, critical thinking, discourse and cognitive presence are discussed and the current thinking regarding the relationships between these concepts, deep learning and the transition between the private world and shared world of the learner, and deliberation and action on the part of the learner are reviewed. Important to these cognitive processes is the support provided by a constructivist learning environment. A short review of semiotics addresses the use of semiotic webs as the cognitive structures being altered during the learning

process.

The state of transcript research regarding cognitive presence is outlined in order to situate the requirement that further research go beyond transcript analysis. These studies have contributed much to our understanding of a Community of Inquiry and have identified the need to probe other sources beyond CMC for indications of cognitive presence in online courses and move beyond transcript research to identify sources and processes that might contribute to deep learning in an online environment.

Finally, a brief review of grounded theory will be presented. This will be required later in order to support the conceptual model discussed in Chapter 5.

A community of inquiry

Lipman (1991) attributes the phrase ‘community of inquiry’ to Charles Sanders Peirce (1839 – 1914) who used it to describe “...practitioners of scientific inquiry, all of whom could be considered to form a community in that they were similarly dedicated to the use of like procedures in pursuit of identical goals” (p. 15). Lipman then addresses the modern use of the term, no longer restricted to only the realm of scientific inquiry:

Thus, we can now speak of ‘converting the classroom into a community of inquiry’ in which students listen to one another with respect, build on one another’s ideas, challenge one another to supply reasons for otherwise unsupported opinions, assist each other in drawing inferences from what has been said, and seeking to identify one another’s assumptions (1991, p. 15).

Garrison and Anderson (2003) state that “There is reason to believe that this inquiry process could be supported in an e-learning context” (p. 27). At the focal point of their reasoning is the Community of Inquiry Model. Garrison,

Anderson and Archer (2000) describe this model as "...a conceptual framework that identifies the elements that are crucial prerequisites for a successful higher education experience" (p. 2). Within this conceptual framework they suggest that any worthwhile educational experience is:

...embedded within a Community of Inquiry that is composed of teachers and students – the key participants in the educational process. The model of this Community of Inquiry assumes that learning occurs within the Community through the interaction of three core elements...cognitive presence, social presence, and teaching presence (p. 3).

Garrison and Anderson are clear that the goals underpinning the formation of the Community of Inquiry are "associated with intended cognitive outcomes" (2003, p. 55). In this respect, they view social presence and teaching presence as facilitating cognitive presence. Garrison, Anderson and Archer (2001) provide a more specific definition of cognitive presence as "...the extent to which learners are able to construct and confirm meaning through sustained discourse in a critical community of inquiry" (p. 1). Table 1 illustrates the elements of the model and the Categories of Indicators that reflect if cognitive presence, social presence and teaching presence have been achieved. For example, if one could identify that a triggering event had occurred, followed by exploration and integration then a certain level of cognitive presence had been achieved.

Table 1. Community of inquiry categories and indicators

Elements	Categories of Indicators	Indicators (examples only)
Cognitive presence	Triggering event Exploration Integration Resolution	Sense of puzzlement Information exchange Connecting ideas Apply new ideas
Social presence	Affective Open communication Group cohesion	Expressing emotions Risk-free expression Encouraging collaboration
Teaching presence	Design and organization Facilitating discourse Direct instruction	Setting curriculum and methods Sharing personal meaning Focusing discussion

Note. From *E-Learning in the 21st century* (p. 30), by D. R. Garrison and Terry Anderson, 2003, New York: RoutledgeFalmer. Copyright 2003 by D. R. Garrison and Terry Anderson. Adapted with permission.

Recognizing the importance of cognitive presence just discussed,

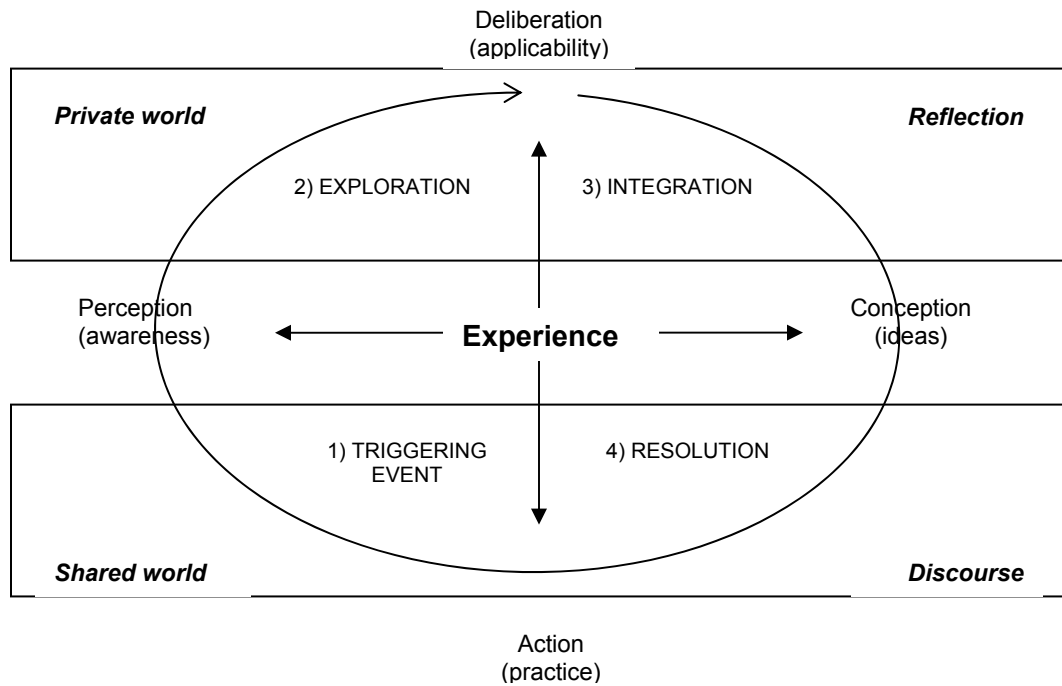
Garrison, Anderson and Archer (2000) suggest that:

The element of cognitive presence in a computer conference can best be understood in the context of a general model of critical thinking...We propose this model as a starting point for our discussion of cognitive presence because of its generic structure. It also conforms to the limitations of a formal and somewhat inherently contrived educational experience where issues and problems are generally artificially posed by the teacher and then explored and tested vicariously (p. 18).

Practical inquiry

The Practical Inquiry Model, illustrated in Figure 1, describes practical inquiry as an ongoing transition between private and shared worlds as the learner moves through the four phases of cognitive presence; i) a triggering event, ii) exploration, iii) integration, iv) and finally resolution.

Figure 1 – Practical Inquiry Model



Note. From *E-Learning in the 21st century* (p. 59), by D. R. Garrison and Terry Anderson, 2003, New York: RoutledgeFalmer. Copyright 2003 by D. R. Garrison and Terry Anderson. Adapted with permission.

As Garrison and Archer (2000) state, “Practical inquiry is intended to discover the meaning of experience“ (p. 73). Experience is at the center of the model. This reflects the genesis of the Practical Inquiry Model from Dewey’s (1910) thinking. Dewey believed that inquiry, to have educative value, must be practical in nature. The ends of inquiry should be grounded in the practical:

The abstract tends to become so aloof, so far away from application, as to be cut loose from practical and moral bearing. The gullibility of specialized scholars when out of their own lines, their extravagant habits of inference and speech, their ineptness in reaching conclusions in practical matters, their egotistical engrossment in their own subjects, are extreme examples of the bad effects of severing studies completely from their ordinary connections to life (1910, p. 51).

The model arranges the phases of practical inquiry along two axes which represent two orientations to the process of making meaning out of experience.

“The perception-conception orientation takes hold of experience, while the action-deliberation orientation creates meaning from experience” (Garrison and Archer, 2000, p. 73). Through reflection the learner grabs hold of the initial problem or triggering event from the shared world and carries it into the private world, moving from exploration (clarification) to integration (insight). Garrison and Anderson (2003, p. 58) view this as a movement from the concrete world of fact to the abstract world of ideas. The result is action, which Garrison and Archer (2000) refer to as the “ultimate test of understanding and the stimulus for further understanding” (p. 72). Action is a post-reflective phase where ideas are applied to actually solve the problem, either real or vicarious, in the shared world of experience. The PIM refers to this phase as resolution.

Both private and shared worlds, and the iterative transition between these worlds are extremely important concepts with respect to the Community of Inquiry and Cognitive Presence. The ‘private world’ is the world of reflection while the ‘shared world’ is the world of discourse.

Reflective thought and critical thinking. The essential characteristics of critical thinking are open to much discussion. Garrison and Archer (2000) state, “While there is some general consensus as to the nature of critical thinking, it is far too complex a topic to conceptualize in a simplistic manner. Not surprisingly, there is no clear agreement as to its precise meaning” (p. 65). As mentioned in the previous definition of critical thinking, Garrison and Archer (2000) focus on Dewey’s discussion of reflective thinking when examining the issue; “Dewey (1933) uses the term reflective thinking in a manner consistent with what we now

term critical thinking” (p. 63). Dewey (1910) addresses the nature of reflective thinking as a process that leads to conclusions based on the “...close study into facts, of scrutiny and revision of evidence, of working out the implications of various hypotheses, and of comparing these theoretical results with one another and with known facts” (p. 5). In other words, conclusions are arrived at and judgments are made based on inquiry.

There are two characteristics of what Dewey (1910) refers to as reflective thought: i) beliefs are based on some form of evidence or testimony, and ii) the grounds for a particular belief are deliberately sought and evaluated for their adequacy to support the belief. According to Dewey (1910), “This process is called reflective thought; it alone is truly educative in value....” (p. 2). Therefore, according to Dewey, thinking undertaken in an environment that does not include inquiry has little, if any, educative value.

Dewey (1933) defines the function of reflective thought as transforming “...a situation in which there is experienced obscurity, doubt, conflict, disturbance of some sort, into a situation that is clear, coherent, settled, harmonious” (p. 100). The limits of reflective thought are then this pre-reflective situation of doubt to begin with, and this post-reflective situation of resolution to end with. This function of reflective thought resonates with Piaget’s concept of equilibrium.

Discourse. Discourse is not just dialogue among the members of a Community of Inquiry. Mezirow (as cited in Merriam and Caffarella, 1999) states that:

Discourse involves an effort to set aside bias, prejudice, and personal concerns and to do our best to be open and objective in presenting and

assessing reasons and reviewing the evidence of arguments for and against the problematic assertion to arrive at a consensus (p. 322).

In this sense, discourse is dialogue that has the same function as Dewey's notion of reflective thought. This discourse within the Practical Inquiry Model introduces the notion of social constructivism. Fosnot (1996) states, "Dialogue within a community engenders further thinking" (p. 29). In moving from the private world to the shared world, the learner is seeking validation of the 'meaning making' that has taken place in the private world of reflective thought. Hence, this movement between worlds is a further stimulus to thinking critically about a problem. The relationship between reflection in the private world and discourse in the shared world is a key element of effective critical thinking. Garrison and Anderson (2003) summarize this importance when they state that "Critical thinking is viewed here as an inclusive process of higher-order reflection and discourse" (p. 56). Within the distance education environment of online courses, they see this as particularly relevant since asynchronous text based communication constitutes the majority of discourse. The private world is the world of reflection. The shared world is the world of discourse and Garrison and Anderson (2003) see the transition between shared and private worlds as iterative in nature. In a sense, this iteration can be viewed as the engine of inquiry where the goal of inquiry is to make sense of shared experiences.

Cognitive presence. Garrison and Anderson (2003) define cognitive presence as "...the intellectual environment that supports sustained critical discourse and higher order knowledge acquisition and application" (p. 55). The social constructivist nature of the Community of Inquiry, and cognitive presence as an

element of this community, are illustrated by Garrison, Anderson and Archer (2001), where they elaborate on the importance of cognitive presence:

Cognitive presence is a manifestation of practical inquiry. Cognitive presence is defined as the extent to which learners are able to construct and confirm meaning through sustained discourse in a critical community of inquiry (Garrison et al., 2000). In other words, cognitive presence reflects higher-order knowledge acquisition and application and is most associated with the literature and research related to critical thinking (p. 1).

Garrison and Anderson (2003) see an important relationship between critical thinking and cognitive presence when they "...define critical thinking in terms of practical inquiry (Garrison and Archer 2000). Cognitive presence is seen to be defined and manifested through the practical inquiry model" (p. 58). Further, they view practical inquiry as "...the model in which we assess cognitive presence. The goal is to provide a practical means to judge the nature and quality of critical reflection and discourse in a collaborative community of inquiry" (p. 60). Though the end state is a resolution to the problem at hand, the route is often complicated as the learner iteratively moves between the shared world of discourse and the private world of reflection. This free movement is a defining characteristic of cognitive presence. Without movement between worlds, the fuel for reflection is diminished.

Deep learning

Garrison and Archer (2000) state that "Critical thinking is, in essence, the process of learning in a deep and meaningful manner" (p. 63). The relationship between critical thinking and deep learning is established here. We engage in critical thinking in order to achieve deep learning.

The notion of deep learning traces its modern roots back to the writings of John Dewey (1910). The process of practical inquiry that has been undertaken cannot be trivial in nature if it is to be considered as leading to a practical outcome, an outcome that itself can be used in further situations of reflective thinking. He introduces the notion of depth of reflective thought when he states that:

One man's thought is profound while another's is superficial; one goes to the roots of the matter, and another touches lightly its most external aspects....The depth to which a sense of the problem, of the difficulty, sinks, determines the quality of the thinking that follows; and any habit of teaching that encourages the pupil for the sake of a successful recitation or of a display of memorized information to glide over the thin ice of genuine problems reverses the true method of mind-training (p. 37-38).

Further, Dewey (1938) examined the differences between the traditional approach to education and the progressive approach to education. The traditional approach to education viewed subject matter as "...bodies of information and skills that have been worked out in the past; therefore the chief business of the school is to transmit them to a new generation" (p. 17). Dewey magnifies the contrasts between the traditional approach to education and the philosophy of education underlying the progressive approach as follows:

To imposition from above is opposed expression and cultivation of individuality; to external discipline is opposed free activity; to learning from texts and teachers, learning through experience; to acquisition of isolated skills and techniques by drill, is opposed acquisition of them as a means of attaining ends which make direct vital appeal; to preparation for a more or less remote future is opposed making the most of the opportunities of present life; to static aims and materials is opposed acquaintance with a changing world (p. 19-20).

These ideas anticipated the work of Marton and Saljo, Entwistle, and Biggs in the last quarter of the twentieth century. Marton and Saljo's research

(1976) found "...two different levels of processing to be clearly distinguishable. These two different levels of processing, which we shall call *deep-level* and *surface-level processing*, correspond to the different aspects of the learning material on which the learner focuses" (p. 7). Entwistle (1981), in reviewing Marton and Saljo's results, concluded that these different levels of processing were also found to result in qualitative differences in outcomes, stating that "A deep approach is thus, at least in this small sample, clearly related to a deep level of understanding. Marton also found that the deep approach was associated with better recall of detail, particularly after a five week interval" (p. 79).

Entwistle (1981) further draws the distinction between a 'deep approach' to learning and a 'surface approach' to learning using the notion of intention of the learner. In the 'deep approach', the intention of the learner is to understand, while in the 'surface approach' the intention is to reproduce. He lists a number of features that are characteristic of deep learning; relating new ideas to previous ideas, relating ideas to everyday activities, developing conclusions, supporting them with evidence, and testing the logic of an argument.

Biggs (2003) built on this notion of intention of the learner in creating a continuum of curriculum objectives beginning with objectives related to surface learning and progressing through to deep learning. Though originally looking at the taxonomy with respect to development levels in children, Biggs (2003) extended the model to address teaching quality at the university level.

Figure 2 – Cognitive Levels of Learning Activities

Desired in objectives	Used in learning	Deep	Surface	Teaching challenge
reflect	reflect	↑ ↓	↑ ↓	↑ ↓
apply: far problems	apply: far problems			
hypothesize	hypothesize			
relate to principle	relate to principle			
apply: near problems	apply: near problems			
explain	explain			
argue	argue			
relate	relate			
comprehend: main ideas	comprehend: main ideas			
describe	describe			
enumerate	enumerate			
paraphrase	paraphrase			
comprehend sentence	comprehend sentence			
identify, name	identify, name			
memorize	memorize			

Note. From *Teaching for quality learning at university* (p. 57), by J. B. Biggs. Buckingham, England: The Society for Research into Higher Education & The Open University Press. Copyright 2003 by J. B. Biggs. Reproduced with the kind permission of the Open University Press / McGraw-Hill Publishing Company.

In linking outcomes with a range of verbs describing lower to higher level cognitive complexity, Biggs offered some interesting guidelines to college and university teachers facing the challenge of preparing students for the academic and workplace requirements for higher level cognitive skills. The teaching challenge Biggs identified was to provide Teaching and Learning Activities (TLAs) to support higher order cognitive activities and to eliminate those activities that support only lower level cognitive activities.

Weigel (2002) defines deep learning “...as learning that promotes the development of conditionalized knowledge and metacognition through communities of inquiry” (p. 5). Bransford, Brown, and Cockney (1999) depict conditionalized knowledge as knowledge that “includes the specification of the

contexts in which it is useful” (p. 31). The previous discussion addresses the notion of applying learning to problems at two levels: near problems, which are close to problems already solved and far problems, which are problems further away from those where the conditions were rather apparent. The issue in both these references focuses on being able to understand under what conditions particular knowledge would be useful. This is reminiscent of Dewey (1910) when he suggests that problems or perplexities are solved by reference to previous experience which is some way analogous to the problem and where previous experiences involve some of the conditions now faced in the new problem.

These criteria and conditions are embedded in the existing set of cognitive structures the student has created over time. Tsai (2002, p. 2) defines a cognitive structure as “a hypothetical construct representing relationships of concepts in a learner’s long term memory (Shavelson, 1974)...a cognitive structure contains the learners’ existing experiences and knowledge that will dominate their reconstruction and information processing of the incoming stimuli (Tsai, 2001).” Cognitive structures are also the focal point of the definition of deep learning published by The Higher Education Academy (2004). The Academy defines deep learning as “Examining new facts and ideas critically, and tying them into existing cognitive structures and making numerous links between ideas” (p. 2). Not only are new ideas compared to existing cognitive structures, but this is done so in a critical manner.

Since the application of cognitive presence has been established previously as most associated with critical thinking, cognitive presence becomes

an important contributing factor to deep learning. It is one of three conditions, teaching presence and social presence being the other two, required for "...an educational experience when higher-order learning is the desired learning outcome. By higher order learning, we mean higher order thinking 'that is conceptually rich, coherently organized, and persistently exploratory (Lipman 1991, p. 19). These descriptions are congruent with the often-expressed ideals of higher education that will lead to meaningful, worthwhile and continuous learning" (Garrison and Anderson, 2003, p. 22).

This thinking calls into question the predominant learning paradigm in higher education, the lecture. Garvin (1991) points to the inadequacies of the lecture approach to teaching in higher education if the goals of higher education are to go beyond the mere transfer of information to the "development of clinical judgment, the formation of critical skills, the shaping of artistic sensibility..." (p. 4). The implication is that critical judgment and critical skills, those manifestations of cognitive presence, cannot be achieved primarily with the lecture method. This challenge has been salient in distance education environments for quite some time, though technology has provided a number of tools around which to design activities, such as online asynchronous conferences, which can support higher level cognitive processes. Moreover, since distance education activities have never been able to rely on an interactive lecture, it comes as no surprise that alternate approaches to the lecture method have received high levels of attention from distance education practitioners.

Nevertheless, most research which examines deep learning as an

outcome of CMC supported learning environments has been associated with case studies. Though informative, these studies have not developed theory related to deep learning and CMC, and have not developed methodologies for the measurement of deep learning in a CMC environment.

Semiotics

Leeds-Hurwitz states that "semiotics has paid a great deal of attention to describing how people convey meanings" (1993, p. xv). Sharing meaning is a critical element of the Practical Inquiry Model. The movement between the private and shared worlds is an important contributing process involved in the making and sharing of meaning. Freire (2006) refers to semiotic mediation as "...one of the central concerns in sociocultural theory. Vygotsky identified several sign-based tools which function in this way and, in light of this consideration, he pointed out language as the *tool of tools*" (§ 14). Blasi and Dasilva (2006) have extended the notion of culture in their interpretation of knowledge domains as having a social organization. They state that "Natural science has a social form of its own. It implies a social distribution of knowledge, with a subculture of specialized knowledge shared by a relatively small number of people" (§ 13). This supports an interpretation of a knowledge domain as a subculture requiring its own signs. Eco, as cited in Simpkins, expands the notion of semiotics to include "...everything that can be taken as a sign" which can be considered as "...everything which can be taken as significantly substituting for something else" (§ 13, 2006). As we move into higher levels of learning and processing data, we could therefore look at signs as concepts rather than as just words or other

symbols. Since these concepts are themselves made up of signs, usually words and diagrams, we could refer to these concepts as a set of connected signs, the totality of which this study refers to as a semiotic web.

Summary of text analysis research

Garrison (1985) and other authors have examined distance education using a generational taxonomy where the descriptions provided by different generations relate to the different technologies used by each generation. Fourth generation distance education, that is, distance education using Computer Mediated Communication as a knowledge creation strategy, has provided a richness of artifacts that have been studied in order to understand the dynamics of this Community of Inquiry and to assess the ability of the COI model to describe actual behaviour. These artifacts are the text transcripts of both asynchronous and synchronous conferences used in the CMC components of distance delivered courses. The research studies summarized below are characterized by their almost sequential building on the previous works of other researchers. Each study, generally speaking, has added another layer of analysis and understanding to the previous studies. The discussion below has chosen to look at the interrelation of the study findings and how each adds to the understanding of the other studies rather than to follow these studies in the order they were conducted.

Garrison, Anderson and Archer (2001) analyzed text transcripts of students taking graduate level courses using an online delivery format. The purpose of this study was to assess cognitive presence and the incidence of

indicators of cognitive presence. The unit of study used to analyze the transcripts was at the message level. Complete messages were analyzed as to whether they represented a triggering, explorative, integrative or resolution message. The findings in this study were encouraging in that they offered some confirmation that cognitive presence descriptors did represent approximately two thirds of the messages in the conferences studied.

At roughly the same time as the Community of Inquiry Model was taking shape, Fahy, Crawford and Ally (2001) analyzed transcripts to gain a better understanding of the structural and interactional features of CMC conferences. Using a new analytic tool called the Transcript Analysis Tool (TAT) they introduced a finer granularity to text analysis by examining sentences as the units of analysis. The TAT classified sentences into one of five major categories: i) questions, ii) statements (non-referential and referential), iii) reflections, iv) scaffolding/engaging and v) quotations/citations (Fahy, Crawford and Ally, 2001, pp. 18-20). Their work on network size and the density and intensity of discussion indicated that these were important in generating genuine group interaction in a computer mediated conference. This is consistent with the postulation by Rourke, Anderson, Garrison and Archer (2001, p.11) “that fairly high levels of social presence are necessary to support the development of deep and meaningful learning,” leading to a plausible conclusion that social presence is related to cognitive presence in a deep learning experience.

Fahy (2002A) continued to work with the TAT and has compared the results of text analysis conducted on cognitive presence indicators of trigger,

exploration, integration and resolution, where complete messages were used as the unit of study, with the finer granularity of the TAT which uses sentences as the unit of analysis. Fahy (2002A) concluded that the community of enquiry (sic) model "...applies to actual interactive behaviour observable among CMC participants" (p. 23).

Schrire (2002) compared the Practical Inquiry Model to models by Bloom (1956) and Biggs and Collis (1982) to better understand depth of learning as related to cognitive and sociocognitive processes. Further, she expanded the text analysis to include the patterns of interaction in threaded discussions, thus expanding the analysis to an examination of patterns of moderation and representations of the collaborative knowledge space that resulted from each discussion studied. One of the most significant findings from Schrire's study (2002) was "the association of high levels of cognition with synergistic patterns of interaction" (p. 216). This is consistent with Garrison (2004) who states that "cognitive presence is created through the dynamic integration of, and iteration between, critical reflection and discourse" (p. 9).

All of these studies have come face to face with a result which begs further research. This is the low level of resolution messages in these conferences. Garrison and Anderson (2003) explain resolution as the final phase of cognitive presence and suggest evidence for resolution when they state:

The fourth phase, resolution, critically assesses the viability of the proposed solution through direct or vicarious application. Resolution requires a commitment to test the solution deductively, perhaps through a vicarious implementation or through experiment. This would require a rigorous analysis of the hypothetical test, which could take the form of a presentation and defence with other participants critiquing the suggested

application. On the other hand, the test could take the form of a direct application or action research project – either an individual or group project (p. 62).

The desire for completion of the four phases is consistent with the practical nature of the inquiry model. An idea that has not been applied to test its applicability can hardly be viewed as practical. The pragmatist roots of the model 'demand' resolution.

Garrison and Anderson (2003) and McKlin, Harmon, Evans and Jones (2002) have offered various explanations for this phenomenon. Archer, Garrison, Anderson and Rourke (2001) attempt to explain this phenomenon as follows:

One possibility is that, during the weeks that these particular transcripts were generated, the objectives of these two courses did not lend themselves to the later phases of critical thinking. It is also possible that the higher level cognitive activities occurred, during these particular courses, when students were writing individual assignments, and the function of the computer conference was seen as exploration of ideas that would then be integrated in the individual assignments. Finally, it is possible that the inspiration for our model of analysis, the model of practical inquiry with its pragmatic focus derived from the foundational work of Dewey is not appropriate for the more abstract and less applied nature of the content of these two courses (p. 9).

Garrison and Anderson (2003) further "speculate that this is very likely due to the democratic nature of the medium and lack of a strong teaching presence" (p. 62).

Schrire (2002) infers that in many CMC conferences, many issues are only partially resolved by discussion. She posits that resolution could be encouraged if ".the participating students were required to do an interim assessment of those parts of the discussion in which they were most actively involved" (p. 245).

These explanations revolve around teaching presence, course design, and course content. As Garrison and Anderson (2003, p. 65) state, "Clearly,

more effort and creativity must go into understanding and appreciating the integrating element of teaching presence to facilitate critical thinking and higher-order learning outcomes within an e-learning context.” In order, therefore, to assess the fostering of critical thinking in Garrison and Archer’s (2000) Practical Inquiry Model, “attention to process, in terms of ensuring progression of reflection and discourse through to resolution (i.e., understanding) is essential” (Garrison and Anderson, 2003 p. 61). Biggs (2003) also supports this notion when he discusses the need for the development and utilization of Teaching and Learning Activities (TLAs) which support higher order learning outcomes (see Figure 3).

Grounded theory

The most widely accepted definition of grounded theory appears to be that given by Strauss and Corbin (1998). Grounded theory is “...theory that was derived from data, systematically gathered and analyzed through the research process. In this method, data collection, analysis, and eventually theory stand in close relationship to each other” (p. 12). They continue on to say that “A researcher does not begin a project with a pre-conceived notion in mind (unless his or her purpose is to elaborate on an existing theory” (p. 12). So grounded theory can have two applications, creating theory and extending theory. Goulding (1999) supports these uses of grounded theory and adds a greater level of understanding to the second use when she states that “...the concepts should be sufficiently developed as to warrant an extensive re-evaluation of compatible

literature in order to demonstrate the fit, relationship, and where applicable the extension of that literature through the research findings” (p. 17).

Goulding (1999) also suggests that an important role can be played by extant theory and knowledge. She states,

Glaser (1978) discusses the role of existing theory and its importance in sensitising the researcher to the conceptual significance of emerging concepts and categories. Knowledge and theory are inextricably interlinked and should be used as if they were another informant. This is vital for without this grounding in extant knowledge, pattern recognition would be limited to the obvious and the superficial, depriving the analyst of the conceptual leverage from which to develop theory (p. 6, 7).

The analysis of the data in this study has made use of extant theory and knowledge. Nevertheless, it adheres to the fundamental principles of grounded research particularly, but not limited to, a verification of the data through an exhaustion of commentary from the participants.

Summary

Understanding the process of moving from trigger through to resolution is a fundamental key in understanding the nature of cognitive presence in online courses and is crucial to our understanding of the ability of online courses to sustain critical thinking and lead to deep learning. Previously in this paper, the discussion has established that the relationship between cognitive presence, critical thinking and deep learning is intertwined as well as complex. Garrison and Anderson (2003) define cognitive presence as “...the intellectual environment that supports sustained critical discourse and higher order knowledge acquisition and application” (p. 55). They connect critical thinking with practical inquiry and cognitive presence in the following, “...we define critical thinking in terms of

practical inquiry (Garrison and Archer 2000). Cognitive presence is seen to be defined and manifested through the practical inquiry model” (Garrison and Anderson, 2003, p. 58). Further, they state that “...the goal is to provide a practical means to judge the nature and quality of critical reflection and discourse in a collaborative community of inquiry.” Finally, Garrison and Archer (2000) state that, “Critical thinking is, in essence, the process of learning in a deep and meaningful manner” (p. 75).

Cognitive Presence is an intellectual environment that supports critical reflection and discourse, which constitute the process of critical thinking. This is manifested through practical inquiry. The four phases of the Practical Inquiry Model are indicators of the depth of cognitive presence achieved. The more indications there are that the learner has moved through all four phases, the deeper the level of cognitive presence and the deeper the level of learning.

Extending the research

Beyond transcript analysis. The text analyses discussed in the previous section have been more quantitative than qualitative in nature. That is, units of study, sentences or messages were grouped according to an established taxonomy, and counted in order to establish a frequency distribution of different units of discourse. These analyses have provided a great deal of insight into the four phases of practical inquiry and have provided inferential validation of the Practical Inquiry Model and the Community of Inquiry Model. Rourke and Anderson (2006) point out that this technique has been observational in nature. Inferences are made from data observation such that “...the indicators of

'participation' may not be sufficiently representative to warrant the type of claims that are offered" (p. 13).

Another factor that is not taken into consideration in text analysis research is that, as Sutton (1999) points out, "A vicarious learner can learn through other students' interactions with the content, instructor, other students and interface without overtly interacting" (p. 10). The implication is that transcripts as artifacts do not necessarily provide evidence for the totality of learning that may take place in an online course or program. One way to address these issues would be to move closer to the actual learning experience by directly asking students about their perceptions regarding their depth of learning in an online course. In this way our understanding of the Practical Inquiry Model and its applicability can be furthered by analyzing the students' own reflections on the learning process. It is also likely that information regarding the Community of Inquiry Model will be provided by these respondents. Researching the learning experience from the perspective of the learner in an interpretive manner, informed by the results of previous text analysis research, the Community of Inquiry Model, and the Practical Inquiry Model could facilitate reflective awareness towards the educational events experienced by the students in relation to their life world (van Manen, 1990). From a phenomenological point of view, the three presences, cognitive presence, which this study is primarily interested in, teaching presence, and social presence become part of the students' 'lives as students' and as participants in the larger social contexts of their everyday lives. Speaking directly to learners could therefore broaden our understanding of factors contributing to

deep learning through a better understanding of the life context within which the learning takes place.

Connecting the Practical Inquiry Model with problem based learning and the Zone of Proximal Development. In the previous section, the link between the PIM and Dewey's work was established. In this section the relationship between the works of Vygotsky and deep learning is examined.

The scarcity of resolution messages noted in text analysis studies may be, as previously stated, due to the lack of strong teaching presence, or related to resolution taking place outside of the conferences, in interim assessment activities or indirectly in the lives of the participants. Resolution is often associated with Problem Based Learning (PBL), where authentic real-world problems must be solved by the students. Successful solutions to a problem are one of the accepted proofs of resolution. Harland's (2003) work with PBL suggests that it can be linked with Vygotsky's Zone of Proximal Development (ZPD) when he states that, "Vygotsky also suggests the use of 'whole and authentic activities' establish the best environment for learning" (p. 267).

Vygotsky introduced the notion of the ZPD late in his career. Fifteen months later, he died. As Meira and Lerman (2001) suggest, Vygotsky had not been able to elaborate on the ZPD. His thinking, nevertheless, has had a significant impact on researchers and scholars studying mediated learning, initially among children and then extending to adults. As Meira and Lerman (2001) state, "...we regard it as inevitable and proper that researchers working with the ZPD appropriate it, a process which of necessity, engages with one's

existing theoretical perspectives, and hence demands some work on the ZPD” (p. 1). In fact, the ZPD has been appropriated and used as the basis for much constructivist thinking in the last twenty five years, from Bruner and Gergen to von Glaserfeld. Further, modern constructivist thinking has been linked to CMC and hypertext by Spiro, Jonassen and Duffy, to name a few.

Vygotsky (1978) defined the ZPD as “the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers” (p. 86). Most recently, Harland (2003) and Rudman, Sharples and Baber (2004) have extended the ZPD out of its original context of child development into adult development, an explicit extension that was previously taken for granted by many constructivist researchers examining situations where peer groups were composed of adult students and the learning was of a higher order.

Wertsch (1985) characterized the ZPD as “a special case of his [Vygotsky] general concern with the genetic law of cultural development. It is the dynamic region of sensitivity in which the transition from inter psychological to intra psychological functioning can be made” (p. 67). This clearly situates the ZPD as grounded in social activity, where teaching presence is manifested in the transitional process, either by an instructor or members of a peer group. In the PIM this peer group would be defined as other students. Resolution may be seen as successful problem solving through interacting within the ZPD. As Meira and Lerman (2004) state,

The revolutionary function of the ZPD is that it is the space, created in activities, in which the participants teach each other and learn from each other, where the dialectic of thinking and speech is manifested, and where the individual's meanings encounter social meanings (sense) and purposes (p. 2).

The implications are that social presence and teaching presence are necessary conditions for progress through the ZPD. Harland (2003) points out that, "...our primary task was to help each student move through their ZPD, while they assumed a seminal role in shaping their own learning environment" (p. 269). This leads to the hypothesis that moving through the ZPD is aligned with moving through the stages of cognitive presence to the final stage of resolution. Vygotsky (1978) himself provides some support for this developmental notion of cognitive presence when he states that,

The Zone of Proximal Development defines those functions that have not yet matured but are in the process of maturation, functions that will mature tomorrow but are currently in an embryonic state. These functions could be termed the 'bud' or 'flowers' of development rather than the 'fruits' of development. The actual developmental level characterizes mental development retrospectively, while the zone of proximal development characterizes mental development prospectively (p. 86-87).

Summary. This study intended to deepen our understanding of online learning by moving beyond transcript analysis research related to the PIM through the use of a different data collection procedure, that of the examination of the perceptions of the students and instructors themselves. Secondly, this study intended to deepen understanding through the analysis of the data with respect to indicators related to Problem Based Learning and the Zone of Proximal Development as students proceeded through not only CMC activities, but also other constructivist assessment tools.

The concepts reviewed form, though not exclusively, a great deal of contemporary thinking regarding the theory underpinning much practice in the distance education field today. This is particularly true with respect to professional degrees which have their practical roots in many of these concepts. These concepts, though again not exclusively, are the extant theoretical environment in which the phenomenon studied in this thesis is grounded. The grounded nature of this endeavour does make use of extant theory and knowledge as it seeks to use the participants' own thoughts to 'make sense' of the phenomenon of online learning. In this way, the answers to the original research questions may be related to existing schema of understanding and still fulfill the requirements for a grounded conceptual model as understood by Goulding's (1999) interpretation of Glaser; that "...the concepts should be sufficiently developed as to warrant an extensive re-evaluation of compatible literature in order to demonstrate the fit, relationship, and where applicable the extension of that literature through the research findings" (p. 17).

CHAPTER III

METHODOLOGY

Introduction

This study was concerned with understanding how students and instructors develop cognitive presence and what stages they proceed through in engaging and developing critical thinking and achieving deep learning throughout the completion of an online course. Moving to a deeper understanding of the perceptions of actual participants called for a methodology that would allow direct questioning and probing of the participants. Therefore, a qualitative methodology was selected.

Focus groups

In focusing on the meanings and interpretations that students attach to the process of learning in a CMC environment, qualitative research methodologies, particularly focus group methods, allow for the 'social construction of meaning' by the very nature of the methodology. Lunt and Livingstone (1996) discuss the appropriateness of focus group methodology as a meaning making research tool.

Focus groups can reveal underlying cognitive or ideological premises that structure arguments, the ways in which various discourses rooted in particular contexts and given experiences are brought to bear on interpretations, the discursive construction of social identities, and so forth. Two themes emerge from these diverse rationales. First, focus groups generate discussion, and so reveal both the meanings that people read into the discussion topic and how they negotiate those meanings. Second, focus groups generate diversity and difference, either within or between groups, and so reveal what Billig (1987) has called the dilemmatic nature of everyday arguments (p. 96).

This perspective on the use of focus group research resonates with a constructivist approach to learning. It reflects constructivism's focus on making

meaning through consideration of differing perspectives, and then moves to the negotiation of meaning based on these differing perspectives. Therefore, this study was appropriately informed by a constructivist epistemology. It is this epistemology that led to the use of focus groups rather than other qualitative tools such as personal interviews. Lunt and Livingstone (1996) capture this thinking when they state that "...rather than regarding the group context of focus group discussions as a convenient (or contaminated) source of individual opinion, we suggest that the group context may itself be significant to the theoretical framework of the research" (p. 85).

Group composition. Respondents were drawn from a number of graduate courses in Distance Education offered at Athabasca University. These courses were offered in an online format. The course instructors were faculty members of the Distance Education Program at Athabasca University. Respondents were recruited from more than one course in order to provide a variety of perspectives and in order to secure an adequate respondent base.

The instructors for these courses also constituted a group. It was hoped that their perspectives as observers of the learning process and participants in the unfolding of this process would contribute to a better understanding of the notions of deep learning in an environment they were involved in creating.

Asynchronous groups. Asynchronous groups were chosen rather than synchronous groups. The nature of the research questions demanded that respondents reflect on both questions and responses. Burton and Goldsmith (2002) conclude that "The use of asynchronous online focus groups can be an

effective methodological tool in educational research. The discussions generated through the asynchronous online focus groups provided a rich data source for evaluation of students' experiences in online learning" (p. 12). Mann and Stewart (2000) state, "email (sic) and asynchronous conferencing are considered less 'immediate' but more personal and thoughtful forms of CMC" (p. 128). Anderson and Kanuka (2003) conclude that "asynchronous text-based focus group interviews tend to be more successful than synchronous text-based focus group interviews" (p. 108). Morrison, Haley, Sheehan, and Taylor (2002) and Gaiser (as cited in Burton and Goldsmith, 2002) both address one of the key advantages of the selection of online asynchronous groups. The online asynchronous focus group explores an online asynchronous phenomenon, reflecting the natural setting of the learning experience. There was no face-to-face or telephone contact with the participants.

A psychodynamic focus group approach. A psychodynamic approach to moderating the focus groups was utilized. Gordon and Langmaid (1988) suggest that "group forces become an integral part of the procedure... These forces are taken account of and used as part of the experience and the data base" (p. 35). Mann and Stewart (2000) see one of the main strengths of the focus group as its ability "to reveal the process of decision making and flux in value formation" (p. 125). Put another way, Lunt and Livingstone (1996) state that:

Analysis of current research practice shows that while some researchers see focus groups merely as aggregates of individuals, others conceive of them as simulations of social relations, or rather, as social occasions in themselves that bear sufficient resemblance to the social occasions under study (p. 85).

An online asynchronous methodology was chosen since it was believed it would resonate with the online learning environment of the students' online courses. This methodology was similar to the discussion boards students have used in their online courses. Thus, the focus group could be steered to a dynamic process of discussion and meaning making rather than one of answering a list of questions. It is this dynamic that led to, as Morgan (cited in Gaiser, 1997) puts it, "the explicit use of the group interaction to produce data and insights that would be less accessible without the interaction found in a group" (p. 135). Gaiser (1997) operationalized what has been said above as follows: "It is important to have flexible expectations and Feig (1989) suggests a researcher should be prepared to go wherever the group goes" (p. 141).

Time requirements. There is little information in the literature that addresses how long participants will spend in the discussion. Moloney, Dietrich, Strickland and Myerburg (2003) reported the time spent on the discussion boards per participant was one to two hours, over a three week period, though several participants reported up to six hours. Times per session ranged from ten to twenty minutes. Gaiser (1997) conducted groups over a period of one week. Burton and Goldsmith (2002) conducted their sessions over two semesters. Rezabek (2000) conducted groups over a period of two and a half months. A time frame of two weeks was selected. This proved to be impractical due to the Christmas break.

Data collection process

The focus group discourse which was captured as text from the focus

group discussion boards, constituted that which was interpreted.

Recruitment. Student and faculty participants were recruited from five different courses from the Master of Distance Education Program at Athabasca University. Approaching students and instructors was approved by the Department Director. Letters (Appendix A) were sent through the Department to all students taking these courses and to the five instructors. Once students were recruited they were sent Informed Consent Packages which were signed and returned to the researcher (Appendix B).

The Discussion Boards were opened on December 10, 2004 and were closed on January 18, 2005. Four sets of data were collected: three online focus groups with students, and one online focus group with instructors, all using an asynchronous text based discussion board. These resulted in a data set of three hundred forty one messages and over 45,000 words.

Indicators. From an etic point of view, a number of indicators were provided by the previously cited works of Dewey (1933), Biggs (2003) and the SOLO Taxonomy, and the Practical Inquiry Model (Garrison and Archer, 2000). More importantly, however, this research study recognized the opportunity for an emic paradigm to be used in identifying indicators of cognitive presence, critical thinking and deep learning. The intent was not to rely so much on managing data as it was to focus on generating concepts (Gough and Scott, 2000). Analysis of the data was conducted in such a way that indicators were "...derived from the data itself, and in which emphasis is placed on the discovery and elucidation of links between categories so generated" (Turner as cited in Gough and Scott,

2000, p. 342).

Timing. Data was collected after the completion of the courses, in December 2004 and January 2005. The focus groups began on December 10, 2004 and were expected to last for two weeks. However, most respondents found that their end of semester assignments pushing right into the holiday period didn't allow them to participate to the level they wished. Consequently, the focus groups were extended to January 18, 2005.

Number of participants. Moloney, Dietrich, Strickland and Myerburg (2003) reported using four discussion boards with a total of twenty-two respondents. Burton and Goldsmith (2002) conducted five focus groups with the number of participants ranging from eleven to fourteen. Burton and Bruening (2003) recommended ten to fifteen participants. Anderson and Kanuka (2003) state that "the e-researcher should consider inviting twelve to fifteen participants, anticipate that eight to twelve will agree to participate, and assume that three to five will drop out during the study" (p. 108). These latter guidelines were used in order to balance richness of data with retention of participants. However, there were only three participants who dropped from the groups. The number of respondents, totaling thirty seven, were within the ranges discussed above.

Number of questions. Burton and Bruening (2003) posted five separate threads at the start of their groups. The first thread was a welcome and 'get to know each other' thread. The four threads posted next related to major thematic topics which had been identified through a literature review as important to the research question. A second set of threads was posted at the end of the

semester. Anderson and Kanuka (2003) offer the following guidelines:

...due to the amount of response time and time required to 'get up and running,' the number of questions that can be asked is often limited to a maximum of ten, with the optimum number being between three and five. When there are more than five questions, the time commitment increases - especially for asynchronous text-based focus groups – resulting in a greater attrition rate (p. 106).

Rezabek (2000) used three thematic topics in his project. Burton and Goldsmith (2002) posted four threads at the beginning of the semester, and another four threads at the end of the semester, identical to the above mentioned study by Burton and Bruening (2003). There is also debate about the timing of questions, that is, should all the questions be posted at once, or should they be posted as the focus group progresses? This debate seems to revolve around, as Gordon and Langmaid (1988) suggest, whether a 'question and answer group session' or a 'psychodynamic group session' is employed.

Questions for student respondents.

The following questions were asked by the moderator:

1. How would you describe the learning experience when taking your course(s) in the MDE program at Athabasca University?
2. How do you perceive the depth of learning that has taken place in the online courses you have taken? What learning activities contributed to this?
3. Garrison and Anderson (2003) have presented a model which hypothesizes what happens in an online course. They suggest that the learner goes through: i) a triggering event, ii) an exploration stage, iii) a consolidation stage, and finally a resolution stage.

Would your learning experiences in online courses tend to support these stages, or not? Do you see the process as being different?

Are there other stages you feel you go through?

Questions for instructors.

Garrison and Anderson (2003) have proposed a Community of Inquiry Model (CIM) as a conceptual framework for CMC learning. In the CIM, cognitive presence is assessed within the Practical Inquiry Model where the learner moves through four phases; i) a triggering event, ii) exploration, iii) integration and iv) resolution.

1. To what extent do you think these four phases represent a reasonable model for the learning process in your courses at Athabasca?
2. What course design elements, if any, do you see supporting these four phases?
3. What roles do you feel you and the student's peers played in the learning process?
4. Previous research using transcript analysis of online conferences in courses indicates a low level of resolution taking place in the conferences. Do you see this in your courses? To what extent do you think resolution is taking place outside of the conferences?

Data analysis

Transcripts of each focus group were loaded into Atlas.Ti, a text analysis tool allowing coding and the creation of relations maps. The focus group

discourse related to the participants personal experiences with their individual course situations, captured as text from the focus group discussion boards. The amount and quality of data from this study was both rich and extensive, enhancing the likelihood of leading to a deeper understanding of the participants' progress through the four stages of cognitive presence. A 'grounded theory' approach to the analysis and interpretation of this data, as discussed in Strauss and Corbin (1998), was used.

Three stages of coding were conducted. First, 'open coding' was used in order to identify and classify what was being referenced by the respondents in their text. This focused the data toward descriptions of the conceptual world of the respondents in relation to their own experience in an online learning situation, allowing the analysis to proceed from the concrete to more general descriptions of the phenomena. The second type of coding used was 'axial coding' where causal relationships were hypothesized. This aided the development of a basic paradigm of generic relationships based on the data; i.e.: phenomena, causal conditions, context, intervening conditions, action strategies and consequences. Finally, a 'selective coding' procedure was undertaken looking for a 'core' category to which all other coding categories might be related.

Limitations of focus group methodology

Although the selection of online focus groups has been rationalized previously in this thesis, there are limitations generalized to focus group methodology, both face-to-face and online, which must be recognized.

Limitations associated with sample size and selection relate to the relatively small size of the sample. Additionally, this was a convenience sample comprised of students from one institution and all from one program. This limits the generalization of results to populations of similar composition.

Though the constructivist nature of the focus group methodology has been used to rationalize its selection in this research, it is nevertheless important to acknowledge that there was significant interaction among respondents. This could limit generalizability of results.

Walston and Lissitz (2000) conclude in their research that an online focus group environment can lessen the effect of dominant participants, but not eliminate it. The possibility of dominance by one or more participants can also limit generalizability.

Edmunds (as cited in Rezabek, 2000) cautions researchers that visual cues and body language that are apparent in face-to-face groups are eliminated in online focus groups. Additionally, spontaneity is limited.

The length of transcripts from online focus groups can make analysis and interpretation time consuming and complicated.

Anderson and Kanuka (2003) identify the issue of noncontiguous discussions. These happen when "...a posting that is built on one person's response appears at the same time as a posting based on a different response" (p. 109).

As with face-to-face interviews, moderator bias can be introduced, either intentionally or unintentionally, through comments or questions that induce a

desired response.

Methodologies considered but not used

A number of quantitative methodologies were considered but judged as inappropriate for this research.

Observation has been used in previous transcript analysis studies. The purpose of this study was to move beyond observation, eliciting the perspective of the participants.

A quantitative survey approach could have been developed using the results of previous transcript analyses as a basis for survey construction. However, this survey would then be based on an etic understanding of the issues and consequently the survey questions might miss important issues and meanings that could only be uncovered using emic methods. It was the intention that this study add to the emic understanding of cognitive presence, critical thinking and deep learning in an online environment. This understanding could then better inform the development of survey instruments that reflect shared meaning among a learner population and can be used in subsequent research studies.

Trustworthiness

Anastas (1999, p. 316) states that "...in constructivist traditions of qualitative research the concept of trustworthiness is often used to embrace and expand on traditional notions of reliability and validity (Lincoln & Guba, 1985: Padgett 1998)." Further, many of the traditional measures for reliability apply only to quantitative research; for example, internal consistency as manifested with

reliability coefficients and split half reliability. Test-retest reliability is beyond the scope of this study. Finally, since only one researcher coded the data, inter-rater reliability was not achievable.

Creswell (2003) states that "...reliability and generalizability play a minor role in qualitative inquiry" (p. 195). However, two issues should be noted. First, this research study built on the results of previous case studies conducted by four different researchers. These studies have made a significant contribution to our understanding of how other course design elements, including CMC, can support the Practical Inquiry Model. We have seen the emergence of themes consistent from one case study to another. Second, these case studies, along with this study, have hopefully led to a deep enough understanding of course design elements in support of the Practical Inquiry Model that wider scale, more generalizable research studies can be conducted.

In order to assess the trustworthiness of the findings, a triangulation approach to data collection was used. First, results were compared to the previous research studies discussed above. Second, focus group interviews were conducted with volunteer participants to probe their perceptions of the lived experience in taking the course, and whether these lived experiences reflect an awareness of triggers, exploration, integration, resolution and deep learning. Further, the interviews probed participants in order to understand the meanings they ascribed to the various activities in the course and the processes taking place. Finally, the researcher engaged in a focus group interview with five instructors at Athabasca. These findings were compared with the other sources

of data in this study and previous studies, looking for common themes and core categories of discussion.

The learner discussions were delayed in time versus the actual learning experiences. This may diminish the likelihood that these recollections reflected the actual practices of the learners during these courses. This issue of veracity was reduced by triangulation with the researcher's actual experiences and the consistency or lack of consistency with the comments of other participants in the same group.

Values and limitations of Atlas.Ti 5.0

The researcher's experience with Atlas.Ti supports the notion that it is a good tool for analyzing large amounts of textual data. The program definitely facilitated the processes of in vivo coding, axial coding and selective coding. Networks of relationships were easy to visualize using the network facility. Attaching memos to quotations, codes and networks was also greatly facilitated, allowing for rich maps which could easily be interrogated.

The major limitation of Atlas.Ti is that there is little access to learning materials which could facilitate the use of Atlas.Ti in order to get the most out of the more advanced tools provided by the program.

CHAPTER IV

RESULTS

Introduction

The conditions established for this study were the use of CMC and constructivist assessment tools, which were discussed in the definitions section, in support of an online learning experience. All student respondents were taking a course in the Master of Distance Education Program (MDE) at Athabasca University. The level of online experience ranged from a few courses to near completion of the program. Some students had also taken courses from other online providers.

All courses used asynchronous conferences, while only a few used synchronous communications. The majority of communication in the courses was through the use of asynchronous conferences. The constructivist assessment tools used were primarily essays, projects, collaborative projects and learning journals. A minority used other constructivist tools such as online group presentations, group moderation, case studies and critical reviews of books and articles.

Based on this, the conditions of the research question with respect to the use of CMC and constructivist assessment tools was met. The assessment tools mentioned most often for these courses were the essay at 26.4% of mentions, followed by CMC at 17%, Collaborative Projects or essays, projects, and learning journals at 9.4%, as shown in Table 2.

Table 2 – Constructivist Assessment Tools

Assessment Techniques

	<u>Students</u>	<u>% distribution</u>
Essays	14	26.4%
Evaluation Reports	1	1.9%
Learning Journals	5	9.4%
Feedback on Learning Objects	1	1.9%
Collaborative projects/essays	8	15.1%
Projects	7	13.2%
CMC Participation	9	17.0%
Self Assessment	1	1.9%
Peer feedback on collaborative p	1	1.9%
Group Presentations	1	1.9%
Case Studies	1	1.9%
Chat Sessions	1	1.9%
Conference Moderation	1	1.9%
Online Presentations	1	1.9%
Article Reviews	1	1.9%
Total Mentions	53	100.0%

All students had taken more than one course at Athabasca. Some had also taken courses from other online institutions, some were taking the Master of Arts in Interdisciplinary Studies (MAIS) program at Athabasca University, and a few already had a Masters Degree from traditional face to face institutions.

Three student groups were conducted and one group with instructors. Student participants from the three student groups totaled thirty one. There were six respondents in the Instructor group. All instructors were teaching courses in the MDE program.

As such, the conditions set out regarding the number and type of participants were met. Additionally, it proved to be advantageous to have

students who were enrolled in the MAIS program and were taking MDE courses. Their different perspectives on how CMC was conducted in each program will be discussed later.

It is important at this time to discuss the process of drawing information and conclusions from the data. This study was interested in the meanings and interpretations that students attach to the process of learning in a CMC environment. Qualitative research methodologies, particularly focus group methods, allow for the 'construction of meaning' by the very nature of the methodology. Nevertheless, in the process of analyzing and reducing the data, a high interpretive burden was placed on the analyst. Consequently, the data was examined with a number of objectives in mind. Firstly, data was examined in an holistic manner, searching for major themes which emerged from the data. Secondly, data supporting similar themes were grouped together in order to examine the data regarding the research questions. Groups of related data were then examined through the lens of these themes to search for relationships which would lead to a grounded conceptual model supported by the data. The analytic tool used was Atlas.Ti, version 5.0.

The coding of data was carried out by the researcher. Since the nature of the research design was highly interpretive, coding was conducted only by the researcher. Initially, data was coded in-vivo, resulting in fifty-two separate codes. Many of these codes were so closely related that they could be subsumed into larger code families. Next, the actual quotations which were coded were individually interrogated and notes, hypotheses or explanations were written and

associated through Atlas.Ti with each quotation. This process encouraged a deeper understanding of the quotations themselves, but also allowed for a better recall of how the quotations and their hypotheses might be related. Atlas.Ti was then used to associate different codes to each other and create networks from these associations. This greatly increased the ability of the analysis to reveal relationships and patterns in the data and to encourage generalizations which could be candidates for further research.

Using these generalizations, categories related to each other were mapped according to their relationship to 'deep learning'. Each of these categories was then examined at a deeper level to identify factors important to deep learning, and maps of these relationships were created. The resulting sub-maps contributed to a deeper understanding of the major theme categories and allowed for further hypotheses and generalizations.

The findings are reported according to the themes identified in the three research questions:

1. Under what conditions of online learning supported by CMC and constructivist assessment tools will students perceive that deep learning has occurred?
2. To what extent will learners perceive that they have progressed through an evolutionary cycle whose elements are defined by Garrison and Anderson (2003) as the categories of cognitive presence: i) a triggering event, ii) exploration, iii) integration, iv) and resolution.

3. To what extent will instructors perceive that course design has facilitated the progression through these four phases?

The major relationships are discussed and then portrayed using the 'network tools' provided in Atlas.Ti 5.0.

Deep learning

The incidence of deep learning among the participants is the appropriate first step in reporting findings. If deep learning was not apparent among these participants, no insight regarding the first research question would be provided. However, the majority of respondents did indicate that they had achieved deep levels of learning in many of the courses they have taken, as reflected in the following comments:

I perceive my depth of learning to date to be quite extensive in terms of knowledge gained in the field of distance education and most importantly, the self-direction I have applied to my learning overall.

I would have to say I have yet to experience learning activity elements that have not contributed to my depth of learning.

However, there were indications that there were variations in the depth of learning taking place. The following quotations capture the sentiments of many of the respondents:

...the depth of learning that took place in each of my online courses greatly varied. Often, it would depend upon my previous experience, knowledge of the subject matter, my interest and my motivation along with the course design. For many of the courses, I just learned what I needed to in order to complete the assignments because that was all that was required. For other courses, I read supplemental material and became quite engaged in the online discussions and group work. Overall, I tend to prefer a somewhat structured environment where there are clear expectations. So maybe it was a combination of the activities and the instructor's expectations that determined the depth of learning.

My experience with online learning is that the learning on some courses is quite deep, but on others I find that I just skim the surface. I think it is similar to what would occur in the classroom depending on my relative interest in a particular course.

So maybe it was a combination of the activities and the instructor's expectations that determined the depth of learning.

What was particularly interesting was the participants' acknowledgement that there were internal and external factors that contributed to their depth of learning. These factors appeared to cluster in themes which were introduced in the above comments; interest or motivation, activities, and teaching presence. Atlas.Ti was then used to study the incidence of comments related to these. The later discussions relate to each of these themes.

Another set of comments also brought into play the notion of critical thinking.

I also agree with the benefit received by the instructor's challenging efforts to 'push' students to further their critical thinking, pursue supplemental readings to elicit greater online conference participation, etc.

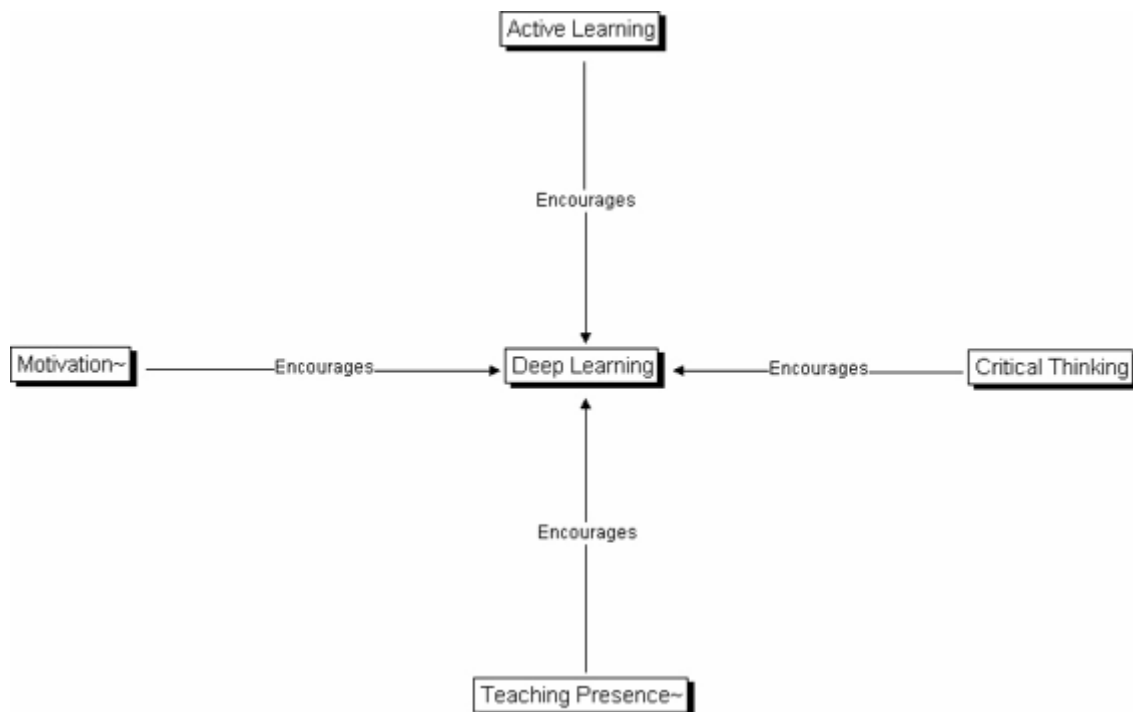
Open exchanges among students help spur critical thought and may challenge some of the life world assumptions that are in existence.

As well, it takes me a while to craft a posting that reflects my (emerging) thoughts. The non-erasable aspect of a post also makes me want to be sure I am saying what I mean to say. For some topics I have searched for related readings to help get a better feel for the subject - this was a requirement in my last class, but I liked it and expect I'll continue this to some degree in other classes.

The earlier literature review regarding deep learning certainly included critical thinking as a way to achieve deeper learning. Additionally, many of the participants also discussed reflection and its important role in a positive learning experience.

The examination of deep learning led to the following visual depiction of the relationships deep learning had with major themes brought up by the respondents with respect to their learning experience. After grounding these relationships in the data, the major themes were explored to a greater depth, looking for more explanation of the themes from participants.

Figure 3 – Factors Encouraging Deep Learning



Motivation. The impact of motivation, and those factors driving motivation, on deep learning was quite apparent. This is not to be unexpected but there does seem to be a heavy weighting towards the external facets of the participants' lives. The question of why students took these online courses was beyond the focus of this study, and begs further research within the context of this studies

findings. Nevertheless, the data convincingly articulates that motivation supporting deep learning is strongly related to the relevance of the learning experience to the work and personal life of the participants. This should not be confused with the distinction between intrinsic and extrinsic motivation. As we shall see later, motivation that supports deep learning is far more connected to the intrinsic need to apply learning to the external world as a means of understanding. As such, it would appear that the learning style is driven by an activity approach to learning.

This introduces a concept we can refer to as life relevance. It appears that the personal and work life of the learner act as a powerful lens which can magnify the level of motivation and deep learning. If learning is connected to this 'life', motivation is higher and understanding is enhanced. This relevance has been coded as Life Relevance (LR).

Life Relevance associates learning materials and Teaching and Learning Activities (TLAs) with the learner's workplace or personal life.

I work in the area of distance education so most of what is covered in the courses has a direct application in my job. I often write about my experiences in my assignments, or try to apply theories to my work situation. I think real world examples bring a lot of meaning to the concepts and ideas I read about in the courses.

I have found the most stimulating conferences to be the courses that I have taken with MAIS. I think that these courses were more easy to relate to on a personal level because they applied to either our own situation (Psychology of Self Management) or our children and their friends (Learning Disabilities) or were just so darn interesting (Organizational Perspectives).

I tend to be the type of learner that gets excited when I can apply the material in a course to a practical application. I am not much into "theory"

just for the sake of learning the theory - how does theory apply to me and what is going on in my life at the moment.

This resonates with Dewey's orientation towards practical inquiry and reflects the importance of situated cognition for the adult learner referred to in Merriam and Caffarella (1999). They state that, "...one cannot separate the learning process from the situation in which the learning is presented" (p. 241).

Young, as cited in Merriam and Caffarella (1999) also points out that:

...situations must at least have some of the important attributes of real life problem solving, including ill structured complex goals, an opportunity for the detection of relevant versus irrelevant information, active/generative engagement in finding and defining problems as well as solving them, involvement in the student's beliefs and values, and an opportunity to engage in collaborative interpersonal activities (pg. 243).

Motivation for these learners is strongly associated with the practical application of their learning. The data suggests that motivation is grounded in the past, present and maybe even future experiences particular to their life worlds.

The context of the learner's work and life experiences can focus our thinking on the social aspect of motivation for the adult learner in a web-based environment and the effects of this motivation on deep learning. This orientation is consistent with the notion of a Community of Inquiry Model, yet it has the potential to explain why, as this research has identified, the process of creating the community must not be confused with the development of the social and cultural structures necessary to make the community function at an optimal level. In other words, the processes involved in design of the course do not guarantee the creation of a community of inquiry. Only careful nurturing through teaching and social presence can accomplish this.

A number of external factors have been identified by the respondents and are discussed below. These external factors are of great importance to the student and reflect the stage of life, as an adult, where learning that is applicable to family and work life is seen as the most valuable learning.

Curiosity. Life Relevance increases curiosity and interest, and contributes to the desire for practical applications and the setting of goals. These in turn are identified by the participants as the most important factors in arousing and maintaining motivation. Pintrich and Schunk (as cited in Eggen and Kauchak, 1999) define curiosity as being "...elicited by activities that present students with information or ideas that are discrepant from their present day knowledge or beliefs and that appear surprising or incongruous" (p. 408). This definition provided direction in coding data for curiosity as opposed to interest, which will be discussed later. Piagetian antecedents of constructivism offer some explanation for the arousal driven by curiosity. Piaget's notions of assimilation and accommodation can represent the processes that curiosity arouses. Wadsworth (1996) explains that interaction with some external stimulus is usually the engine of these processes.

Spielberger and Starr (as cited in Drillings, 1994) suggest that there are two types of curiosity: diversive curiosity which is brought on by a state of boredom, and specific curiosity, which is what this paper is concerned with.

Specific curiosity is induced in situations in which an organism lacks information about the stimuli which impinge on it, that is, stimuli that are characterized by a high degree of complexity, novelty, and incongruity. Once aroused, specific curiosity leads to exploratory behaviour designed to supply information that will reduce the organism's subjective uncertainty and discomfort (p. 228).

Participant responses indicate that questions in the conferences and challenges from the professor are sources for such external stimuli in an online course:

On one occasion I participated in a conference about semiotic research. I didn't particularly embrace the idea of this kind of research. I felt that semiotics wasn't an avenue that I would personally choose to use for research. The instructor could have pointed out the benefits of using semiotics, but instead she decided to put me to a challenge. It was an effective tactic on her part because her challenge required that I put semiotics to the test (on a small scale) and make the effort to actually find out for myself how beneficial it can be.

Questions can evoke curiosity – and this curiosity may move people to explore and learn.

Questions may jar an individual's belief in their knowledge and push them to seek knowledge.

Specific curiosity appears to be focused through a lens of Life Relevance within the context of the specific course. If the content and discussions, questions and challenges, don't relate to the lifeworld of the student, then it is far less likely that curiosity will be aroused or stimulated. For example, the following quotation indicates that curiosity is driven by comparing course material to the lifeworld of the participant, and relates to the Piagetian processes of accommodation and assimilation:

The courses I have taken thus far are more like a review of the life narrative by examining and questioning my lifeworld to see if I have been too comfortable in my own sheltered existence.

Put another way by another participant, specific curiosity may be activated by a predisposition to question our view of the world as it balances with different possibilities and realities.

If we are open to learning, receptive to different possibilities, different realities - we can learn an incredible amount about ourselves and others - inside and outside of formal classrooms and thus have many 'triggers and

aha moments’.

Interest. The data suggests that motivation to engage in learning activities is also driven by interest. Students are more likely to be engaged in conference discussions and assignments when the topics are of interest to them.

Conversely, the opposite is true about material and topics that are of little interest to them. The following quotes support this polarization:

My own research - what I mean by this is that in these courses I have felt very free to follow my own line of interests that the course content has sparked. I have found that this deepens and enriches my learning. I especially enjoy when instructors encourage this outside exploration.

If my interest is low, then I will attend to the other learners, materials, and instructors less, and put less thought into my assignments. I will also not research very broadly. If I am interested in something to do with the course, then I will pay more attention and learn more deeply.

Interest is most aroused when the degree of Life Relevance is highest. As mentioned earlier, this Life Relevance is most often grounded in topics that are related to work, family or personal life. Pressick-Kilborn and Walker (1999) capture this notion by casting interest in a socio-cultural framework where interest is focused on “...meaningful and purposeful activity, with the development through participation in socially and culturally situated activity” (p. 7). This is particularly appropriate to the adult learner, where, as one student participant put it, “Adult learning is about sharing of personal/professional experiences, building upon them, and self-directing one’s learning as a lifelong process.” As such, interest is characterized as a dynamic and constantly changing process driven by the sociocultural relationships, including those relationships of work and family. As summarized by Pressick-Kilborn and Walker

(1999), "...interest is interpreted as a social construction developing within the dynamic relationship between the individual and the situation" (§ 1). This sociocultural approach to interest is consonant with Paris and Turner's notion of situated motivation where "...motivation is constructed by the individual in a cognitively dynamic context" (1994, p. 214).

Vygotsky, as cited by Wertsch (1985), viewed the genesis of cultural development, the formation of concepts, and other higher mental functions as being based on relations between people, and referred to them as interpsychological processes. Internalization occurred when the transition between social influence from outside the person to social influence inside the person took place; the transition from interpsychological processes to intrapsychological processes. It is important to note that intrapsychological processes are seen by Vygotsky as social in origin. With the adult learner learning at a distance, the two most prominent social groups are work and/or family. It would be reasonable to suggest then that interpsychological processes in an online environment would most likely resonate within the context of family and work rather than the online community since family and work are far more present and tangible than the online community. So these processes might more likely be internalized due to the mediating effect this resonance would have on the process of internalization. This is not a surprising finding within this group since the MDE program's focus at Athabasca University is on the completion of a professional graduate degree.

This being the case, the Practical Inquiry Model (PIM) proposed by

Garrison and Anderson (2003) is a model that appears to have explicative value for the depth of learning achieved in this participant group. Life relevance, which appears to support deep learning, often manifests itself through the practical application of learning to address a problem or issue at work or in personal life.

Practical Application. Reminiscent of Dewey's orientation to practical inquiry, participants point to their desire for practical application. This practical application is grounded in their life experience, most particularly their work and their relationships. Additionally, practical application increases motivation, which in turn drives deep learning.

I tend to be a very practical thinker that must apply theory to the real world in order for it to make sense to me. Also this application allows me to be able to use this information again and again.

I tend to be the type of learner that gets excited when I can apply the material in a course to a practical application. I am not much into "theory" just for the sake of learning the theory - how does the theory apply to me and what is going on in my life at the moment.

This practical application is one of the indicators used by Garrison and Anderson (2003) to signal that resolution has taken place. Linking this notion of resolution with the end test for deep learning as being practical application can be viewed as one method to measure if deep learning has occurred.

Practical application as a driver of deep learning can be associated, through the data, with the course design elements of asynchronous conferences and constructivist assessment tools. The data definitely points to application of learning to life and work situations and how these are folded into the course teaching and learning activities by both instructors and students. In the case of CMC, the following quotes illustrate this:

Some of the life experiences by other students give the best reinforcement for the readings and serve at times as a counterpoint for arguments by other students or the professor.

In other cases experienced students can be very good at prodding a conversation along by interjecting personal experiences and using good metaphors to illustrate a concept.

In terms of learning from other students, simply having an opportunity to discuss, read other interpretations, see how the information relates to someone else's personal or work experiences all help to broaden my understanding.

Life experiences provide better reinforcement of the content of readings, and add legitimacy to comments made in conference activity in a CMC supported course.

Life relevance, personal examples and work or life applications seem to facilitate interest and understanding. The personal examples are instances of 'teaching presence' provided by the participants themselves, contributing to deeper understanding. Nevertheless, many participants did not find that the conferences contributed to deep learning to any great degree. Though the data does not address the content of the conferences the participants engaged in during their courses, further studies should examine the relationship between their perceptions of learning through the conferences and the degree to which conference discussion is oriented to life experience, and to explore the hypothesis that the low level of integration and resolution noted in transcript analysis research may be the result of low levels of applicability of the discussion content to the lifeworlds of each participant.

Assignments as constructivist assessment tools also contribute to depth of learning when they have a practical application to the student's life or workplace. Such practical applications are drawn from, or provided out of, the work life of the

learner or from their personal life. The practical application appears to assist the learner in synthesizing or integrating learning into the existing schemata of the individual.

I think I learn about particular concepts or topics in a class through readings and assignments but the actual "aha" moments occur in the practical use of these concepts.

So for me, the application of the learning is critical. I don't get a sense of what I really know about the concepts or understand until I use them.

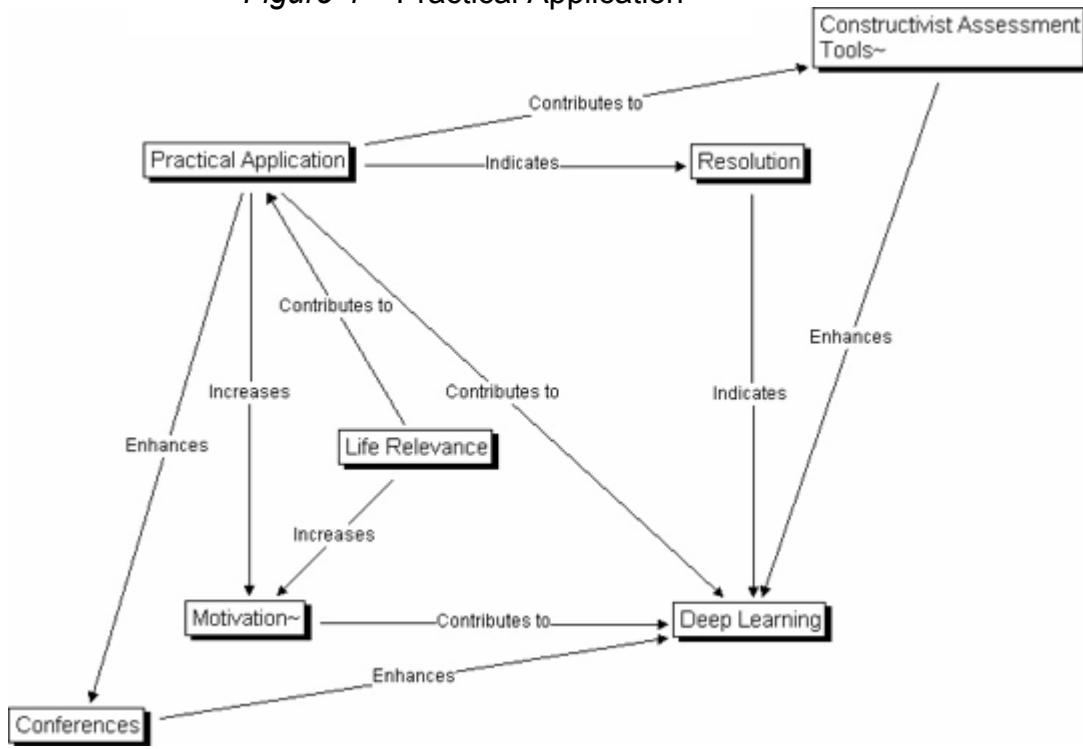
The data offers some further support for this focus on application of learning to life and work experiences with its direct reference to the practical orientation of much adult learning: "Adult learning is about sharing of personal/professional experiences, building upon them, and self-directing one's learning as a lifelong process." The participants appear to be telling us that as adult learners, they are interested in application of learning in their careers and lives. As adult learners this is the macro-context within which they engage in learning activities, and as such we need to consider that theories relating to situated cognition and contextual learning may have a more important role to play amongst adult learners than amongst university cohorts who have yet to enter the workforce.

One participant referenced a dynamic which might begin to explain this phenomenon. She stated, "When I was in university, I consumed myself with the university environment...and feel that a large part of my consciousness involved playing with my studies..." To university students, this is likely, at the time, the most important environment in their lives. Adult learners in an online environment, and in fact many part time learners, aren't able to be, or are not

inclined to be, consumed by the university environment. They are consumed by their family and work life and move their interest from curiosity to practicality.

Figure 4 generalizes the relationships discussed above. Life relevance provides the set of objects from which practical application can be realized. It also increases motivation. Practical applications discussed in conferences can contribute to a deeper level of learning, and also provide topics for constructivist assessment tools, which can contribute to deeper learning. Finally, practical application is one of the indicators that resolution has taken place, and resolution is itself a contributor to deep learning.

Figure 4 – Practical Application



Self-determination. The participants clearly found the level of self-determination in the courses they had taken as highly motivating. Deci (1992) frames self-determination in the following quote:

Self-determination theory distinguishes between the motivational dynamics underlying activities that people do freely and those that they feel coerced or pressured to do. To be self-determining means to engage in an activity with a full sense of wanting, choosing, and personal endorsement. When self-determined, people are acting in accord with, or expressing, themselves (p. 44).

So closely linked to the self, self-determination appears to be greatly influenced by and in many cases determined by the life relevance the students find in and bring to a course. They clearly prefer to have the discretion to direct their learning towards areas of interest, increasing motivation and thus deep learning.

I like the idea that I can direct my learning where I want to.

I also appreciate the personalized options in the MDE program. Almost every paper I have written has had some choice involved. It has allowed me to focus on topics that interest me.

...in these courses I have felt very free to follow my own line of interests that the course content has sparked. I have found that this deepens and enriches my learning. I especially enjoy when instructors encourage this outside exploration.

Connectedness. The data supports the notion that students have a need to feel connected to a community of learners. This need for connectedness manifests itself in a number of different ways. These manifestations are well-defined and resonate with the notion of Community of Inquiry as defined in the literature review. Students are definitely motivated by a sense of connectedness and are demotivated by feelings of disconnectedness. The following quotes give an indication of this and the effect it can have on motivation and participation in conferences.

Maybe I don't *fully* participate in my online conferences. Personally, I always feel a bit disconnected. It is something that I'm thinking of studying in my thesis....something about how to better create online identity. That's what I feel is missing, identity. It doesn't matter what subject area I am

studying, I don't feel that I know the other students well enough to really *virtually* get involved in online discussions. Maybe it's just me.

Elluminate allows users to talk, use a white board, text message, go to websites, and watch a PowerPoint presentation. I really enjoyed and learned a lot from the profs lectures and from the group presentations that occurred during this course. I don't think I would have liked all my courses to use Elluminate - but it certainly made me feel more connected to the instructor and other students. (We even had a virtual Christmas party).

Comments made by participants also indicated that there were three concepts associated with a sense of connectedness. These were validation, support and teaching presence.

Validation. Validation manifests itself as two types of communication from the Community of Inquiry. The first is communication that affirms the points of view stated by the student, in both conferences and assignments. The second adjusts these points of view with constructive feedback. Validation enhances connectedness and connectedness increases motivation.

I believe that student-teacher comfort levels do have a bearing on learning. I am more likely to delve further into a topic when an instructor affirms a contribution of mine (as in a conference setting) and makes suggestions for additional considerations.

When the facilitator affirms my or others comments regularly or triggers learners to think of additional input to add, I feel as though I belong to the online community; I am a part of it. Similarly, a more experienced or knowledgeable peer who responds with added input to my postings generates a sense of my belonging to the online community.

Conversely, it is also clear that a lack of validation weakens the student's sense of connectedness, and can be a demotivating factor.

I have been disappointed when my conference contributions, that I felt were significant, did not spark any discussion or took on an entirely different life than what I had in mind.

I can relate to this quite well. Not receiving any response to a posting can

leave me feeling disappointed and perhaps even ignored.

Support. Support helps students deal with the doubts they may have about their own perspectives and understandings of an issue. Both of the quotes below address this, but the second quote also addresses the notion of being 'left alone' to complete assignments, even when the student has serious doubts about her thinking.

I found support from my classmates too. Some of them replied to my messages helping me with my doubts and that was very motivating.

While I am going through the readings I hardly find deep questions for the conferences, but when I'm preparing my assignment all those doubts spring simultaneously. The problem is that, sometimes, the professor seems to be too busy to answer my doubts and that's when I need his-her total support. Sometimes I found support from my classmates in those critical situations, but not always.

The implication is that connectedness is required for motivation. This is also echoed in the following quotation which casts connectedness as a sense of not only belonging to the community associated with a specific course, but also with the community of the institution as a whole. The type of support mentioned below addresses the student's need for self-efficacy in that the institution cares enough about the student to provide this support.

A quality learning experience in my opinion is one that supports the learner. I don't have to go looking for information - it is provided. I don't have to guess how the program is structured or what I have to do to succeed - it is provided. If I ask a question of either my instructor or the institution I can count on it being answered quickly. I feel I belong to the institution and my being there as a student counts. So for me a quality learning experience is all the tangibles and intangibles that make learning pleasant as opposed to an onerous task that I might dread undertaking.

Teaching presence. This topic will be discussed in greater detail with respect to its contribution to deep learning later in this chapter. However, a few

words regarding the relationship of teaching presence to connectedness should be made here. Teaching presence is where we find instances of support and validation. Generally speaking, when there is a low level of perceived teaching presence, students do feel un-connected and this has an impact on motivation levels.

I appreciate conferences where the professor is present, and especially liked ones who posted summaries of our conferences when they were done, identifying the major themes. As students, in the flurry of our discussions, we can miss the bigger, thematic picture. This prof also provided a wealth of links to other sites he thought might be of interest to some or all of us. Of all the profs I've had so far, he was the best conference facilitator. One really felt his presence and his commitment to our learning.

Instructor involvement in the courses I have taken to date has ranged from virtually no involvement to an instructor who regularly summarized and made comments about the postings. I preferred the instructor who was more involved. I didn't feel that she took the ownership of my learning away from me but she certainly fostered my learning and used those "teachable" moments to further the learning of the other members of the class.

These two quotations amply illustrate the desire for teaching presence and a preference for more presence than less. The second quotation illustrates that this can be done without decreasing the level of self-determination that so many students find motivating.

Finally, as we will see later, teaching presence is not limited to the instructor. The constructivist learning environment used in these courses allows and encourages students to provide teaching presence to other students. This will be discussed in the later section on teaching presence.

Figure 5 captures the relationships between connectedness and validation, support and teaching presence. Connectedness is also identified as

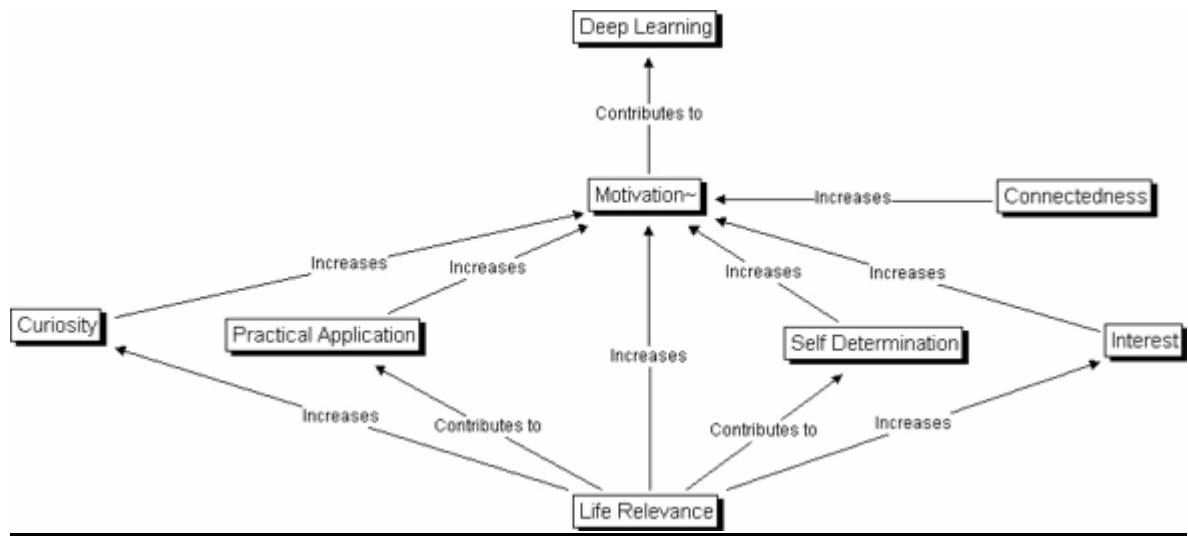
an important factor in increasing motivation where present, and decreasing motivation where absent.

Figure 5 - Connectedness



Summary. For these adult learners who are in a profession oriented Masters program, the data indicates that Life Relevance increases motivation. Life relevance gives the student a connection with their lifeworld with respect to their academic endeavours. This direct motivation is enhanced by the effect life relevance has in acting as nourishment for curiosity, practical application, self determination and interest. The Community of Inquiry also has an important impact on motivation. It is through the dynamics of the community that the learner stays connected to the academic lifeworld, and receives validation and support through the learning process.

Figure 6 - Motivation



Critical thinking, discourse and reflection. As discussed in the literature review, critical thinking and reflection must be present for deep learning to take place. According to one instructor, “Reflection is an essential critical thinking phase, the stage where the brain chews on information on the back burner while we go on with our lives.”

The Practical Inquiry Model previously discussed by Garrison and Anderson (2003) portrays the process of critical thinking as embracing two major activities; reflection and discourse. The following quote supports this:

I feel the self-directed readings foster an active learner within us and have challenged and developed my critical thinking skills in a very positive manner. It gives us time to think about the content, ‘play with it’ so to speak and determine the message gained. We can take our thoughts and further reinforce them, clarify them, and question them in the online conferencing. Again, the value out of all this resides with how interactive the players are in the conference (i.e. us as an individual learner (sic), fellow students and the facilitator) and the overall quality of the instructional design to foster active learning.

This participant identifies the transition made between the private world of reflection and the shared world of discourse. This process of transition between these two worlds grounds a number of further relationships which the data reveal. These will be illustrated later in the results. For now, other participants add support for this notion of transition as a source of deep learning:

Open exchanges among students help spur critical thought and may challenge some of the life world assumptions that are in existence. I have found that in all the courses I've taken the reading is stimulating and the assignments have forced me to think in ways that I might not have done previously.

These comments also support the importance of life experiences, both private and shared, discourse, and reflection in the critical thinking process and the consequent depth of learning. The Practical Inquiry Model appears to provide a reasonable explanation for how learning takes place under the stated conditions of this study. These participants also support the notion that learning is situated in the context of a learning community and the experiences and life relevancies of those in the community. Students readily transit between the two worlds, and see the primary value of the conferences as presenting different perspectives which fuel reflective thought.

Garrison and Anderson (2003), referring to the Practical Inquiry Model, consider that, "...these phases are not immutable. They are generalized guidelines that, in practice, may be 'telescoped' or reversed as insight and understanding is either achieved or blocked" (p. 58). The learning process becomes iterative in nature. There appears to be support for the non-linearity of the learning process in the following quotes:

I agree with your non-linear comment. I think while learning, things happen in a less organized fashion and it is only afterwards when we analyze the learning, that we can put things into neat little categories. Learning for me has often been quite chaotic.

I suspect however, that if I am familiar with a subject the stages may be more non-linear i.e. my consolidated knowledge of an area may be triggered by someone else's added knowledge followed by my further exploration of the new knowledge added...I would also say the staging is cyclical in nature in addition to being continuous.

This cyclicity may relate to connections being made with the life experiences of the participants, and this results in a spiral nature of the process, as referred to by Infed (2005):

In some representations of experiential learning these steps, (or ones like them), are sometimes represented as a circular movement. In reality, if learning has taken place the process could be seen as a spiral. The action is taking place in a different set of circumstances and the learner is now able to anticipate the possible effects of the action.

This spiral may be more focused if mediated by a teaching presence which gives the student some metacognitive tools to bring structure to this process.

Reflection is also seen by a number of respondents as an important contributor to their learning experience. When asked about the role that reflection played in their learning experience, the following comments were made:

Reflection is an important part of my learning experience. For me it usually involves encountering information (through CMC, readings etc) that I don't understand/have an opinion on/or is contrary to my opinion. Reflection isn't always a conscious thing for me - sometimes I am driving in the car or walking and a thought pops into my head - that either raises more questions about the topic or helps me frame the topic. In order for me to 'own' the knowledge - I have to reflect on it and find a home for it in my brain.

Reflection - yes very much so. I mull over questions and then, since others seem to respond quicker, might mull over their responses too. Some topics relate directly to my own experiences, others not so much, the latter generally take me longer to respond to. As well, it takes me a while to craft

a posting that reflects my (emerging) thoughts. The non-erasable aspect of a post also makes me want to be sure I am saying what I mean to say. For some topics I have searched for related readings to help get a better feel for the subject - this was a requirement in my last class, but I liked it and expect I will continue this to some degree in other classes. One part of conferences that I really appreciate is the duration. There is no need to respond immediately. I sometimes respond days later and others do the same. Some of those delayed discussions become the best 'threads'.

There is solid support in these quotes that the delayed nature of asynchronous groups allows and encourages extended periods of reflection. Students are given time to reflect, which is most often not the case in a face to face or synchronous DE discussion. Students also have time to reflect critically by examining published sources to support their reflections. The asynchronicity of these discussions provides an important affordance to all participants and not to only the quickest thinkers, or most vocal students, as in a synchronous discussion. Students are also given an opportunity to explore issues of interest and curiosity, contributing to added motivation. Nevertheless, many online discussion boards do not really foster an opportunity to reflect on the perspectives of other students.

Reflection appears to be activated from two important sources; the course materials and the online course discussions. But the spiral nature of the learning process previously discussed also indicates, as do the following quotes, that the course materials and discussion also act as a continuously re-energizing force that motivates the students to deeper reflection and hence deeper learning.

I usually finish a course gaining a better appreciation for perceptions or reactions to reading materials that might not otherwise occur to me because of student communication. This exposure increases my awareness that I need to challenge how and why I think and react to what I read. It serves as a reminder to think about what the content might mean

for others, not just myself.

I really appreciate the multiple perspectives on the course reading material that CMC enables. I like to know what other learners think about it, and also how they think about it. I feel it helps me to form my own ideas more fully.

This resonates with Piaget's notion of equilibration discussed by Wadsworth (1996), where he states, "Equilibration allows external experience to be incorporated into internal structures" (p. 19). New perspectives and new information force the student to assimilate, that is, adding to existing schemata, or to accommodate, that is, altering existing schemata to accept new experience and information.

Despite the results discussed above, a number of participants offered suggestions related to their perception of problems with online asynchronous discussions. In many instances participants felt that reflection and discourse were not encouraged, and in some cases discouraged due to discussion design and group dynamics, including the participation of the instructor. These comments provide some insight into how to deepen the learning experience by improving the performance of conferences.

I just think that there needs to be more discourse and reflection for in depth learning to take place in the conferences.

The conferences are good but not outstanding. In some cases, they are little more than "online homework assignments"...all of us answering the same set of questions and commenting on the answers of our classmates. You wouldn't do that in a classroom discussion...ask everyone the same question. How many salient, different answers are there to the average questions-for-reflection about a given reading?

I am a very strong proponent of the use of CMC, however, I also think that we have a lot to learn about effective use of conferencing.

As I said in my first post, it is often used as an online homework assignment.

It appears that the potential of conferences to encourage the transition between the shared and private worlds of the learner is not being maximized.

The following quotes illustrate that participants do, however, feel that conferences could play a much greater role in the learning experience:

I just don't think that conferencing is living up to its promise as a learning tool...but I think that that is because of the way it is used, not the tool itself.

What is missing is in-depth, focused, dialectical discussion about the topic.

The data also supports the notion that some of the problems occurring in conferences are due to a lack of understanding on the part of the learner regarding how to best use conferences as a learning tool. Many use the conference to post rather long essays about a topic:

There are definitely some students who assert themselves very aggressively in some of the threaded conversations. Some comments can be 'discussion closers' as opposed to 'discussion and idea generators'.

In one course there was a highly knowledgeable individual who would start off each conference with a long and thoughtful summary of the issues. He was so thorough that it felt as if there was nothing left to say, and no point in responding except to be polite. His work was very interesting, but it killed the conversation.

These participants may be suggesting that metacognitive strategies are required to optimize the learning experience in a conference. An understanding on the part of participants of what makes a good conference and what can kill a conference prior to the start of a conference, and the roles of participants could enhance the collective learning outcome of a conference. They also indicate that

there is an opportunity for stronger teaching presence to guide participant behaviour so that group discussions are deeper and more dialectic in nature.

Participants also found that being forced to participate in a conference was stressful. These comments came from self-avowed lurkers who have a more reflective learning style.

Shamefully, I must admit I have been a lurker! and have resented forced participation because it caused such stress. As well, I am seeking some classroom options for some of the classes. In January I am taking a class that only has 10% participation. I just get the stress of writing for the instructor!

Mechanics aside, there's the question of learning styles. I like to lurk! In a traditional class I only like to contribute if I feel like I have a really good point that it looks like no one else is going to make. In a conference the prof and the rest of the class can't see me nodding thoughtfully and offering support. I feel like I have to perform in order to "earn" my class participation marks. It's stressful for reflective learners.

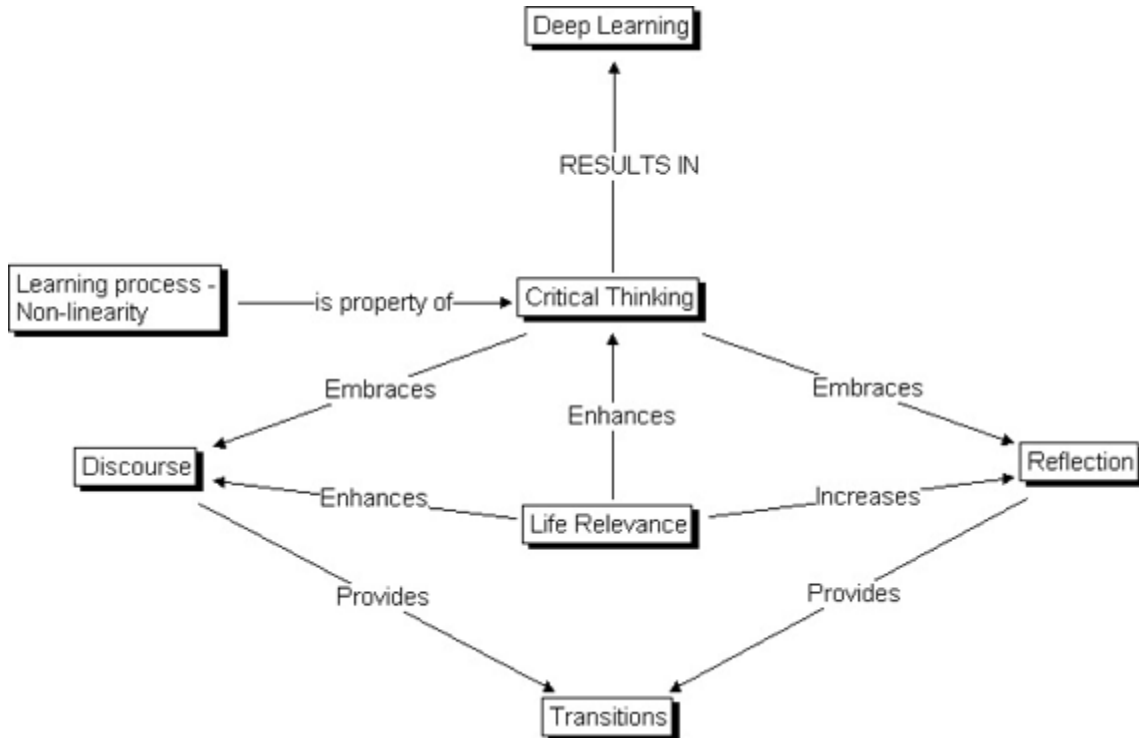
Balancing out these feelings is the following comment which indicates that forced participation, though stressful to some learners, can make for an optimized conference learning experience.

With respect to CMC - I find it is not used as much or as effectively if marks are not given for it. In one course, 30% of the mark was for CMC. It was the best CMC I have seen.

Summary. Figure 7 illustrates the relationships discussed above. Critical thinking embraces the two notions of reflection and discourse, between which the learner makes transitions. Reflection and discourse proceed together in a spiral or cyclical nature supported by the energizing effect of these transitions. Life relevance increases reflection as the learner naturally looks for a validation of discursive content through comparison of commentary or theory with their lifeworlds. Disequilibrium between ideas proposed by others in the discursive

process and the learner fuel more reflection, further clarification and meaning making with other participants, and consequently further reflection until equilibrium is restored.

Figure 7 – Critical thinking, reflection and discourse



Teaching presence. The influence of teaching presence on participant discourse and reflection in conferences and with respect to assignments and group work presents perhaps the most complex array of relationships in this study. A number of comments have been made in the previous discussion highlighting the notion of teaching presence as an important factor in the effectiveness of online courses as support for deep learning, particularly with respect to motivation and connectedness.

Participant discussions related directly to teaching presence can provide insights on how important teaching presence is to deep learning. In general, the student focus groups point to a definite desire for more teaching presence from the instructor.

I find that a professor that interjects their own thoughts and occasionally sums-up our points is extremely welcome.

For learning purposes, - more feedback regarding what is good, insightful, and what needs work would be helpful.

One thing that made a big difference for me was the participation of the instructor. I found that the instructor was very good at making the group think differently and deeper, and at bringing into the discussion views that were out of the ordinary or contrary to popular opinion. I found that this helped make the case for me that this form of learning could be of comparable quality to classroom-university learning.

It would be unfair to say that previous researchers have underplayed the importance of teaching presence as a contributor to deep learning. However, text analysis has failed to identify the weight that students place on Teaching Presence with respect to the overall learning experience, the level of motivation created in a course, and the desire students have for instructors to play an important and visible role in developing a Community of Inquiry.

Participants indicated that the notion of feedback is not limited to validation, as previously discussed, but also to constructive criticism which helps improve the student's work, and to the creation of an environment that fosters the development of critical thinking skills. The importance feedback plays in development of these skills is reflected in this quotation:

Last term, one instructor participated in the conferences by questioning our postings, providing feedback and re-directing our thinking. Any time I made a posting, I thought about the comments she might make and I tried

to address them in advance. In doing so, I became a much more critical thinker.

This is not to say that students require their hands to be held through the learning process. In fact, many students shared the opinion reflected in the following quote:

I would also like to add that at times, course facilitators encourage a more self-exploratory type of online forum. Meaning, the facilitator remains mostly silent and allows the students to drive the online conferences.

The withdrawal of the facilitator in this instance places the responsibility for learning activities on the participants. They in a sense create an interpsychological exploration of an issue. This can, but doesn't necessarily, lead to shared meaning and a better understanding for many of the students regarding an issue. They may be scaffolding each other because they are outside their comfort zones. As one instructor pointed out:

I assure them from the outset that my goal is for them to succeed and that although they will find themselves outside of their comfort zone, they are experiencing normal graduate school feelings.

The metaphor of 'comfort zone' resonates with the notion of Vygotsky's Zone of Proximal Development (ZPD). In the literature review the argument was made that Vygotsky's ZPD should be just as applicable to adult learners as to children. Stepping outside one's comfort zone can be likened to stepping into one's ZPD. Vygotsky (1978) defined the Zone of Proximal Development as follows, "It is the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (p. 86). The students step out of their comfort zone and into

a zone where they need intervention from a more capable 'other' in order to progress.

Teaching presence can act within the ZPD not only to develop deeper and more solid understanding of an issue, but also to develop critical thinking skills. This enhances cognitive presence, making it more productive, where we consider productive as how deep the learning experience is. This may be a crucial skill that this type of ZPD supports, in that better critical thinking skills will result in deeper learning. Thus we should consider that the role of conferences as played out in the real world is not necessarily one of leading to resolution. This might help explain the low incidence of resolution captured in text transcript analyses conducted by other researchers.

One of the most important values of the online conferences is to achieve a better understanding of the material through sharing life experiences and real world examples. Almost all respondents felt that one of the primary values of the online conferences was to provide different perspectives on the readings and other course materials. The following quotes represent the sentiment of the student groups:

One of the arguments put out to discourage distance education is that there is little interaction among students and that it is more difficult to have tutors guide the course. Open exchanges among students help spur critical thought and may challenge some of the life world assumptions that are in existence.

I always find it interesting and important to listen to viewpoints different than my own, because I know I only represent a small proportion of any given population and it is important I understand what is going on outside of my little box. If I was not open to this interaction what is the point of taking courses in the education process? I could just read the books if that is all that is involved in learning theory.

This, I think, is the best aspect of conferences and I agree this is where their value lies in a distance ed. course. In a good conference I can read other views and get ideas about the topic that broaden my perspective.

Not only are different perspectives provided, but these perspectives appear to be an important contributor to critical thinking, and ultimately to deep learning. This social construction of understanding appears to be energized by these differing perspectives, which lead to critical thought. The cognitive mechanism that makes this possible is not discussed by the participants, but as mentioned above, the process leading to understanding appears to be partially driven by the examples and real life experiences provided by the group, again highlighting the importance of life relevance to deeper learning.

The following quote may be used to ground the interpretation that online conferences have the potential to create a Community of Inquiry, and this community, through the process of internalization, contributes to the development of the learner.

Well, I've had some courses where I've been amazed and highly intrigued with some of the comments, backgrounds, perspectives of other students. It certainly can't be taken lightly the power of bringing in a collection of minds from such a vast range of backgrounds and current situations.

At this point, we can link this idea with the notion of development from a Vygotskian point of view. As Cole and Scribner state, "...when Vygotsky speaks of his approach as 'developmental', this is not to be confused with a theory of child development. The developmental method, in Vygotsky's view, is the central method of psychological science...the mechanism of individual developmental change is rooted in society and culture" (Vygotsky, 1978, p. 7). Perhaps the

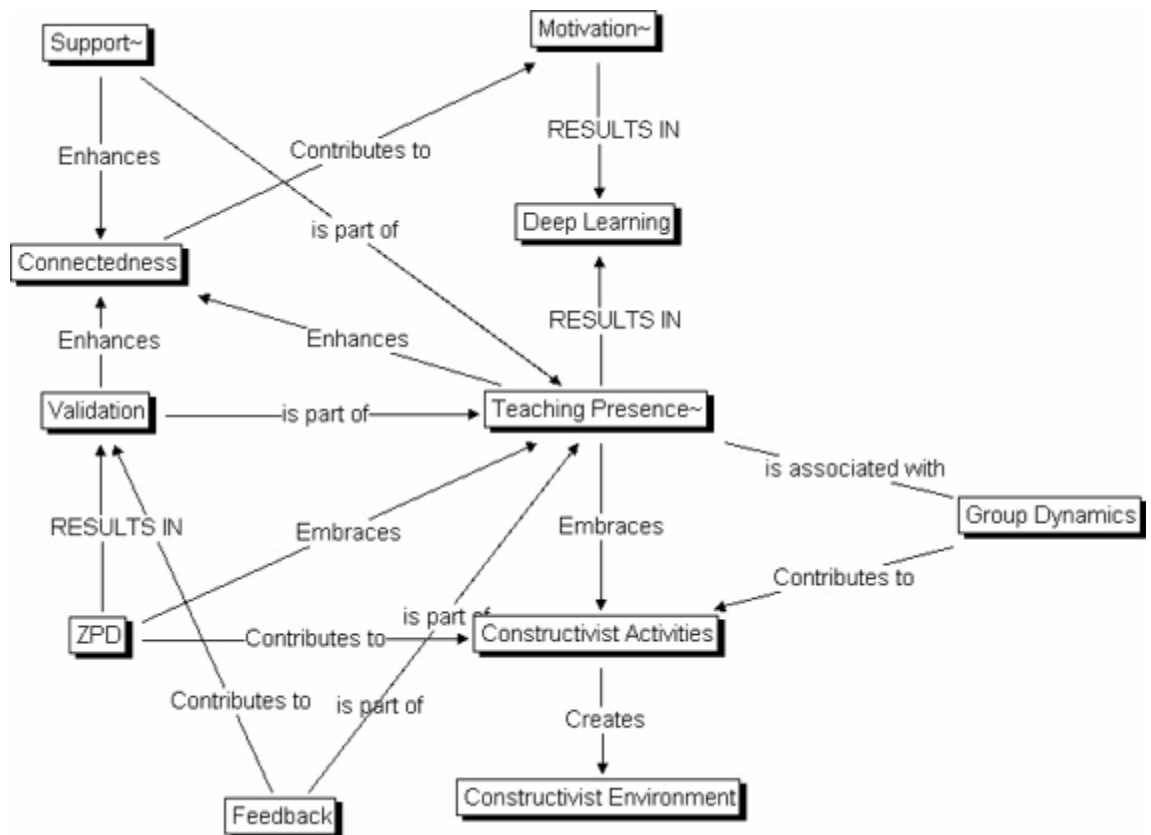
notion of Community of Inquiry needs to embrace a culture of inquiry that must be internalized for the individual to realize the deepest learning from an online course. As we will see later, online facilitation and group dynamics, the management of which is still developing, need to focus more on the role of conferences if they are to significantly differentiate online learning from independent study.

Summary. In the previous section on motivation, the connection between teaching presence and connectedness was made, as was the importance of validation and support to the development of a sense of connectedness. Connectedness was previously established as an important contributor to motivation, and thus is a contributor to deep learning. These relationships, along with those discussed in this section are portrayed in the Figure 8.

One of the important roles of feedback is to provide validation to the learner. Feedback is also an important element of teaching presence. Feedback is necessary for the creation of a constructivist learning environment. This environment is supported by activities which are scaffolded by the instructor when the student steps out of their comfort zone into the Zone of Proximal Development.

Teaching presence also plays an important role in optimizing the impact of CMC as a learning tool. The instructor and other learners in the community of inquiry can be active participants in the development of a group dynamic grounded in a culture of group development.

Figure 8 – Teaching Presence



Active learning. The data, as previously discussed, supports the notion that participants see their learning experience enhanced by their opportunity for practical application to real life and by their participation in discourse and reflection. These are both indicators of Active Learning. The student is engaging in activities that support learning rather than acting as a passive receptor for information. The data has also established the relationships between life relevance, practical applications, and reflection and discourse. Practical applications for each student are defined by the context of their field of experience. The ‘practicality’ is defined by their work or personal relationships. Peterson, Morrison, Cram and Misanchuk (1996) address this when they claim

that, "...in active learning, the learner is actively processing and interpreting in context, creating personal meaning, integrating learning with life experiences, and developing an understanding of content that enables them to do something with it" (p. 2). The importance of context is highlighted by the following participant who states that:

What I find very worthwhile is that I can apply the information/knowledge directly to projects I am involved with at work. That has helped me synthesize more than if I were taking more courses, without any real context to apply them to.

Since the underlying premise, based on the above quote and discussions, is that responsibility for learning rests with the student, then it is reasonable to postulate that when the life experiences that define context for the students, which in turn directs interest, curiosity and the desire for practical application, are tapped into, they have the potential to 'activate' the learner. The notion that a learner can be activated in an online environment is supported by the following quote:

I feel the self-directed readings foster an active learner within us and have challenged and developed my critical thinking skills in a very positive manner. It gives us time to think about the content, 'play with it' so to speak and determine the message gained. We can take our thoughts and further reinforce them, clarify them, and question them in the online conferencing. Again, the value out of all this, resides with how interactive the players are in the conference (i.e. us as an individual learner, fellow students and the facilitator) and the overall quality of the instructional design to foster active learning.

This participant associates critical thinking with active learning. She anthropomorphizes the concept of active learning by saying there is an active learner within us that can be activated through instructional design. Her notion of activating the "active learner within us" can be seen as a metaphor for

encouraging cognitive presence, and thereby deep learning. Previous discussion has indicated that practical application is rooted in the life experiences of the student. As such, the Practical Application of learning, as reflected in the following quote, by definition is an example of Active Learning:

I think my learning through the MDE courses has been quite deep, especially in the topic areas that have been relevant to my work life. The opportunity to use real life examples in my papers has been most beneficial. I've also had the opportunity to apply the theories and concepts I've studied in school to my work situation. So I'd say the activities that are more self-directed are the most useful.

At this point, it would be useful to focus on an important interpretation of Active Learning as grounded in the data. The following quote illustrates an important distinction between Active Learning as participating in activities, and Active Learning where the student takes the responsibility for this participation:

I believe that the role of the online learner is significantly different from that of the classroom learner. As an Athabasca learner in MDE, this learning experience demands that I am an active learner. When I say that, I mean the responsibility to learn, to participate and to ask questions requires my effort and initiative - I truly own the experience.

This quotation supports the views of Peterson, Morrison, Cram and Misanchuk (1996) where they state that, "We think the end goal, the underlying intent, of any of these 'active learning' strategies should be to develop autonomous learners, learners who are self-directed and take responsibility for their own learning process" (¶ 5). This inclusion of the notion of responsibility goes beyond Bonwell and Eison's definition (1991) of active learning which suggests that, "They must read, write, discuss, or be engaged in solving problems. Most important, to be actively involved, students must engage in such higher-order thinking tasks as analysis, synthesis, and evaluation" (p. 1). One could postulate that there is a

positive relationship between responsibility as manifested in self-regulation and the level of higher order active learning engaged in.

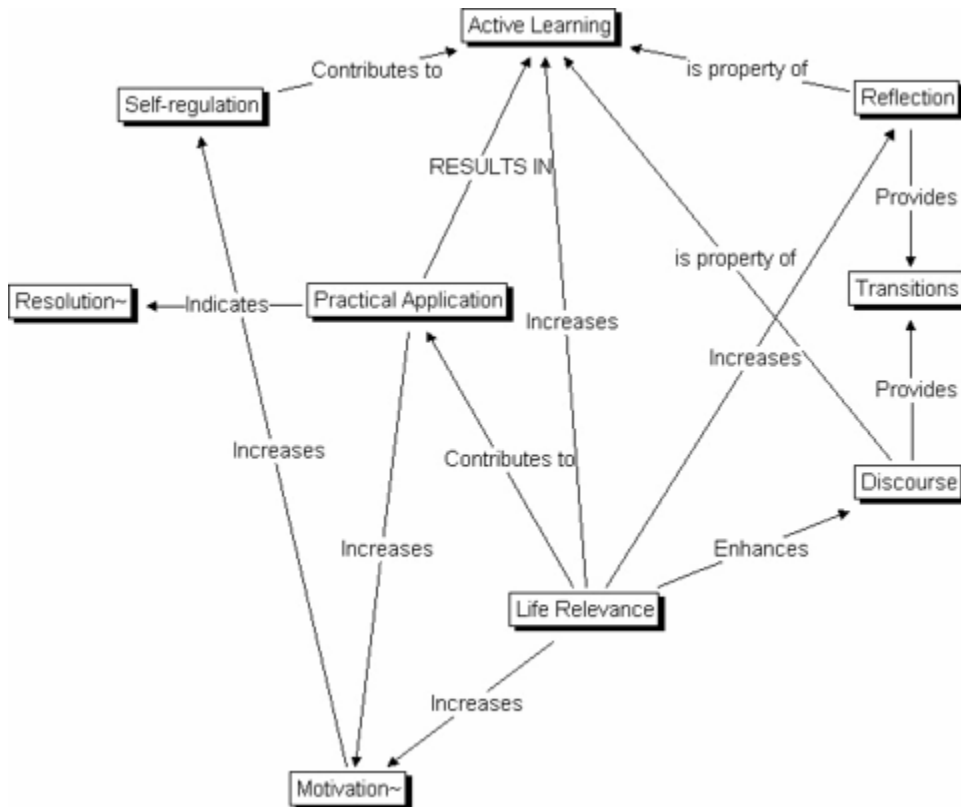
The literature links self-regulatory behaviour with motivation, which has been established in a previous section as contributing to deep learning. Zimmermann (1994) states that, “The construct of *self-regulation* refers to the degree that individuals are metacognitively, motivationally, and behaviorally active participants in their own learning process” (p. 3). It has previously been established that motivation is increased by Life Relevance and Practical Application of learning. Motivation in turn increases self-regulatory activities and has been established as increasing the depth of learning. This is supported with the following quotation from the data:

I think that in any learning setting, the amount of learning is up to the participant. I've worked with learning style instruments over the past ten years to encourage designers and instructors to include activities that will appeal to most learners most of the time, and that helps learners recognize when an activity is not really suited to them, but how to cope with it. Having said that, if a student is really motivated, they will find a way to learn.

Summary. Active learning is related to much of the prior discussion in this study. Life relevance has been established as a contributor to higher levels of motivation and to the opportunity to engage in practical application. Life relevance also increases reflection and enhances discourse through the use of real life examples. This richer level of reflection and discourse, through transitions between the two, contributes to the learner's involvement in active learning. Higher levels of motivation also increase the level of self-regulation which helps to energize the active learning activities of the learner. As previously

illustrated, discourse and reflection and motivation are contributors to deep learning, and their effect is magnified by active learning, especially when it is energized by life relevance. The following figure illustrates these relationships.

Figure 9 – Active Learning



Cognitive presence

The previous section has established that deep learning does take place in a CMC supported online course. The factors that are related to the level of online learning have been identified as motivation, critical thinking, teaching presence and active learning. In the MDE program, which is a professional practice program, these factors appear to be greatly enhanced by the level of life relevance that can ground the learning experience. The next section addresses

the second research question, which is meant to explore students' perceptions of their progress through the learning experience.

The focus groups revealed that students aren't readily able to articulate the learning process they are engaging in. Few of the students perceived themselves as progressing through the stages of cognitive presence, not necessarily because they didn't proceed through them, but because they were not able to articulate the process they go through. In fact, there is overwhelming evidence in the data that the participants were not able to readily articulate shared meaning surrounding the learning process.

Nevertheless, a number of quotes describe discrete elements of learning which, if ordered, would define a learning process. For example, one participant stated that "...it takes me a while to craft a posting that reflects my (emerging) thoughts." This student doesn't refer specifically to a transition from exploration to consolidation, but the inference that the student is engaged in some sort of process leading to this transition is apparent. Another example relates to the notion of a triggering event. This student stated that "For me it usually involves encountering information (through CMC, readings etc) that I don't understand/have an opinion on/or is contrary to my opinion." This could be viewed as one type of triggering event. Another student comments on the process of synthesis when she states, "What I find very worthwhile is that I can apply the information/knowledge directly to projects I am involved with at work. That has helped me synthesize more than if I were taking more courses, without any real context to apply them to."

Once prompted by the interviewer, there was still little agreement on a specific process, and there was little shared meaning regarding the elements of the process. It was only when participants were asked specifically to comment on the stages of cognitive presence as outlined in the Practical Inquiry Model that they were able to articulate any salient awareness of a structured process characterized by specific steps. When participants were actually presented with the four stages of the PIM, most of the respondents agreed it was a conceptualization that reflected their experience, while the others were reluctant to characterize it as a description of what they felt occurred in their learning process. This being said, they were not able to clearly articulate with any degree of certainty what process they actually proceeded through.

This phenomenon could be characterized as the result of an inherent weakness of the focus group methodology, which asks the learner to adopt a retrospective perspective on a process that occurred in the past. Other methodologies are needed to explore this issue, and they are discussed in the section on recommendations for future research.

Triggering event. Participants identified a number of activities that they would consider to be a Triggering Event. None of these appeared to dominate as an archetypal definition of the phenomena, but many participants mentioned more than one event could trigger the learning process. This identification of important events in the learning process was more forthcoming when prompted by the researcher.

Questions posed by instructors and other students can act as triggering events. The following quotes relate to the questions posed in online course conferences:

The main triggering event is when the instructor posts a question or task for the board.

Yes, I definitely think that questioning is capable of starting the learning process. There are at least 2 ways - off the top of my head - that they can do this. 1. Questions can evoke curiosity - and this curiosity may move people to explore and to learn. 2. Questions can create a vulnerability that may be necessary to the learning process - if someone believes they already know all there is to know, they are less likely to learn.

Questions may jar an individual's belief in their knowledge and push them to seek knowledge. Obviously this is a delicate process because questioning in a way that harms someone's confidence will not help the learning process.

This type of questioning has as its antecedent an interactive environment that supports discourse. It is important at this point to remember the previous discussions regarding the importance of Life Relevance to encouraging discourse. Life Relevance can provide a lens which can connect the question with previously learned knowledge and previous experiences which can add personal dimension to the question. However, as the following quote portrays, questions that seem to be more information oriented than reflection oriented can in fact disrupt discourse and the interactivity of the learning environment.

There is an art to CMC mediating, and posing questions that are simply reiterations of textbook (or guide book) questions can make answering them feel like homework (I think someone mentioned that feeling somewhere else in this conference). Often the difference between a skilled and unskilled teacher is in how s/he asks questions.

Other participants expanded on the importance of how questions are posed. Questions that are asked within the flow of a discussion tend to energize discussion. These new questions can be seen as triggering events as well. This

is consistent with the cycling back and forth between the individual world of meaning and the shared world of knowledge as discussed by Garrison and Archer (2000, p. 74).

Questions need not be limited to the discursive environment of conferences. Questions are also instigated through assignments. Previous discussions have linked the importance of Practical Application and Problem Based Learning to the ability of assignments to enhance deep learning. Grounded in this is the hypothesis that Triggering Events that resonate with the life experience of the student will result in a deeper level of learning. Additionally, as the following quotes support, triggering events can be closely related to the practical problems and issues students face in their work and family lives:

I do, however, agree with XXXXX that case studies and PBL problems are effective "triggering events" leading to exploration and integration.

"Triggering events" for me often occur in the practical use or application of ideas/concepts that I have learned.

I would say triggering events in learning for me often occur in the workplace where I have been able to apply concepts. So for me, the application of the learning is critical. I don't get a sense of what I really know about the concepts or understand until I use them. To a certain extent, assignments have also been learning triggers. It depends on whether the assignment was "useful" for me and again, that would mean there is a practical application.

The last quote is also noteworthy. It is plausible that a successful resolution in the workplace may act as a trigger itself leading the learner to a deeper level of engagement with course or program material. In other words, 'getting a sense of what I know' can lead to further application of learning in the workplace through positive feedback provided by the initial cycle of cognitive presence. This

hypothesis is worthy of future research.

It has already been demonstrated in the results for Question 1 that curiosity and interest are grounded in the life experience of the student. Participants have also identified that curiosity and interest can act as triggering events.

In the learning realm, for me, the triggering event is interest in the concept.

Some authors from the courses said that an "interest" is needed to learn. For me, those triggering events motivated me to investigate about the topic and to go deeper in the discussion. It was not like normal course material that you just have to understand and apply in your assignments. It was different, those events made me look for more and more information, also, because they didn't have a due date, it let me expand my curiosity.

The following quote also connects the discussion with this paper's previous definition of curiosity and its link to Piaget's notion of the process of equilibration, where equilibration, as Wadsworth (1996) states is "...the process of moving from disequilibrium to equilibrium" (p. 19). The reference to a question 'jarring' their beliefs can act as a triggering event in this process. The question elicits a state of disequilibrium, calling for a learning process which will reestablish equilibrium. The cognitive processes of assimilation or accommodation that lead to a new state of equilibrium indicate a heightened depth of concentration on the question which classifies it as a deep learning experience.

Questions may jar an individual's belief in their knowledge and push them to seek knowledge. Obviously this is a delicate process because questioning in a way that harms someone's confidence will not help the learning process.

A significant number of respondents did not see a triggering event in this manner. They saw it as the point where some type of 'learning explosion' has taken place. To carry the metaphor further, many felt that it was only after a 'critical mass of knowledge and reflection' had been reached that such an explosion would occur. This rapid release of learning energy was referred to by many participants as the "AHA" moment. The following quotes summarize the thoughts of those participants sharing this point of view:

No I don't think the triggering event is the first event in the process of learning. At least not in my experience. The triggering event is the event that tells me I have learned. I believe the process of learning starts with the acquiring of information through reading and taking notes and then the analysis of information occurs - that is where I find it is helpful to have the interactions on the course discussion boards or the discussions with my friends and colleagues. So I suppose it is in this analysis of the information I have acquired that the triggering event or the "aha" event happens. I think of the learning process as a cycle and the triggering event or the "aha" moment could occur anywhere during that cycle.

Triggering events: well, thus far, they are sometimes (for lack of a better word) "aha" moments and sometimes they are the outcome of a systematic attempt to learn.

I agree the first three take place (although not in the order presented). I am not sure about the resolution stage. I would put them in this order: 1) exploration, 2) triggering event (if it occurs), 3) consolidation.

These 'AHA' moments are reminiscent of Garrison and Anderson's (2003) definition of insight as "...the classic 'eureka' experience where clear solutions and or coherent conceptualizations occur ...insight arises as a result of reflection (being immersed in a well-defined problem) and the generation of tentative conceptual representations" (p. 58). However, characterizing insight as a triggering event seems to put the 'cart before the horse' and perhaps indicates a low level of awareness for metacognitive strategies among the participants.

Another group of students interpreted a triggering event as the point where learning actually occurred; the 'AHA' moment, that point where 'everything came together'. These participants, as in the previous group discussed above, seem to have little if any awareness of a learning process; just that when the 'AHA' moment occurs, they are aware that they have learned. In the following quotation, as an example, the participant refers to a triggering event as the outcome of the learning process as opposed to the beginning:

Triggering events: well, thus far, they are sometimes (for lack of a better word) "aha" moments and sometimes they are the outcome of a systematic attempt to learn.

I am not sure where the triggering event fits within these stages. When a triggering event does happen I believe that it occurs after exploration. This might be because triggering events thus far usually involve equating seemingly unconnected ideas and finding their relationship. I need to explore subjects, learn more about them, wrestle with what I have learned before the triggering event is likely to happen.

Maybe, but I maintain that, in my experience, these "triggering events" do not and will not happen until I have, at least, gone through the exploration stage.

It is plausible that this issue is related to differing understandings between 'trigger' as the start of a process versus trigger as 'the spark that ignites the explosion'. Further research should take into account this potential for differing meanings of this term.

Also of interest is the lack of mention by respondents of what the 'start' of the process would be. It is possible that these participants see the start of a course or program as the beginning of the process, so to them the notion of a triggering event as a starting point for the learning process for a particular topic is irrelevant, since they have already made the decision to start some kind of

process.

An alternate interpretation could be that they are in a continuous process that has no beginning, but only stages of heightened activity, engagement and the three other stages of cognitive presence; exploration, integration and resolution. This heightened situation could be created by a question, an assignment, a work or life situation or curiosity and interest. This point of view is illustrated in the following quotations:

There may be only one major triggering event for an entire program as opposed to one for each course. In a similar fashion there may instead or in addition be many smaller scale triggering events during a course of study. The model appears to lack definition in this area.

The word 'event' in this model bothers me, as it seems to point to a certain time and a short-lived moment. This may sometimes be accurate, but for other learning it may be better classified more broadly as triggering 'experiences' - more than one event or experience that can 'trigger' exploration. Perhaps that is why you are reorganizing the process to start with exploration: it makes it a broader process of many thoughts and experiences leading one to learning.

There is another group that views the triggering event as grounded in their work experience. Learning, viewed as an outcome and not a process, as it connects with relevant life experience is viewed as a trigger, as evidenced by these quotations:

The "triggering events" that I have experienced are usually related to connections that I make between my own experiences and what I have been learning. Often these events occur in conjunction with conversations I am having about what I am learning. These conversations could be in the form of online conferencing or they could simply be relating what I am learning to a friend or a colleague.

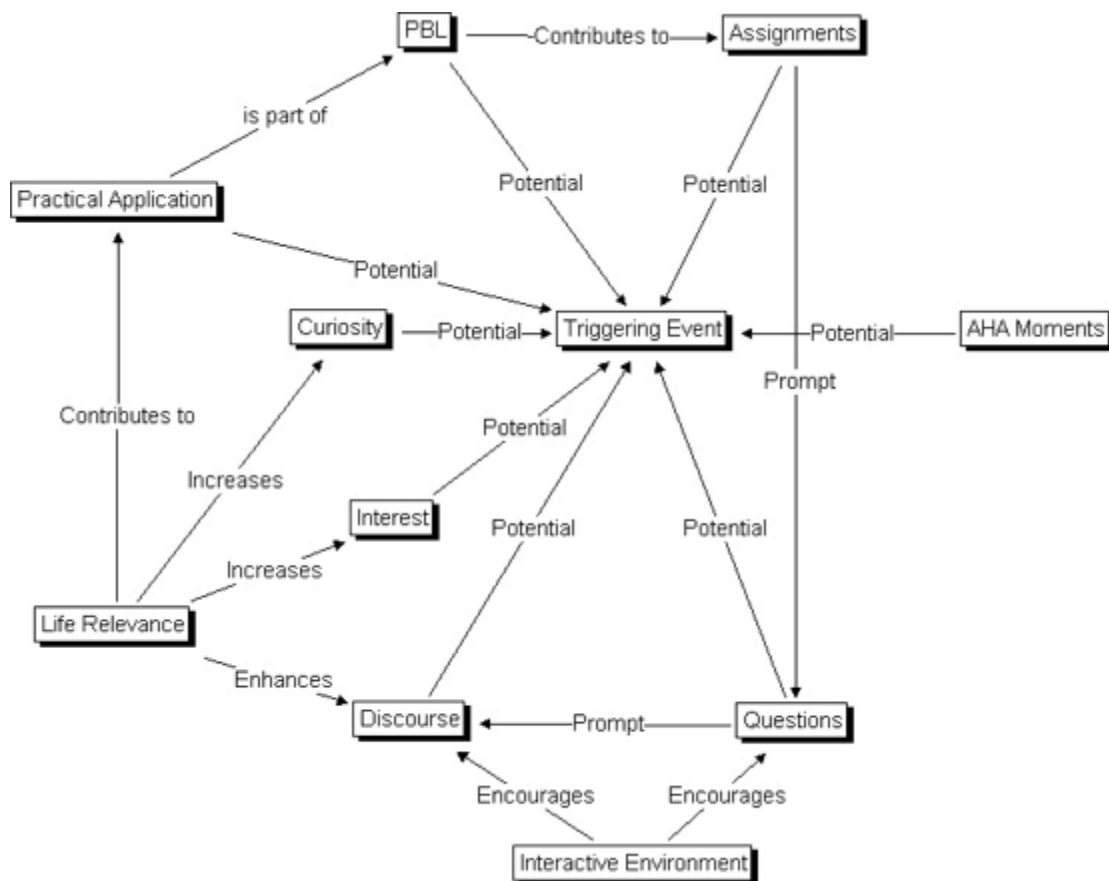
For me a triggering event may be conversation on a related topic, or some other work related concept that helps put pieces into perspective.

What appears to be clear from this discussion is that participants have many interpretations of what a triggering event might be. Some relate to a more precise process, while others are more amorphous in nature. As one participant put it:

Maybe we need to look more closely at what we mean by a "triggering event." I suppose some trigger events may have happened long before we even begin an exploration and it would be through the process of exploring a particular subject that we remember the trigger event? It would be like remembering an unanswered question that one has had for a time, and this might increase one's motivation and concentration to learn the answer to that question.

Figure 10 represents the conceptualization of a Triggering Event and the factors that the participants have identified as potential Triggering Events.

Figure 10 – Triggering events



Exploration. Generally, the data supports the current understanding of exploration as outlined in the Practical Inquiry Model, where exploration is described as “...a search for relevant information and ideas” (Garrison & Anderson, 2003, p. 62). The cyclical nature of the learning process discussed earlier in this paper is also an important theme in the discussion of exploration. This cyclical or ‘divergent’ nature of exploration is illustrated by the following quotes.

I suspect however, that if I am familiar with a subject the stages may be more non-linear i.e. my consolidated knowledge of an area may be triggered by someone else's added knowledge followed by my further exploration of the new knowledge added.

The presence of the instructor is an important element in my opinion, particularly if the instructor pushes the students to scratch beyond the surface by asking supplemental questions based on their postings.

I am also pleased by the way that the online conferencing allows for interaction between students and teacher and for further exploration of topics that the course generates.

Progression through the exploration stage is less likely to be linear when input and added perspectives from other students and instructors galvanize further exploration. This galvanizing effect of other participant inputs appears to create mini-triggers for further exploration. One important role of the conference then is encouraging exploration, as is the role of the teacher in encouraging students to explore areas to a deeper level.

Another galvanizing factor is the level of interest the student has in a particular topic.

My own research - what I mean by this is that in these courses I have felt very free to follow my own line of interests that the course content has sparked. I have found that this deepens and enriches my learning. I especially enjoy when instructors encourage this outside exploration.

But I often find strands (which may be considered off topic by some) can allow personalized topics/interests to be explored.

I have found that the individual assignments, especially the final assignment/project have been an opportunity for me to more deeply explore an area of interest.

These quotations amplify the already discussed importance of life relevancy to the interest and motivation of the student. Interest proceeds from life experiences, and also energizes exploration when the student can see an application in their work or personal lives. Encouragement from the teacher validates this approach to exploration and is another instance of the importance

of the role of the teacher in the exploration stage.

The last quote above, which supports the importance of interest in the exploration stage, also supports the important role that assignments and readings play. The following quote amplifies this perspective:

I have found that the individual assignments, especially the final assignment/project have been an opportunity for me to more deeply explore an area of interest. Melding course readings and what I've learned from others' postings as well as personal interests have deepened my learning.

Exploration Stage - is the actual working through the course materials, particularly the readings. I try not to simply go through the motions when reading the course content, but actually reflect on what is being presented and try to place the content in mental context.

A second perspective on this stage of cognitive presence relates to the orienting nature of exploration, as witnessed by the following quote:

Once I receive my new textbooks and readings for a course I immediately begin into the exploration stage to determine how big the forest is and how the boundaries are defined. If there are areas that I am not familiar with I then begin to seek out new information and resources to augment the materials provided and provide an introduction to the basic concepts and principles that we will be dealing with.

A number of students mentioned receiving their course materials and immediately exploring them to orient themselves to the issues the course focuses on. As mentioned in the section on triggering events, the receipt of course materials appears to be a trigger for exploration. This does not preclude more exploration later on, but it does point to orientation as a self-regulatory action used as a tool to ground further exploration. This self-regulatory behaviour leads to a more focused search for readings, articles and perspectives on a particular topic.

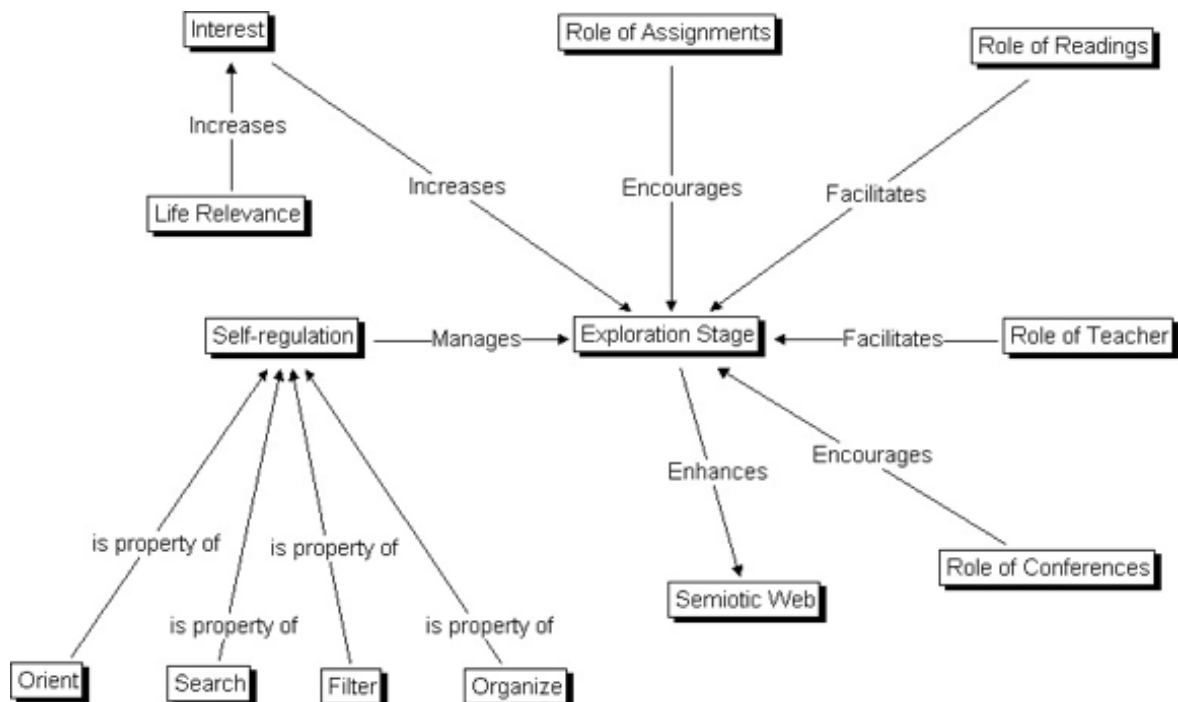
There is support in the data that reflects a collecting and filtering nature of exploration culminating in organizing the information. The student collects a lot of information, some more relevant and some less relevant to a particular issue. Then the course readings and orientation are used as a filter to discard peripheral items collected during exploration.

Often I have gathered so much information and interesting tidbits that it is hard to find enough time to go through it all. This results in focusing back on the core materials provided in the course and scanning the remaining materials to further examine the jewels in the rough that can apply to probable situations that I will encounter within my job, or that would provide excellent amplifying information for term papers and reports.

From a cognitive perspective, the above quote also points to the notion that new information is acquiring new meaning during this organization. The student would appear to now begin the process of incorporating this new set of organized knowledge into their existing semiotic web. This provides insight as to the point of transition from the process of exploration to the process of integration.

The data supports the notion that there are a number of facilitators for exploration and that there are also some self-regulatory activities required to make the exploration stage most productive. Figure 11 illustrates these relationships.

Figure 11 – Exploration



Integration. Garrison and Anderson (2003) define integration as “...a tentative connection of ideas capable of providing meaning and offering potential solutions” (p. 62). Both constructivist assessment tools and conferences play an important role in this process. Assignments are important activities that facilitate ‘seeing’ the relationships between what has been learned in a course to elements or items in the existing semiotic web of knowledge and life experience of the learner. It would appear that this results in a deeper level of learning for the student:

My perception of my depth of learning that's an interesting question. I think it depends on the amount of connections I am able to make between what I have learned and what I already know.

Depth of learning appears to be equated with the number of connections made between what is being learned, that which is entering the semiotic web, and what one already knows, that which is already embedded in the semiotic web. New learning is embedded in an existing semiotic web, thereby modifying the web.

A number of student comments relate to the importance of assignments as a structure around which to integrate information into prior learning. The design of assessment techniques appears to carry a high degree of importance as a facilitating strategy for the integrative process.

The best learning for me has come from the assignments, as that is where I have to put ideas and analysis together to create a product. That's when I start to "get it" and feel like the courses had real value.

I find the course assignments to be the most valuable learning activity. I appreciate the opportunity to direct my own learning and pick the topics I am interested in. This is what makes the courses and program relevant to me.

The assignments provide the structure around which to consolidate the information into a coherent 'bit' of learning which can be embedded in the student's existing semiotic web. This process appears to provide a springboard to further reflection.

Assignments also give the student the opportunity to more deeply embed new learning in their semiotic webs. The following quote shows us that feedback on assignments is an important contributing factor to consolidation:

...consolidation also occurs when a course instructor gives positive feedback on my written assignment...

Feedback acts as validation. This contributes to consolidation since it gives the

student the confidence to embed the learning into their semiotic web.

As previously discussed, the practical application of learning through assignment designs that address the life relevance of the student can provide a context that further embeds the learning into the life experience of the learner. Learning that is more deeply embedded in life relevance represents a deeper level of learning.

I would add that consolidation also occurs...when I get to restate or demonstrate the course learnings at work - e.g. the principles or concepts I've learned about become part of my language or practice at work.

Earlier in this section, this type of practical application was associated with the notion of problem based learning as a method which demands that students develop metacognitive skills and use them in the solution of problems. Perhaps it is the conscious use of metacognitive skills that allows the student to realize that some sort of resolution has taken place.

There were also a substantial number of participants who considered conferences as a contributor to the process of integration.

I'm guessing that in a CMC environment, this is where I might integrate what others have posted so far in an attempt to find a pattern.

... conferences and interactions with other students and the instructor creates a virtual forum that facilitates my tentative understanding to more solid understanding...

This is consistent with previous discussion on the importance of a constructivist learning environment to the achievement of deep learning. Conferences give students an opportunity not only to see new relationships and patterns pointed out by other participants, but they also encourage reflection which can lead to

deeper learning.

Conferences also afford validation for a participant's emerging web of new meaning. This appears again as an important factor in the integration process:

However, when a classmate supports my beliefs and opinions, then I could be in the consolidation stage.

...the online conference offers affirmation or angles to view the issues from.

I agree with you all when you discuss how the instructor's presence and comments validate the students' comments and participation.

It would appear that validation allows the student to accept and integrate the new information into the existing semiotic web. Here again we may see a transitory overlap between integration and resolution, as we saw a transitory overlap between exploration and integration.

Delivery of the course design is also likely an important factor in leading the student through to integration. This is particularly true with respect to the role of conferences in contributing to consolidation through more forcefully exploring different perspectives and supporting a higher level of reflection. Some participants would like to see even higher levels of exploration into differing perspectives and the level of reflection that is required for this to occur. This often manifests itself as a desire for more participants in conferences to feel it acceptable to challenge differing perspectives in order to encourage reflection:

What I think happens frequently in the conferences in the MDDE courses is that the "exploration, integration" phases don't happen or are cut short. One reason I think that this happens is a reticence on the part of the participants (including me) to challenge the views of my colleagues. I haven't had any professors do that either.

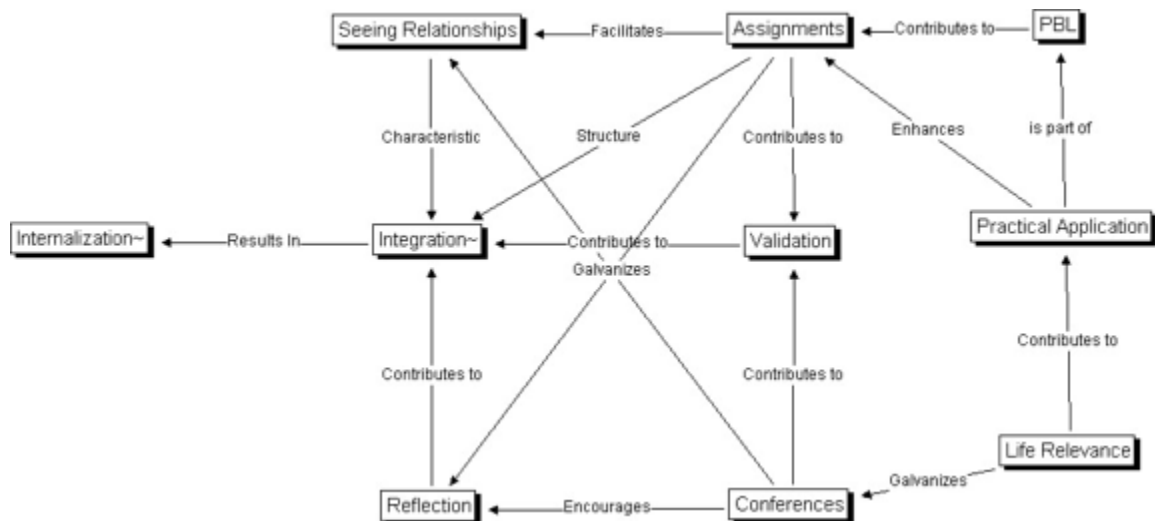
In terms of learning from other students, simply having an opportunity to

discuss, read other interpretations, see how the information relates to someone else's personal or work experiences all help to broaden my understanding. It is helpful to have my own assumptions challenged. If others can do so based not only on their own experiences but also extensive learning, then that adds to the quality of the discussion.

Though not a topic for this research study, Garrison and Anderson (2003) point to the importance of social presence in creating a learning environment which accepts challenge as a method to support deeper learning. They state that, "Social presence means creating a climate that supports and encourages probing questions, skepticism and the contribution of more exploratory ideas" (p. 50). It would appear that a number of strategies relating to social presence should be designed into the course so that a more challenging yet healthy environment of inquiry can be created.

The above discussions point to designing the course so that it offers an opportunity for the students to make connections between previous concepts and new concepts, and validate them through conferences and constructivist assessment tools. This notion emphasizes the important roles of course design and carefully selected and relevant content in leading the student through to some form of integration or consolidation. It also points to the development of a learning environment that welcomes challenge and questioning of other learner's perspectives. These relationships are illustrated in Figure 12.

Figure 12 – Integration



Resolution. As mentioned in the Literature Review, previous research using text analysis procedures has found that resolution occurs at a low level in conferences. This study, which looks at total course design and program experience, has already shed some light on the role of other constructivist assessment tools in encouraging resolution. In their discussions of cognitive presence, Garrison and Anderson (2003) refer to resolution as the phase where learners “...critically assess the viability of the proposed solution through direct or vicarious application” (p. 62). There are indications in the data that support this definition of resolution. Nevertheless, the participants were less able to confront the notion of resolution versus the other elements of cognitive presence. The data related to this phase is similarly sparse compared to the incidence of resolution in text analysis research on conferences. However, when we do look at the notion of practical application as a dimension of resolution, it becomes

abundantly clear that participants relate resolution most often to practical application.

The instances of resolution mentioned by participants fall into two broadly defined categories; practical application and demonstration of understanding. These categories should not be viewed as totally inclusive of the examples mentioned in this study since these examples are course dependant and would likely vary in other programs at other institutions.

The quote below evidences the dilemma faced by the participants in identifying if resolution has occurred.

I find it hard to determine if I have reached higher levels of learning. How clearly can we see how our knowledge has developed? Perhaps that's why learning that relates to our professional life feels most gratifying. It allows us to quantify our learning in relationship to something that we already know.

Participants indicate that they find it much easier to witness their own learning if they have been able to apply the learning to solve a practical problem. This allows them to quantify their learning. Problem based learning embedded in the work life of the student demands a solution to the problem and solutions are definitive in their manifestation of result oriented behaviour. It also appears to be a result oriented underpinning to learning which is related to the underlying context the courses are being taken in, that of the professional life of the student. Problems demand solutions and solutions can be quantified. This becomes clearly apparent in the quotes below.

I don't get a sense of what I really know about the concepts or understand until I use them.

I can apply the information/knowledge directly to projects I am involved

with at work. That has helped me synthesize more than if I were taking more courses, without any real context to apply them to.

This last quote also relates back to the discussion of contextual learning which was presented under the first research question. Context provides them with a familiar backdrop against which to compare their before course and after course states. It should also be considered that the metacognitive skills required to recognize learning in a more abstract environment may not be as well developed in professional students who have been away from the academic context for many years.

Problem based learning has been established in the discussion of the first research question as embracing practical application. These relationships further identified practical application as contributing to deeper learning. With practical application indicating resolution, we can propose a positive relationship between resolution and deeper learning.

Participants also identified activities which provide for a demonstration of understanding as indicators of resolution.

This then naturally flows into what I would consider the resolution stage which is the evaluation of the course materials and discussion that have taken place augmented with additional resources to synthesize a “final project” that demonstrates comprehension and understating of the concepts involved with the areas of discussion.

The best learning for me has come from the assignments, as that is where I have to put ideas and analysis together to create a product. That's when I start to "get it" and feel like the courses had real value.

These projects and products become a physical manifestation of deep learning which are eventually validated, in cases of positive evaluation, by feedback from the instructor.

This desire to perceive some sort of physical manifestation is also apparent when examining conferences and the resolution which might occur in them.

This sounds like the place where someone might post a final summary or propose a solution to a problem. I think this happens from time to time as well, but again, I think it is less common. It's definitely a higher order learning skill.

This may also occur when the instructor posts a final summary and closes the discussion.

Within the context of all comments made about conferences, participants were less than enthusiastic about conferences where postings were limited to summaries of what other learners had already said. They would prefer a more dynamic participation to lead to reflection and collaboration as a means of arriving at a satisfactory end state.

Yeah - that's it! We don't feel like conferencing is a brainstorming place - where ideas feed off each other's contributions - which would be a much more natural and collaborative process.

What is missing is in-depth, focused, dialectical discussion about the topic.

Finally, there was some indication that the low level of commentary on resolution might be related to the level at which resolution can or should occur.

The following quotes indicate that some participants feel that resolution might occur at the program level, when the courses themselves fall into a recognizable pattern of relationships.

What I mean is that by taking one course at a time, I am not certain that I am getting the big picture. As an upper classman in university when I was concentrating on my major, the content of one course often supplemented or augmented something in another course. It is analogous to having several parts of a puzzle which are all different but which fit together. It is not like that with this programme, for me. Though I am, for sure,

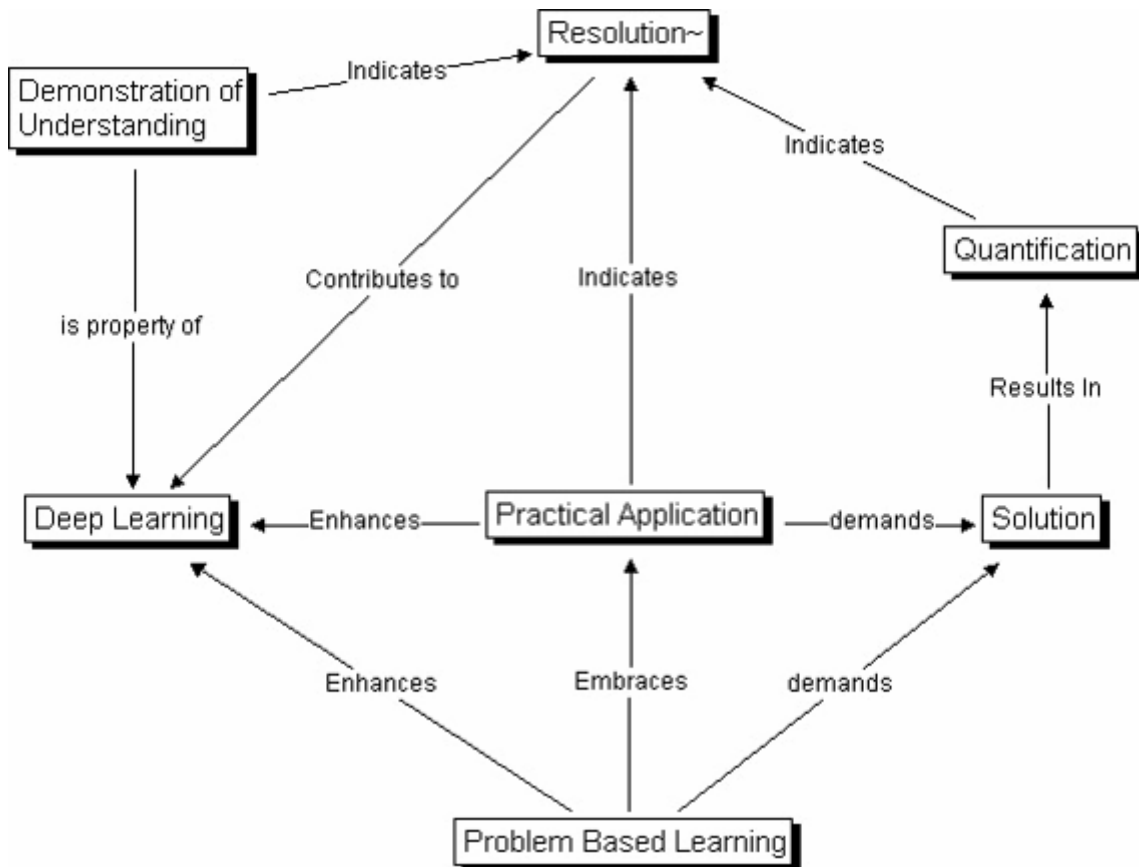
accumulating a body of knowledge, I don't feel as if I am getting a "whole big picture" view...a synthesized view.

I have had the same feeling about taking the programme one course at a time. I feel as if I get a good look at one piece of a puzzle without seeing the overall picture. I may see how this piece connects to other pieces or I may not depending on which courses I have taken. I have a real concern about being able to put all the pieces together into a coherent picture.

It is also possible that for many learners, they interpret the concept of resolution as the successful completion of a course or program. They view resolution at a more macro level and see their learning as being validated by successful completion.

Nevertheless, the majority of participants supported the relationships outlined in Figure 13. Practical application grounds the learner's sense of resolution. When a learner uses the concepts learned to solve a problem rooted in personal experience, this practical application 'demands' a solution. The successful solution results in a quantification of learning in that the learning allowed the learner to solve one real problem, or two or more. This quantification is a solid indicator of resolution for the participants. Problem based learning in general and particularly practical application contribute to deep learning. Finally, a demonstration of understanding as manifested in assignments, whether practical or not, also indicates resolution and supports deep learning.

Figure 13 – Resolution



Instructors' perspectives on cognitive presence.

Three important themes emerged from the faculty focus group. First, not all courses have the Community of Inquiry Model (CIM) as a backdrop against which to design course content, assessment techniques and Computer Mediated Communication. Second, resolution need not occur for valid learning to have taken place. Finally, it may not be appropriate for resolution to be the outcome of a single course, but rather the outcome of a complete program.

With respect to course design, the following quotes are representative of the issue raised by the participants.

So, ok, based on my observations (of the one course I have 'tutored' - designed by XXXXX) - I would have to say, this tends not to be an accurate representation of the learners' learning activities in the course I taught at AU. This being said, the course was not designed with the intent to facilitate a community of inquiry....

I find it difficult to address the questions asked partly because, like XXXXX, I question if the CIM model is reasonable if the course author/designer did not have the 'creation of a community of inquiry' as an explicit goal.

The expectation that a single course will provide resolution is therefore contingent on whether the goal of the course was the progression through various stages to a recognizable manifestation of resolution. The roots of the Practical Inquiry Model reside within a pragmatist philosophy of education. However, courses and programs developed with a liberal, humanistic, critical or radical philosophy would not necessarily demand a resolution stage, yet still see the learner pass through some form of a triggering stage, an exploration stage and an integration stage.

The second theme leads to the consideration that resolution is not necessary for a valid learning experience; that students may still be abundantly present cognitively yet never achieve a concrete resolution type of event.

For example, in the study guide, readings, assignments and conferences, I try to ensure that triggering, exploration, and integration are fostered. Like some of the other people in this conference, I'm less confident that 'resolution' can, should or does occur. Indeed, one might argue that in many cases, resolution would be premature and 'uncertainty' and continuing enquiry should be the outcome.

What we hope to accomplish in [this introductory course] is that they become more analytic and 'critical' with many more new questions about

the activities, goals, processes and needs of the students they will teach. So, for this course, one of the goals is: more questions and less certainty. Hopefully, other learning experiences will facilitate resolutions and/or yet more questions for research.

As these quotes indicate, higher cognitive processes of analysis, reflection and critical thinking are valid outcomes for a course. The development of these cognitive skills as an outcome for a course are viewed as valid. In these cases there is a progression towards a well articulated terminal outcome that does not necessarily involve resolution as defined in the Practical Inquiry Model, but a process of Piagetian equilibration.

The third theme addresses the notion that resolution is best examined on a program level rather than on a course level.

I tend to look at the macro level while attending to micro details. In a well-designed program, each course is a building block. Each assignment gives strength to the brick, but what is learned in each assignment is not limited to the course in which it is given. Hopefully, students come away from a course feeling successful with their attempts to master new concepts and projects. New learning repeats and builds from course to course to develop expertise. Yes, perhaps a way to think about this is that micro level successes build to prepare the student to succeed with the macro level thesis as the resolution.

This would assume that each course is a stand-alone module without interdependence that a program of studies implies. I would hope that phase four is a state that our students achieve by the end of their programs. I don't know that students could handle a well-designed transformative death-rebirth experience every semester. Look closely at the CIM model in the context of transformational education.

Garrison and Anderson (2003) suggest three examples of indicators that would imply resolution; application, testing and defending. A macro or program level thesis or project would satisfy these conditions and would appear to represent a journey through the four stages of the Practical Inquiry Model. The second quote

is more narrow in its application since it refers to a course on transformational learning. Nevertheless, it does illustrate that compartmentalizing the stages of the Practical Inquiry Model on a course basis may be too narrow an application of the model.

The role of the instructor goes far beyond the pre-constructivist role of 'disseminator of information'. The universal support for this notion among these participants highlights the change in role of the instructor in a constructivist learning environment.

The role of the instructor would be that of facilitator, helper, and partner in the learning process. The role of the teacher is to not simply provide information; he/she must create the conditions (e.g., triggering event) within which a community of inquiry can be fostered.

The role of the instructor has moved, by necessity of the distance delivery, to one of a facilitator from one of a provider of information. The instructor becomes the steward of the Community of Inquiry. Further, as the next quote indicates, the instructor can also provide a scaffold which can help the students negotiate their way through the learning process to some level of perceived success. This success need not be resolution.

Resolution, again I prefer to guide the student through scaffolded successes to culminate in a successful thesis.

The participants also identified an interesting role for students. Students are motivated to help each other, also providing scaffolding for the learning student.

On the boards students are eager to share resources and personal "tips of the trade" that pertain to the task at hand.

I often see them playing guiding, facilitating and even didactic roles. I'm especially delighted when they share sources, seek out information for other students and acknowledge other students wholeheartedly. That is, there is often a 'generosity of spirit' expressed and while I'm not sure how to characterize this in CIM terms, I'm confident that it is a substantive and constructive contribution to the learning, not just for the individual receiving the support but also for the 'observers'.

These scaffolding and guiding roles played by both instructors and students would appear to be a key indicator that a Community of Inquiry has in fact developed. Moreover, they resonate with the Vygotskian notion of a Zone of Proximal Development (ZPD). As Wertsch (1985) points out, "...the zone of proximal development is a special case of his [Vygotsky] general concern with the genetic law of cultural development. It is the dynamic region of sensitivity in which the transition from interpsychological to intrapsychological functioning can be made." The appropriateness of application of the ZPD to adult learning situations has been discussed in the literature review.

The importance of this supportive role of instructors resonates with the attitudes of learners to teaching presence discussed earlier in this study.

I am very impressed with the support given by the professor's. Most assignments are returned with an extensive critique, both positive and constructive and usually includes a number of suggestions for future improvement.

Another instructor in a research course participated a lot in the conferences, was very supportive, suggested ideas or ways to improve, and was upbeat.

Summary. The results of this study have shown that deep learning does occur in CMC courses which also make use of constructivist assessment tools. Indications are that this learning can be quite deep, but must be supported by a connection to the life experience of the learner. This is not unexpected since the

professional nature of the MDE program indicates a desire on the part of learners to be able to put their learning to use outside the classroom.

Life experience is also an important facilitator for the learner's journey through the learning process. Though the participants sometimes did not agree with the researcher's terminology, these issues reduce down to a question of using learner defined language for further research.

Finally, both students and instructors agree on the importance of instructor support during the learning process. Nevertheless, learners are more concerned with the more tangible outcomes such as the resolution provided by practical application, while instructors also see validity in learning processes not designed with resolution as a necessary outcome of the learning experience.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

This study began as an extension of research which had been conducted into the behaviour of learners in an online CMC supported learning experience. The intent was to take the insights that have been developed through previous research studies and hypothetical constructs and begin to probe actual participants about their perceptions of the learning process. By creating a forum where learners could reflect on actual practices, of both the learners themselves and the instructors in CMC courses, it was hoped that deeper meanings could be jointly constructed regarding phenomena that had been observed in previous studies. Glaser and Strauss (1967) have stated that,

...one should deliberately cultivate such reflections on personal experiences. Generally we suppress them, or give them the status of mere opinions (for example, opinions about what is true of fraternities, having belonged to one before becoming a sociologist), rather than looking at them as springboards to systematic theorizing (p. 252).

The personal experiences of the participants were collected, in their own words, and analyzed with the objective of developing hypotheses grounded in both the behaviour and the perceptions of the learners. As Maines (1991) has put it, there is:

...a tradition in the social sciences that argues that social research must privilege what people actually do -- their actual behavior -- rather than the purity of abstract theoretical systems. Thus, theory must be grounded in data about social behavior, and patterns of conduct must be discovered before theories can be subjected to verification (p. 5).

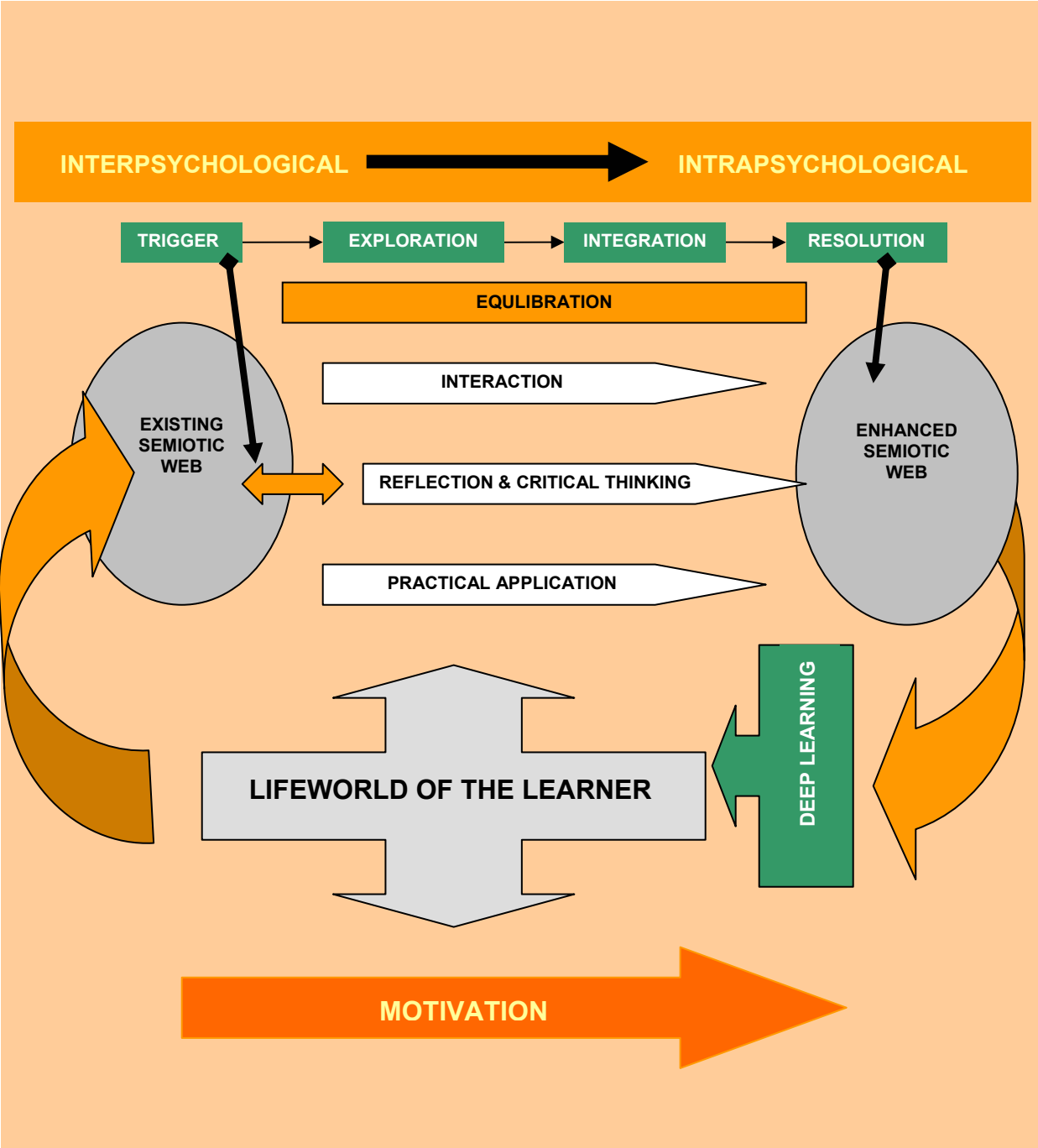
It was hoped that the development of a grounded conceptual model would be a starting point that would lead to a systematic approach to further research.

This was important since my own personal experiences as a participant in online learning had presented me with a variety of approaches to course design and a number of dramatically different learning environments from which I derived a number of insights regarding course design. However, as Glaser and Strauss point out, "An insight, whether borrowed or original, is of no use to the theorist unless he converts it from being simply an anecdote to being an element of theory"(1967, p. 254).

The following illustrates the elements of a conceptual model grounded in the data obtained in this study. Critical to this theory is the role played by what is referred to as the lifeworld of the learner. This lifeworld grounds the explicative nature of the model in the essential role of the lifeworld as the 'organism' that is not only affected by the learning process, but also affects the learning process.

The data supported the notion that learning is deeper when the learning can somehow be related to the work or personal situation of the student. This model postulates that this occurs because the lifeworld grounds or attaches the unfamiliar to the familiar in such a way that the unfamiliar becomes embedded in the familiar. The organism can be viewed as dynamic, changing as meaning progresses through a process of internalization. The lifeworld regulates the progression through the stages of cognitive presence and motivates the student to engage in reflection and critical thinking, leading to deeper learning.

Figure 14 – Lifeworld Theory of Deep Learning in a CMC Environment



Lifeworld of the learner

Agre and Horswill (1997) define lifeworld to mean:

...an environment described in terms of the customary ways of structuring the activities that take place within it -- the conventional uses of tools and materials...The term originally comes from phenomenological sociology, where it refers to the familiar world of everyday life, and specifically to that world as described in the terms that make a difference for a given way of life (p. 3).

Life relevance plays an important role during the learning process. It acts as an important driver of motivation, and it acts as a facilitator of the learning process through its ability to drive learning to a deeper level. This model proposes that this life relevance is embedded in the lifeworld of the adult learner. The learner interprets learning materials based on the affordance the learning presents to the lifeworld of the learner. This affordance, in an adult learning situation, has been shown most often to be associated with the practical application of new learning to the lifeworld of the learner as manifested in their work life, personal life, or both. As such, the new learning loops through the lifeworld of the learner, altering that lifeworld. Deep learning can then be viewed as having taken place if the lifeworld has been altered.

The model makes use of the notion that the lifeworld is constituted of semiotic webs of meaning, some which are closely related and some which are less closely related. These semiotic webs consist of semiotic units, units of meaning, and the relationships between these semiotic units. A particular semiotic web becomes salient when a student begins a course or program of studies. The learning process is triggered by a particular teaching and learning activity . The learner becomes cognitively present at this trigger point and

progresses through the stages of cognitive presence facilitated by the processes of interaction, reflection and critical thinking, and practical application. The trigger point is illustrated as being outside of the semiotic web of the learner. It can be totally exterior to the lifeworld, or come from the lifeworld. Triggers from outside the lifeworld are introduced into the process through teaching and learning activities. Triggers from inside the lifeworld are introduced through the previously discussed notions of curiosity and interest.

Exploration is galvanized by interaction, reflection and critical thinking, and practical application. Interaction within a community of learners includes direct interaction with other learners as well as interaction with the instructor and course materials. This interaction introduces differing perspectives and new input which may not have been considered by the learner. The learner engages in interpsychological processes with the other members of the community of learning. The participants, both learners and instructors, begin to explore differing points of view. This process can be viewed through the Piagetian lens of equilibration. Interaction introduces a situation of disequilibrium, which requires that the learner reflect on and critically examine differing perspectives and contradictory information. As the learner works through this process of exploration, mini-triggers are introduced which lead the learner and the community to deeper exploration and reflection, mirroring the cyclical nature of cognitive presence.

At a point, exploration draws on the practical experiences of the learners. Life examples from the experiences of the learners are used to help explain, to

oneself and to the other learners, concepts that are being shared. At this time, learners may also see practical applications in their lifeworlds. These practical applications motivate the learners to move to the next stage of cognitive presence.

Integration can be viewed as the transition between the time the learner is faced with external points of view and a state of disequilibrium to a phase of actively seeking equilibrium. Only through the re-establishment of equilibrium can the process of internalization continue. The learner is motivated to seek this new state of equilibrium. Practical application can result in a focal point used to direct more interaction and more critical thinking and reflection. But in this phase, the motivation takes on a different quality. The learner is targeted toward the solution to a real world problem that is embedded in the life experience of the learner. The integration process has as its ultimate goal the resolution of this problem, using the shared meanings developed in the exploratory stage as a means to resolution.

When the problem is solved, equilibrium has been reestablished. The solution, being a highly personal solution since it relates to the lifeworld of the learner, is drawn into the semiotic web of the learner, altering the web in a fundamental manner. As this semiotic unit is altered it becomes embedded in an altered lifeworld where it can begin the process of relating its new self to the already established relationships with other semiotic units in the lifeworld of the learner. We can view the depth of this embedding as the depth of learning. Once deeply embedded, the process of internalization is complete.

Internalization

The progression through this process has explicative value with respect to the process of internalization as postulated by Vygotsky. In *Mind and Thought* (Vygotsky, 1978) he called the "...internal reconstruction of an external operation *internalization*" (p. 56). These external operations or activities were examined as "semiotically mediated social processes" (Wertsch, 1985, p. 62). In the previous chapter the results indicated that teaching presence, either in the form of student to student or student to teacher interaction, greatly facilitated the learning process and led to a deeper understanding of the concepts discussed in this social interchange. It is important to note that Vygotsky (Wertsch, 1985) saw the necessity for a semiotic or representational system to mediate between internal and external planes of functioning. Since Vygotsky was focusing on child development, his semiotic system was referred to as speech.

In the literature review, the argument was put forth that it should be accepted and expected that Vygotsky's theories would be extended from the world of child development into the world of adult ontogenesis. Accepting this premise can allow us to expand the notion of speech as a semiotic system to the particular ideas and concepts in a particular knowledge domain. This would mean that ideas and concepts could be viewed as signs, so that we could better understand sign mediated higher mental functions such as cognitive presence and deep learning.

Participants in this research study also felt that much of the learning was due to their interaction with readings, course materials and study guides. If we

accept the premise that these educational artifacts are merely textual, video or audio media for the communication of signs, then we can adopt the next premise that private activity that involves these semiotic artifacts is a 'surrogate' social interaction.

Interaction involving other students and instructors and interaction involving learning artifacts then can be viewed as representing a semiotic system that has the potential to mediate between the external and internal worlds of the learner. At this point it should be noted that, as Wertsch (1985) states, the process of internalization is not merely explained by a simple process of transference. Vygotsky (as cited in Wertsch, 1985) states that 'it goes without saying that internalization transforms the [external] process itself and changes its structure and functions" (p. 63). He goes on to explain that internal mental processes, those psychological functions which are intrapsychological, have been altered in a genetic manner by exposure to culturally mature forms of existing behaviours. If this notion of cultural behaviours is extended to a subculture of a particular domain of knowledge and practice, then the resolution within an adult learning situation requiring higher cognitive processes can be viewed as Vygotsky's progression from an interpsychological process to an intrapsychological process, as presented in Figure 14. The intrapsychological process has generated an evolved semiotic web.

This model evolves Vygotsky's Zone of Proximal Development into an explicative representation of adult learning in an online environment where teacher/student, student/student interaction and student interaction with learning

materials all participate in the process of internalization of shared meaning facilitated by a CMC environment. The premise that semiotic artifacts can be concepts and ideas leads to the notion that cognitive presence can be viewed as the evolution of interpsychological processes to intrapsychological processes. This evolution, based on this research study, can take place in an online environment which uses CMC and constructivist assessment tools.

CMC affords the learners the opportunity to reflect and critically appraise their own ideas and understandings, explore and integrate their ideas. Constructivist assessment tools encourage learners to use these ideas, as well as others evolved from learning transactions with materials made available through various media, to arrive at a stage of resolution. Interaction online, reflection and critical thinking, and practical application move the learner through the stages of exploration and integration to a resolution that is deeper than just putting together the pieces of a knowledge domain puzzle.

Recommendations

The following recommendations are categorized under three major themes; recommendations for research practice, for learning and for teaching behaviours and practices in a Community of Inquiry, and for future research studies.

Research practice. It is recommended that groups be staggered in their start times by at least one week. This will allow for adaptation of the later group questions and discussion based on the experience of the earlier groups. Definition of terms and assumed shared meanings can be verified in the first

group. Interesting threads developed in earlier groups can be explored in the later groups. Groups of two or three individuals or one on one depth interviews would allow for a more dialectic exploration of the issues.

The researcher remained fairly aloof from the discussion, intervening only to post questions and to clarify terms or to paraphrase and ask for agreement, to ensure the moderator was interpreting lengthy discussion threads as close as is possible to the participants' original thinking.

Careful attention should be devoted to the timing for the groups. Holiday periods between December and January should be avoided.

The researcher should develop the necessary skills with the coding program, in this case Atlas.Ti before the research goes into the field. The reporting of results in this study was greatly delayed by insufficient knowledge of the coding instrument.

Preliminary coding should begin as soon as enough data is available. After the first question is completed would be appropriate.

The length of time the discussion board remains open should be a minimum of three weeks.

Application of the model in practice. In practice, this grounded conceptual model calls for course and program design to offer opportunities for subject matter to resonate with the existing lifeworld of the learner. To encourage deep learning in a CMC environment opportunities must be designed to provide high levels of interaction, high levels of reflection and critical thinking, and relevance to the lifeworld of the learner.

Significant opportunities for self-directedness will allow the learner to engage in learning activities that have an application within the lifeworld of the learner. This will enhance motivation, which is a driver of deep learning.

Instructors should be prepared to coach the student through a process of inquiry that may not reflect the expertise of the instructor, but reflects the application of learning to the lifeworld of the learner. Coaching in metacognitive strategies should take on a higher degree of importance in course design.

Resolution can be expanded to include any positive development of the salient semantic web of the learner. This can be characterized as solving a problem, defending a position, engaging in practical application or any activity that employs the newly evolved semantic unit of the learner.

There is also an opportunity for instructors to provide the students with some knowledge of the metacognitive strategies which could be used for deep learning. The results would indicate that this could help deepen the learning of the students.

Future research. Extension of this research beyond the sample of MDE students at Athabasca University is recommended. Participants could be drawn from the two other Master's programs at Athabasca University. Secondly, valuable insights may be gained from students who have completed the MDE program. To adjust for the level of cognitive skills of the participants, it would be interesting to extend the study to undergraduate and college students. It would be appropriate to eventually extend this research to students who are not studying education, and/or are enrolled in undergraduate programs. Also, the

generalizability of results could be achieved as a follow up survey whose design and questions have been informed by this study.

Consideration should be given to further studies taking into account the delayed nature of data collection. Interesting and insightful results may be more forthcoming during a course rather than after. This would enhance the phenomenological nature of the results by avoiding the need for recollection of past events. The data would be from the present, not the past. Techniques such as learning journals, or discussions with the researcher and other participants during the learning process could be used.

The importance of practical application in this study led to the inclusion of the lifeworld of the learner into this model. The exploration of how a lifeworld has changed after completing a course or program could lead to a more precise definition of the resolution stage of cognitive presence. As an indicator of resolution, it may allow researchers to broaden their view of resolution beyond the current indicators.

The model has implications regarding the domain of transformational learning. This is especially so since the notion of internalization is grounded in social processes and this model is grounded in the evolutionary process which embeds a newly transformed intrapsychological process in the learners semiotic web.

Perhaps the most interesting area for further research may be the exploration of semiotics as it relates to higher order ideas and concepts. Can we look at ideas and concepts as signs, or are they too complicated to act as signs?

There are a number of variables that should be examined in order to provide some level of calibration for the theory. To begin with, there are observable phenomena which can be recorded; amount of interaction and instances of practical application. It may be possible to relate levels of motivation with levels of practical application using attitudinal measurements towards levels of motivation in a particular course. The same could be done for the learners attitudes toward how deep their learning was.

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APPENDICES

APPENDIX A – LETTERS OF INVITATION

Student Letter of Invitation

Date: October 31, 2004

Dear MDE student,

I would like to invite you to participate in a research project that I am undertaking for my MDE Thesis. The purpose of the study is to explore the learning process students engage in when taking an online course. In order to develop practices that encourage a worthwhile learning experience in an online environment, it is extremely important that the experiences and perspectives of students such as yourselves be heard and understood by researchers, practitioners and decision makers involved in building online courses.

What I am asking of you is to participate in an online focus group to discuss your online learning experiences. This focus group will be very similar to the conferences you have participated in as part of you MDE experience. I anticipate that about three to five hours of your time will be required over the course of one to two weeks at the end of the course you are currently taking. It is not necessary that you respond every day to the conference, but for a worthwhile discussion I would suggest that at least every second day would be required. If you wish to respond more often that would be perfectly acceptable. You will need access to the internet and an e-mail address.

Participation is voluntary and you may withdraw from the study at any time. If you are interested in participating, please send me an e-mail at professor.len@sympatico.ca expressing your interest by November 14, 2004 and I will send you an Informed Consent Package. In the meantime, you can reach me at 519-972-2727, ext. 4300 if you have any questions. I appreciate the time and effort this will require and I would greatly appreciate your participation.

Sincerely,

Leonard Olszewski
Principal Researcher
professor.len@sympatico.ca

Faculty Letter of Invitation

Date: September 18, 2004

Dear Professor,

I would like to invite you to participate in a research project that I am undertaking for my MDE Thesis. The purpose of the study is to explore the learning process students engage in when taking an online course. In order to develop practices that encourage a worthwhile learning experience in an online environment, it is extremely important that the experiences and perspectives of instructors such as yourselves be heard and understood by researchers, practitioners and decision makers involved in building online courses.

What I am asking of you is to participate in an online focus group to discuss your online teaching experiences and your perceptions of the learning process students go through in an online course. I anticipate that about three to five hours of your time will be required over the course of one to two weeks at the end of the Fall 2004 Semester. You will need access to the internet and an e-mail address.

If you are interested in participating, please send me an e-mail to professor.len@sympatico.ca expressing your interest by October 08, 2004. I have also attached an Informed Consent Package which will provide you with the details of the study. In the meantime, you can reach me at 519-972-2727, ext. 4300 if you have any questions. I appreciate the time and effort this will require and I would greatly appreciate your participation.

Sincerely,

Leonard Olszewski
Principal Researcher
MDE Student
Athabasca University

APPENDIX B – INFORMED CONSENT PACKAGE

1. Title of Thesis: Cognitive presence in collaborative web-based learning environments: Student and instructor perspectives.

2. Contact Information: Principal researcher: Leonard Olszewski
Tel: 519-972-2727, ext. 4300
E-mail: professor.len@sympatico.ca

Thesis Supervisor: Dr. Terry Anderson
Tel: 780-497-3421
E-mail: terrya@athabascau.ca

3. Responsibilities and time commitment of participants:

It is anticipated that approximately three to five hours of your time will be required over the course of one to two weeks at the end of the Fall 2004 semester. It is not necessary that you respond every day to the conference, but for a worthwhile discussion I would suggest that at least every second day would be required. If you wish to respond more often that would be perfectly acceptable. You will need access to the internet and an e-mail address.

4. Purpose of the research:

In the past five years, a significant amount of research has focused on the analysis of text as a methodology for understanding the impact of collaboration on the construction of knowledge, the making of meaning and the depth of learning in online courses using Computer Mediated Communication (CMC) as a core component of the instructional design. These studies have examined artifacts, transcripts of conferences, and have undertaken taxonomic and pattern analyses in order to infer whether deep learning has taken place. The purpose of this qualitative study is to extend this research by examining the perspectives developed by students and instructors through their lived experiences in an online environment designed to encourage deep learning.

5. Data collection methods:

Research design: Qualitative.

Research methods: Online, asynchronous focus groups.

Sample: A convenience sample of approximately twenty five students from three to five courses from the MDE program at Athabasca University will be selected. A convenience sample of three to five instructors in the MDE program at Athabasca University will be selected. Students and

instructors will be in separate groups. Instructors will not have access to student discussions and vice versa.

Data collection: Three student focus groups will be conducted. One instructor group will be conducted. The groups will be conducted using an asynchronous discussion board with the researcher facilitating the groups. Text transcripts will be electronically saved.

6. Risks and benefits: The risks associated with participating in this research study are negligible and are certainly no greater than those encountered in regular course based conferencing. The benefits are your contribution to a better understanding of how students engage in a learning process in an online collaborative environment. This will help inform the design of online courses and the role of instructors and students in this environment and inform the practices of both.
7. Privacy: Data in the form of focus group transcripts and any other information about participants will be electronically saved on the researcher's computer. Two backup copies will be committed to removable data storage devices. One data storage device will be kept in the researcher's office under lock. The second data storage device will be kept in a safety deposit box. One hard copy of transcripts will be printed and stored under lock at the researcher's office. These will be saved for three years and then destroyed.

All information will be held confidential, except when legislation or a professional code of conduct requires it to be reported.

8. Availability of results: A final copy of the thesis will be made available through the Athabasca University Library. The whole or parts of the thesis may be published and/or made available on the WWW.

Consent

I have read and understood the information in this package, and I agree to participate in the study, on the understanding that I may refuse to answer certain questions, and I may withdraw at any time.

Signature:

Date:

Name (Please Print): _____

Please mail this signed consent form in the self addressed stamped envelope provided.