UNIVERSITY OF SOUTHERN QUEENSLAND

Exploring teaching and cognitive presence in blended learning: promoting pre-service teachers' critical thinking

A Dissertation submitted by

Petrea Redmond

Dip. Teach, B.Bus, M.Ed

For the award of

Doctor of Philosophy

2011

Abstract

Despite extensive expenditure by universities on technology tools, the impact on teaching practice and students' critical thinking remains disappointing to many. Current research which investigates the impact of teaching presence on cognitive presence in undergraduate blended learning is scarce.

This study investigated teaching and cognitive presence in blended undergraduate teacher education courses. Garrison, Anderson, and Archer's (2000) Community of Inquiry (CoI) framework has been used as a conceptual framework and as a lens to investigate critical thinking. A multi-case study was used to identify the impact of teaching presence on cognitive presence and the promotion of critical thinking. The mixed methods of data collection and data analysis used surveys, content analysis, interviews, and document analysis to detect elements of teaching and cognitive presence and gain insights from participants' perspectives.

The findings of this study suggest that indicators of cognitive and teaching presence are found in a variety of spaces within a blended course. The majority of teacher online discussion contributions were those of direct instruction, even for instructors who considered themselves constructivist educators. In the online discussion section of the blended courses the majority of student contributions were at the exploration level of cognitive presence, except when teaching presence explicitly promoted higher levels through an assessment mandate to post at the higher levels of integration and resolution. This study has recommended a modification to the cognitive presence construct to add reflection as an indicator for the resolution phase of cognitive presence.

Certification of Dissertation

I certify that the ideas, experimental work, results, analyses, software and conclusions reported in this dissertation are entirely my own effort, except where otherwise acknowledged. I also certify that the work is original and has not been previously submitted for any other award, except where otherwise acknowledged.

_____ _____

Signature of Candidate Date

ENDORSEMENT

_____ _____

Associate Professor Peter Albion Date

_____ _____

Professor Glen Postle Date

Acknowledgements

This dissertation is a result of compromise, patience, support, and encouragement of a number of individuals. I would like to thank Dr Peter Albion for his continual encouragement and ongoing guidance, insights, and mentorship. Dr Glen Postle, thank you for your thoughts and views of my dissertation.

I am grateful for the support of my colleagues. Particularly to Alison, Lesley, Chris, Alice, and Steve who endured my complaints, came with me for writing retreats, discussed conceptual frameworks, and shared the frustration of Endnote and SPSS while on their own research journey.

Thank you to those pre-service teachers and teacher educators who enthusiastically participated in my case studies. I hope that my representation of your work, thoughts, and dialogue honour the stories of those who participated.

As a wife, mother, academic, and beginning researcher this journey has been a long and arduous one, especially for my family. To my family – Mark, Elyssa, Alexander, and Ruth - and friends: thank you for your patience. I could not have completed this without your love and support.

Table of Contents

List of Figures

List of Tables

CHAPTER 1: INTRODUCTION

Overview

Since the popularisation of the World Wide Web for use in education during the 1990's, universities have struggled to find the most effective way to harness its possibilities to improve teaching and learning. Many universities now have courses in a blended mode to meld the advantages of both face-to-face and online learning environments. How best to blend, and the effectiveness of each element in the blend to create improved critical thinking and depth of knowledge, have not yet been fully explored. Initial research comparing the effectiveness of online learning and face-to-face learning indicated that there is no significant difference in the learning outcomes of students (Twigg, 2004). All learners, irrespective of learning environment—face-to-face, online or blended—have the opportunity to achieve the same cognitive outcomes.

Blended learning enables educators to create learning opportunities where both face-to-face and online paradigms are part of the learning process. This research aims to investigate the impact of teaching presence and cognitive presence in blended learning experiences, to achieve quality learning outcomes which promote critical thinking; while students are connecting, constructing, and applying knowledge.

Over the past decade, Garrison, Anderson, and Archer's (2000) Community of Inquiry (CoI) framework has been used to investigate critical thinking in online learning. Various studies have examined the levels of cognitive presence in online discussions using the CoI model and other frameworks (Duncan & Barnett, 2010; Fahy, 2002; Garrison, Anderson, & Archer, 2001; Garrison, Cleveland-Innes, & Fung, 2010; Kanuka, Rourke, & Laflamme, 2007; Schrire, 2004). Evidence indicates that students rarely reach the higher levels of cognitive presence (Garrison et al., 2001; Meyer, 2003, 2004; Redmond & Mander, 2006; Schrire, 2004; Stein et al., 2007). Several of these studies have indicated that teaching presence (what the teacher does) may have a significant impact on cognitive presence (level of student thinking and understanding) but it has yet to be empirically demonstrated (Garrison, Cleveland-Innes, et al., 2010).

Despite an increased number of research studies in this area, most utilised the CoI framework in a higher education context in post-graduate courses. How teaching presence effects cognitive presence in undergraduate blended courses remains an open study.

The shortage of research on the impact of teaching presence on students' cognitive outcomes within undergraduate blended environments is problematic because it is the type of evidence that course designers require if they are to support critical thinking and deep knowledge construction. Most research is limited to one element within the CoI framework and only one source of evidence, for example, content analysis of online discussions or a student survey.

The findings from this study will contribute to research on how teaching presence influences cognitive presence particularly in a blended environment at the undergraduate level. This study explored the direct effect of course design, instruction and facilitation on the quality of online discussion and other elements of a blended course. It used multiple data sources including online discussions, survey, interviews and course documentation.

The purpose of this initial chapter is to describe the contextual background and the focus of the study; to briefly discuss the major constructs in the research; to explain the purpose and significance of the research; and finally, to outline the structure of the thesis and define key terminology.

Theoretical Perspectives

Today's universities are under pressure to look for potential cost savings while providing improved learning outcomes to an increasingly diverse student population, some of whom demand engaging, flexible and digital learning opportunities. Digital enhanced learning has been described using different terminology in different parts of the world. In a North American context often the terms technology, instructional technology or educational technology are used, whereas in England and Australia the expression 'information communication technology' (ICT) regularly replaces the term technology. Within this dissertation the term ICT will normally be used except within direct quotes.

Many universities create blended learning experiences (supporting face-to-face classes with online information and discussion) rather than purely face-to-face courses; which increases the flexibility of, and access to, learning. Teaching within these contexts, academics can no longer rely solely on their academic knowledge (Laurillard, 2002). They are under pressure to examine and develop an understanding of "what it means to teach and learn in increasingly networked, technology-rich, digital classrooms" (Clifford, Friesen, & Lock, 2004, p. 19). The shift to blending face-to-face and online learning requires the development of new strategic plans, goals, objectives, and methods.

This study investigated how teaching presence supports critical thinking in a blended learning environment. The CoI framework, blended learning, and critical thinking are the key concepts used in this study. They are briefly described below and an expanded discussion on these concepts is provided in Chapter 2.

Community of Inquiry

The CoI framework is based on the principle that exploratory, organised, critical, and rich thinking comes from participating within a community of learners (Garrison & Anderson, 2003; Lipman, 2003). Within a community of inquiry, 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 inference from what has been said, and seek to identify one another's assumptions"(Lipman, 2003, p. 20). Garrison and Anderson (2003) suggest that a

community of inquiry is made up of learners and educators "transacting with the specific purposes of facilitating, constructing, and validating understanding, and of developing capabilities that will lead to further learning" (p. 23).

The CoI framework consists of three key elements: cognitive presence, social presence, and teaching presence (see Figure 1). Garrison, Anderson, and Archer (2000) consider that these three elements are essential to effective educational experiences, where learning occurs in a community through the interaction among all three elements.

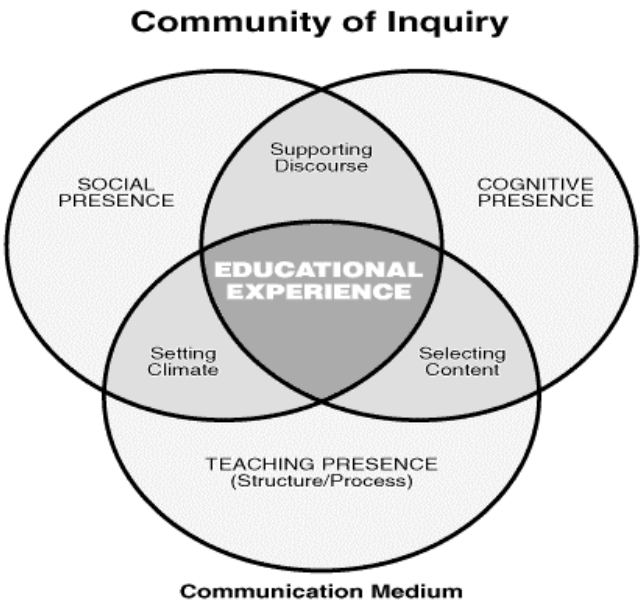

Figure 1.1. Community of Inquiry (Garrison & Anderson, 2003, p. 28)

Social presence encompasses the ability of the participants to come together for a common purpose – in this case learning. Garrison, Anderson, and Archer (2010) suggest social presence occurs when the participants are "identifying with the community, communicating purposefully in a trusting environment, and developing interpersonal relationships" (p. 7).

The second element of the CoI framework is teaching presence, which shapes the learning experiences. It includes "the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (Anderson, Rourke, Garrison, & Archer, 2001, p. 5).

Cognitive presence represents "the analysis, construction, and confirmation of meaning and understanding within a community of learners through sustained discourse and reflection" (Garrison & Anderson, 2003, p. 55). There is a direct link between the process and outcome of critical thinking and cognitive presence.

Cognitive presence is described in more depth in the Practical Inquiry model which was developed by Garrison et al. (2000) to guide design and implementation of learning experiences. The Practical Inquiry model has four phases: triggering, exploration, integration, and resolution. Triggering events are those tasks, stimuli or

questions which encourage inquiry. It is where learners recognise a problem or have a sense of puzzlement. The exploration phase is characterised by searching for and sharing literature, ideas, or experiences that relate to the initial dilemma. The third phase of integration is where participants connect ideas from multiple sources and create possible solutions. Resolution is the last phase, where a final solution is refined, applied, or critically assessed. At this stage, other questions frequently form to begin the inquiry cycle again. In this research these four phases are used to investigate the cognitive presence of the student participations.

Blended Learning and Teaching

Blended learning is a relatively new field and educators are still exploring what constitutes effective practice within higher education. Mantyla (2001) described blended learning as "taking two or more presentation and distribution methods and combining them to enhance the learning content and experience for the learner" (p. 3). This is a very broad definition and, because there is no single way to design and deliver blended learning, there is a multiplicity of ways it is enacted in practice and described conceptually within the literature.

The blending of multiple resources, delivery media, and teaching methods to promote learning has occurred in higher education throughout the 20th century, for example, using video in face-to-face classes or including a telephone tutorial to an external course. Blended learning is not a new concept, but the infusion of web-based technologies into face-to-face learning to create blended learning (Australian National Training Authority, 2003) is relatively new and requires educators to consider the best way to utilise the benefits of both face-to-face and online learning. Within this intersection, dynamic as well as very different and transformative learning opportunities are created (Garrison & Kanuka, 2004). Within this study, blended learning is referred to as being the intentional selection and organisation of online and face-to-face elements within a blended course.

Research is required to investigate how educators working in blended courses might take advantage of the technology tools and infrastructure to develop educational experiences which promote connection, communication, collaboration, and critical thinking in addition to a deeper understanding of key concepts. Oliver and McLoughlin (1999) suggest that the focus should be on the expansion and sharing of advice which follows constructivist pedagogical approaches rather than on the technology tools. However, McLoughlin and Luca (2000) comment that "few empirical studies have made recommendations about pedagogy to practitioners in higher education" (¶ 4). Bonk and Dennen (2003) argue that educators require a number of supports (e.g., technical support, tools, pedagogical advice) to assist them "to foster greater student critical and creative thinking in their web-based teaching efforts" (p. 332).

Critical Thinking

Critical thinking is a preferred process involved during and as a result of quality educational experiences. Garrison, Anderson and Archer (2010) claimed that critical thinking is "the ultimate goal of higher education" (p. 6). This aligns with Newmann and Wehlage (1993) who advise that the role of education is to engage "students in

using their minds well" (p. 8). They go on to say that this might include exhibiting higher-order thinking skills, developing a depth of knowledge, and engaging in substantive conversation.

Within the inquiry process, the ability to think critically is vital to a positive outcome (Facione, 1990; Lipman, 2003). "[C]ritical thinking is thinking that has a purpose" (Facione, 2010, p. 4), and it requires specific skills and dispositions. Analysis, interpretation, inference, and self-regulation are examples of some skills required; (Bruning, Schraw, Norby, & Ronning, 2004) but these skills need to be supported by dispositions such as inquisitiveness, open-mindedness, and persistence (McPeck, 1981). The outcome of this research study is intended to add to the body of literature in the areas of blended learning, critical thinking, and the CoI framework.

Research Problem

Although many undergraduate courses blend both face-to-face and online environments to assist students to access information and to dialogue with peers and others to assist with the construction of meaning, anecdotal evidence gained through the researchers personal experience and discussions with colleagues, and statistical information gathered from the Learning Management System, suggest that undergraduate students tend to under-utilise the online components of their blended courses.

With the increasing use of blended learning in higher education, it is important that educators have an understanding of how they might support and facilitate cognitive presence within this learning environment. Garrison and Cleveland-Innes (2005) suggest that the role of teaching presence is significant in the development of critical thinking and knowledge construction through dialogue.

The purpose of this study was to map the influence of teaching presence in developing cognitive presence and the selection of appropriate educational experiences when blending the face-to-face and the online learning. It also explored the positioning of reflection within the cognitive presence framework. This research study investigated how instructors of blended courses might enhance online postings and the development of reflection and higher-order thinking. It also explored the relationships between teaching presence and cognitive presence both online and face-to-face through the lens of the CoI framework.

While Garrison, Anderson, and Archer presented the CoI framework in 2000, the framework was not yet fully developed. Since then, many others have attempted to define and measure cognitive presence and teaching presence (For example, Akyol & Garrison, 2008, 2011b; Archibald, 2010; Bangert, 2008; Duncan & Barnett, 2010; Shea, Li, & Pickett, 2006). To this point, the CoI framework has been used to analyse online post-graduate learning, with the exception of Vaughan (2004) who has used the framework to investigate blended learning and faculty learning communities. The majority of the studies focus on online discussion to illuminate the four phases of cognitive presence or practical inquiry. These studies have been based on the assumption that all phases of cognitive presence will be borne out in online

discussion. Previous studies differ from this study in that multiple sources of evidence will be obtained (beyond online discussion) to expose the levels of thinking across all four phases.

The participants in this study were volunteer students from three undergraduate blended courses within the Faculty of Education at the University of Southern Queensland (USQ). One tutorial group from each course was selected to explore as a case.

This research aimed to provide evidence that within an undergraduate blended learning environment, effective teaching presence gives rise to enhanced student cognitive presence. It investigated what role the teacher might have in ensuring that positive learning outcomes of the undergraduate program are achieved in a blended program.

Research Questions

A number of questions are addressed in this research.

Key research question:

In what ways can teaching presence enhance the development of cognitive presence in a blended undergraduate teacher education course?

Subsidiary questions:

1. What is the nature of student cognitive presence in the online discussion element of a blended course?
2. What is the nature of teaching presence in a blended course?
3. What aspects of teaching presence promote cognitive presence?
4. How can teaching presence in the online component of undergraduate blended courses be modified to enhance cognitive presence and the development of critical thinking?
5. How might reflection be positioned within cognitive presence?

By investigating the subsidiary questions, the key themes evolved and enabled the key research question to be answered. These questions were influenced by both personal observation and the literature about online discussion. It is currently not understood how undergraduate learners in their online component of blended learning environments perceive the value of online and face-to-face components within a blended learning course, nor how teaching presence impacts on students' cognitive presence.

Research Goals

The intent of this research was to focus on the impact of technologies on undergraduate learning and teaching. The research explored issues of pedagogy in an attempt to understand and apply the knowledge to address an authentic problem in the discipline of teacher education. Bass and Eynon (2009) recommend that educators should be "engaging in the scholarship of teaching and learning – using the tools of scholarship to study their own classrooms – to deepen their

understanding of the learning process and its relationship to teacher practice"(¶ 6). This research was exploratory in nature, because there is a lack of research in the area of undergraduate blended learning within a CoI framework.

The purpose of this concurrent mixed method study was to explore relationships between teaching presence and cognitive presence in undergraduate blended learning courses within a teacher education program. Within a multi-case study and using the lens of the CoI framework, the focus was on examining the course design, instruction, and facilitation, and the resulting quality of student cognitive presence. Interviews with instructors, course documentation, and archived online discussions from both staff and students were examined for links between teaching presence and cognitive presence. At the same time, staff and students completed a survey to indicate how effective the online environment and the face-to-face environment were with respect to a number of activities, for example, stimulating curiosity, identifying key issues, and application of ideas. The reason for combining both qualitative and quantitative data is to better understand this research problem by converging both numeric trends and detailed views.

This thesis describes models of effective practice and examples of how instructors might take advantage of the ICT tools and infrastructure to develop educational experiences which promote communication, collaboration and critical thinking in addition to a deeper understanding of the concepts which form the basis of the learners' educational experiences.

Successful blended learning environments require students and instructors to be involved in quality interactions resulting from critical thinking and reflection. This requires teachers to re-think how they design and deliver their courses. One of the most challenging parts of the re-design is deciding which elements should continue to remain in the face-to-face mode and which elements should more effectively be dealt with online. Hence the need exists to conduct research into undergraduate blended learning environments, to determine effective teaching practices and provide examples or guidance for educators.

Working within a blended learning environment and under a teacher registration mandate to ensure teaching graduates possess and are able to teach the skills of higher order thinking, teacher educators need to consider how to maximise the benefits of both the face-to-face and the online components of blended courses to facilitate cognitive presence that supports reflective and critical thinking.

This research was situated within undergraduate blended courses at an Australian regional university. In particular, the research investigated the role of online dialogue within blended courses to extend interaction and reflection. These concepts will be viewed through the lens of the CoI framework (Garrison et al., 2000).

Research Design

The research was conducted under the naturalistic paradigm (Lincoln & Guba, 1985; Stake, 1995) using the real world as the research setting, without any control or manipulation. A mixed methodology (Tashakkori & Creswell, 2007) was used to explore the research problem and examine the relationships. The research was conducted using a multiple case study (Yin, 2009) involving three undergraduate blended courses.

Case study provides a holistic blueprint for the research and parallels the changing trend of educational research which has "shifted from a focus on effective behaviours toward the hermeneutic purpose of understanding how teachers make sense of teaching and learning" (V. Richardson, 1994, p. 5). The use of case study enables an in-depth focus on the processes (Burns, 2000) involved in teaching and learning.

In addition, with a move towards researching process "there has been a strong movement toward teacher research that gives voice to practitioners, allows them to communicate their wealth of knowledge to other practitioners, and helps them improve their practice" (V. Richardson, 1994, p. 5). Reflective practitioners also consider the voice of their students (Jay & Johnson, 2002). The data for this study were collected through a number of instruments from which both the teacher and the student voice are drawn. Both qualitative and quantitative methods have been employed to collect data. Yin (2009) stated that within case study "various methods are not mutually exclusive" (p. 13). The sources of evidence include student survey, teacher survey, archived online discussion transcripts, and course documentation. These items are explored more fully in Chapter 3.

Details of sampling frame and size are provided in Chapter 3. Data reduction occurred via statistics and thematic analysis. Data are displayed pictorially in tables, graphs and maps. Qualitative data has been transformed into narrative and quantitative data was converted into codes. Correlation tests of quantitative and qualitative data have been completed. Data have been consolidated or recombined to create new data sets and data comparison will occur in the cross case analysis.

This case study is an explorative inquiry which is conducted within the localised boundary of three blended courses within the Faculty of Education at USQ, during Semester 2 of 2007. The only elements under control of the researcher were the courses and tutorial groups within those courses selected as case studies. No other variables could be controlled.

Significance of Study

The outcomes from this research study for higher education will complement current research using the theoretical framework of the CoI. It will add to the scholarly research and literature in the field, because the framework has not previously been used in an undergraduate blended learning environment. Further nuances were uncovered due to the use of multiple data sources and the fact that the research is set in an Australian regional university rather than a North American university, where most of the previous research has been. A further contribution to

the field is the expansion of the cognitive presence indicators to explicitly include reflection as an indicator at the top level of the framework. Conclusions drawn from this study should provide direction for future research.

This study will help to improve practice by telling the stories of how others engage their students in critical thinking, both in online discussions and other elements of their course. The outcomes of this research will be in the form of implications for instructional design rather than intervention, and it will conceptualise key factors in the design and development of undergraduate blended courses.

This study contributes to the field by identifying the relationship between teaching and cognitive presence in an undergraduate blended learning environment. It also provides Faculty teaching in blended learning environments with examples of how they might take advantage of the technology tools and infrastructure to develop educational experiences which promote communication, collaboration and develop reflective and critical thinking in addition to a deeper understanding of the concepts which form the basis of the learners' educational experiences.

Benefits to the wider community exist because blended learning environments have rapidly emerged in various sectors of society. Educational institutions, businesses and community organisations which opt to use blended learning will need to re-examine their current educational and training practices. This study examines some of the issues or themes that need to be considered for the design and development of blended courses to promote deep cognitive learning.

This research will make contributions to the professional discourse at the local level, within the Education Faculty, and between faculties at USQ, in addition to the broader higher education community of teacher educators.

Structure of Thesis

This thesis is presented in six chapters. Chapter 1 has introduced the background to the study and the research problem. It has also provided a brief overview of the methodology and the organisation of the thesis. Finally, key terms were defined.

The literature review presented in Chapter 2 builds the necessary theoretical foundation and examines the areas of blended learning, critical thinking, and the CoI framework. In addition, it provides details of the theoretical framework which will guide the design of the methodology and inform the findings of the study.

In Chapter 3, the methodology and research design of the study are described. A multi-case study design using a mixed methodology approach was utilised. The data collection devices and processes used to address the identified research issues will be presented.

Chapter 4 presents the results and findings derived from the analysis of the data collected from each of the three cases. Building on this initial information, a case by case analysis and cross-case analysis is provided.

Chapter 5 provides a discussion of findings and comparisons to prior research examined in the literature review.

The final chapter, Chapter 6 relates the findings to the initial research questions; and it discusses the future implications and the limitations of the study.

Definitions

Blended learning: "learning which combines online and face-to-face approaches" (Australian National Training Authority, 2003, p. 5)

Cognitive presence: "the analysis, construction, and confirmation of meaning and understanding within a community of learners through sustained discourse and reflection" (Garrison & Anderson, 2003, p. 55)

Community of Inquiry (CoI): "is composed of teachers and students transacting with the specific purposes of facilitating, constructing, and validating understanding, and of developing capabilities that will lead to further learning" (Garrison & Anderson, 2003, p. 23)

Critical thinking: "purposeful, self-regulatory judgement which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential conceptual, methodological, criteriological, or contextual considerations upon which that judgement is based" (Facione, 1990, p. 2)

Information communication technology (ICT): "a diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information" (Blurton, 1999, p. 1). Other researchers may use the word technology to represent the same concept.

Mixed methods research: "the combination of at least one qualitative and at least one quantitative component in a single research project" (Bergman, 2008, p. 1)

Naturalistic generalisations: "conclusions arrived at through personal engagement in life's affairs or by vicarious experience" (Stake, 1995, p. 85)

Online teaching and learning: "teaching and learning that takes place over a computer network of some kind and in which interaction between people is an important form of support for the learning process" (Goodyear, Salmon, Spector, Steeples, & Tickner, 2001, p. 68)

Practical Inquiry: reflects the critical thinking process and the means to create cognitive presence" (Garrison et al., 2001, p. 11)

Prac: professional experience or field placement, when pre-service teachers are placed in schools to practice teaching in a classroom.

Reflection: "Active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends" (Dewey, 1933, p. 9)

Research method: "the forms of data collection, analysis, and interpretation that researchers propose for their studies" (Creswell, 2009, p. 233). Examples of tools used for data collection within this research include survey, content analysis, and interviews.

Research methodology: "the overall approach to research" (Mackenzie & Knipe, 2006, ¶ 16). In this research it refers to mixed methodology as the research design.

Research paradigm: "the philosophical intent or underlying theoretical framework and motivation of the researcher with regard to the research" (Mackenzie & Knipe, 2006, ¶ 25) or a "set of beliefs, values and assumptions" (R. B. Johnson & Onwuegbuzie, 2004, p. 24). In this research it refers to the constructivist and naturalistic approach.

Social presence: the "ability of participants in a community of inquiry to project themselves socially and emotionally as 'real' people (i.e., their full personality) through the medium of communication being used" (Garrison et al., 2000)

Teaching presence: "the design, facilitation and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (Anderson et al., 2001, p. 5).

Abbreviations

The following is a list of abbreviations which appear within this thesis. They are used in full (in the first instance).

ICT Information and Communication Technology

CoI Community of Inquiry

USQ University of Southern Queensland

Chapter Summary

This initial chapter has laid the foundations for the thesis. It provided some contextual background information. Then the research problem was outlined and the research questions were introduced. The methodology, significance and structure of the thesis were briefly described and key terms were defined. The subsequent chapters provide a detailed report of the research study. Chapter Two will review relevant literature and present the theoretical framework that underpins this thesis.

.

CHAPTER 2: LITERATURE REVIEW

Overview

In the previous chapter, the research problem, context, and background of the study were introduced. Chapter 2 will present a review of the literature in a number of areas related to the research problem: in particular, the emergence of blended learning; changes in teaching and learning in higher education; the importance of dialogue and critical thinking; the establishment of a community of inquiry to improve learning outcomes; and relationships among the three elements within a community of inquiry.

In light of the changing demographics and characteristics of today's undergraduate higher education students, and the significant financial investment universities have made in ICT, research is required to investigate how educators working with blended courses might take advantage of the ICT tools and infrastructure to develop educational experiences which promote connection, communication, and critical thinking. This research is exploratory in nature and the following literature review will orientate the reader to the main ideas and unearth the research issues that will be the focus of data collection and analysis described in chapters 3 and 4.

Blended Learning and Teaching

Present day higher education student cohorts could be considered to be more diverse than in the past particularly in western nations such as Australia, Canada, and the United States of America. The recent shift in universities to include a focus on mass education, internationalisation and vocationalism (Nixon, 1996; Star & Hammer, 2008) has attracted students who traditionally were not part of the elite student body. While studying, many of our students have competing demands on their time such as family and work commitments. The changing needs and demographics of higher education students require universities to provide more flexible access to learning opportunities, often through the use of ICT.

In addition, the 21st century student has been exposed to and has used an extensive variety of technologies in their leisure, work, and previous education. With this exposure comes a realisation and expectation that learning can occur "Any Time, Any Place, Any Path, Any Pace" (National Association of State Boards of Education Study Group, 2001, p. 1). The introduction of mobile and 'smart' technologies like iPhones has resulted in a wider scope of synchronous and asynchronous interactive possibilities. Students expect to access learning opportunities through multiple pathways, one of which is through the ICT; and higher educational institutions rely on ICT to deliver quality teaching.

Internationally within higher education, there is widespread use of ICT to support and enhance all types of learning, for example, the use of synchronous audio chat sessions and learning management systems to present information and provide opportunities for asynchronous online discussions. Universities are now looking for evidence of value from their investment in ICT within a competitive education

market. Fundamental issues for higher education are continuous improvement, increased access to teaching and learning opportunities, and decreased financial investment to gain improved learning outcomes.

Learners of the net generation use technologies to support their conversations, interactions, participation, and thinking in a different manner from their preceding peers. Downes (2005, 2006) refers to these new ways of learning as *e-learning 2.0*. This type of learning uses virtual games, simulations, learning management systems, or Web 2.0 tools to learn through sharing, participation, and conversation. Unlike previous distance education models, which promoted independence of time, space, and location, current blended and online learning environments provide the capacity for both independent and interactive learning to achieve both discipline-specific and generic outcomes such as higher-order thinking skills. Garrison and Kanuka (2004) point out that when online, "learners can be independent of space and time—yet together" (p. 97).

ICT can sustain opportunities for teaching and learning at both the independent and the collaborative levels. When face-to-face teaching is integrated with an online experience, it might be considered a blended approach. This blending of the two modes can bring about a rich learning environment where interaction is not limited by location, time, or space online; yet it also provides the opportunities for dynamic and quick face-to-face exchanges.

It has been suggested by Prendergast (2004) that ICTs can enhance teaching and learning by exploiting the "need for socialisation to aid learning through blending face-to-face experiences with synchronous online tools, asynchronous online methods …… in an appropriate mix" (p. 2). In an attempt to create environments suitable for adult learners in the 21st century this study seeks to align quality teaching and learning features in both face-to-face and online environments with students' perceptions of effective learning and teaching. The resulting blend of learning environments should aid in the promotion of active participation in learning communities as part of learners' lifelong and lifewide professional practices.

There are a number of ways we can blend elements of teaching and learning. These include the blending of: resources and media to provide a range of different learning materials; pedagogical practices to cater for individual and collaborative approaches, different learning preferences, structured and unstructured learning; and learning environments, to provide increased flexibility of access over fully face-to-face learning.

Blended learning has been defined by Elliot Masie (2002) as "the use of two or more distinct methods of training" (p. 59). It may also be referred to as flexible, mixed mode, or hybrid delivery. After reviewing the literature, Graham, Allen, and Ure (2003) distilled the many definitions of blended learning down to having three common themes: combining instructional modalities or media; combining instructional methods; and combining online and face-to-face instruction. From this Graham (2005) developed the following definition: "Blended learning systems combine face-to-face instruction with computer-mediated instruction" (p. 5) .

The Oxford Dictionary (2005) defines blend as “to combine to form a harmonious whole”. This harmonious combination demands that blended learning is not simply layering the online environment on top of face-to-face learning, but capitalising on the advantages of both environments and creating learning opportunities where both modes are an essential part of the learning process. Blended learning is not a new concept, however the infusion of ICTs, and web-based technologies in particular, into face-to-face learning is a relatively new concept. It is this convergence of asynchronous online and face-to-face that Graham Spanier, president of Pennsylvania State University, calls "the single-greatest unrecognized trend in higher education today," (Young, 2002, March 22, p. A33). This type of learning requires teachers to consider the best way to utilise the benefits of both the face-to-face and online learning environments. It is at this intersection that we find a dynamic and very different and transformative learning environment which provides flexibility in time and space.

Contemporary learning and teaching environments might be thought to sit on a continuum with traditional fully face-to-face learning and teaching on one end and fully online learning and teaching on the other end; a wide range of examples of how ICTs (including the internet) can and have been used to support learning and teaching occur in the spaces along the continuum. Depending on your definition of blended learning all spaces between the two ends might be considered blended. The diversity of “blendedness” falls along the continuum shown below in Figure 2.1.

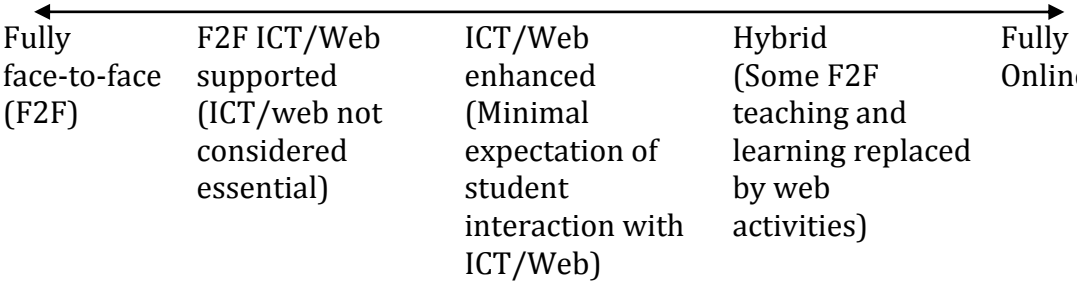

Figure 2.1. Learning and teaching continuum with ICT/Web

In a report which studied the growth of online education in the United States, blended learning was identified as a course with 30% to 80% of the content being delivered online (Allen & Seaman, 2010). Osguthorpe and Graham’s (2003) research suggests that “no two courses will be exactly the same” (p. 228). They indicated there is a variety of 'blends' for different purposes and argue that we should select the best elements from each of the modes, depending on the purpose. There is no one way to design and deliver blended learning; hence the multiplicity of ways that it is enacted in practice and described conceptually within the literature. Effective teaching for successful blended learning, like all learning, is context dependent. Stacey and Gerbic (2007) indicate that each blended situation provides a variation in “pedagogy, learning environment and technology” (p. 3).

Irrespective of how the blend is enacted, “the aim of those using blended learning approaches is to find a harmonious balance between online access to knowledge and face-to-face human interaction” (Osguthorpe & Graham, 2003, p. 228). There

must also be consideration as to the online human interaction, as this is where the learning 'lives' in the online space. When creating the blend, it is also important to achieve a balance between structure and flexibility.

Within this research study, a blended course is to be understood as one where the course instructor has intentionally selected and organised the online and face-to-face elements within the course, giving consideration as to what types of learning activities are most effective in each environment. The blending of multiple

resources, delivery media, and teaching methods to promote learning is not a new concept, but it requires educators to consider the best way to utilise the benefits of both face-to-face and online learning.

Blending online and face-to-face learning can result in both improved learning outcomes and decreased financial cost (Twigg, 2004). These benefits can be seen at the institution, faculty, and learner levels. The Pew Foundation sponsored research to study the redesigning of face-to-face courses for blended learning (Twigg, 2004). The study looked at 30 blended courses across a range of post-secondary institutions in the United States. Twenty-five of the newly re-designed blended courses showed improved learning outcomes and five of the re-designed courses indicated no significant difference between learning outcomes prior to and following the re-design (Twigg, 2004). All of the courses within the study indicated reduced financial costs after the redesign (Twigg, 2004).

Research has identified that redesigning courses from face-to-face to blended learning resulted in cost savings and improved learning outcomes. At the institutional level, benefits derived from implementing blended courses include improved cost efficiency through cost reduction; more effective use of resources (e.g., students' spending less time on campus requires fewer physical resources such as lighting, buildings, and parking); expanded access to the institution's educational offerings; increased enrolments and decreased drop, failure, and withdrawal rates (Dziuban & Moskal, 2001; Singh, 2003; Twigg, 2003).

Advantages at the faculty level include instructors' increased use of reflective practice or continuous improvement, because blended learning requires new approaches to teaching and an ongoing opportunity to experiment with new approaches to learning and new types of educational technology (Dziuban & Moskal, 2001). The blended courses also provide a more flexible teaching and learning environment (Garnham & Kaleta, 2002).

Educators within the Pew study also saw enhanced student interaction and engagement resulting in improved results. For example, in one of the studies the percentage of students earning an A- or higher increased from 37% to 56% (Twigg, 2003). Within a WebCT survey "94% of lecturers stated that classroom-based teaching and online learning is more effective than classroom-based teaching alone" and "over 85% of lecturers believe e-learning improves teaching creativity and student learning success" (WebCT, 2004).

Advantages for learners include decreased costs. Less commuting to university, with less parking and fuel costs, may also result in social benefits such as reduced pollution and the flexibility for learners to respond to the competing demands for

their time. Less scheduled time on campus enables learners to access the online learning component at a time and place that suits them. Twigg (2003), Garnham and Kaleta (2002), and Dziuban and Moskal, (2001) also found blended learning afforded enhanced learning outcomes, that is, students performed better in blended courses both in their understanding of critical concepts and in their final results.

We have left behind the debate of no significant difference (Russell, 1999) and recognise that students within online courses learn as well as on-campus students. In fact, there have been some studies which are now identifying conditions where online learners outperform learners in face-to-face settings (Means, Toyama, Murphy, Bakia, & Jones, 2009; Zhao, Lei, Yan, Lai, & Tan, 2005).

Given the advantages of improved learning and reduced costs it is not surprising that in 2003, Arabasz and Baker (2003) found that in the United States "80 percent of all institutions offer[ed] hybrid [blended] courses" (p. 2). However, educators of blended courses must consider how best to utilise the face-to-face and online resources, tools, and environments when designing learning experiences where learners actively engage with content, peers, educators, and others to individually and collectively connect, construct and apply knowledge while developing critical thinking skills.

What educators have yet to come to terms with is how best to harness the advantages of both face-to-face and online environments to improve learning outcomes. Positive results require not only effective use of ICT based tools and environments but also alignment of contemporary curriculum, assessment, and pedagogy. When making decisions about the suitability of the blend, there are four key areas to consider: the nature of the student body; the level of study; the nature of the unit material; and the nature of assessment required to meet unit and course objectives (R. M. Field, 2005).

There may be institutional imperatives which make blended learning attractive from both the institution and the student perspectives; for example, a change in student demographics, the desire to address different learning preferences, and the ability to access different learning experiences. These might be considered pedagogical reasons which provide the opportunity to address the needs of individuals and expand the opportunities for learning.

Teaching and learning and not the ICT tools available, should drive the decisions about how the online and offline components are blended (Clark, 2003). The effective combining of face-to-face and online delivery demands that blended learning capitalise on the advantages of both environments and/or overcome the weaknesses of the environments. Osguthorpe and Graham (2003) remarked that educators should be "trying to maximize the benefits of both face-to-face and online methods—using the web for what it does best, and using class time for what it does best" (p. 227).

Singh (2003) reminded us that "the concept of blended learning is rooted in the idea that learning is not just a one-time event—*learning is a continuous process*" (p. 53). Some learning experiences touted as online learning are merely online information delivery. Access to information is no longer problematic; in fact, the

internet has provided an abundance of information available. However, as Simon (1996) asserted, "a wealth of information can create a poverty of attention" (p. 7). It is the interaction with the information and among participants as part of the learning process that is important. There is a need to restructure teaching practice and learning activities to actively involve students in learning through engagement and interaction.

It is no longer a question of "Why blend?" (J. Cross, 2006, p. xviii). However, other questions yet to be answered are: How might an educator effectively blend online and face-to-face instruction in a manner that will assist learners to successfully achieve meaningful learning outcomes? Does this make it an instructional design problem? Is the issue one of blending or of selecting from the variety of possibilities available for designing instruction? Is this an ecological problem, one of working in/with an environment to maximise learning?

Typically, blended courses will have reduced on-campus or face-to-face time commitment for students, due to the online components of the course requiring learners to participate in a different context. Blended learning enables educators to create learning opportunities where both face-to-face and online paradigms are part of the learning process. As educators consider what will be an appropriate mix of face-to-face and online learning activities, they must also ensure that the academic rigour of the course is not compromised.

Learners need multiple cognitive opportunities to connect theory and practice by "engaging in attention, enactment, reflection, critique, adaptation, [and] articulation" (Laurillard, 2000, p. 136). Blended learning provides learning opportunities where both face-to-face and online paradigms are part of the learning process: providing multiple opportunities and contexts to facilitate dialogue and interaction, to provide access to information, and to represent abstract ideas visually during the process of knowledge connection, construction, and deconstruction. In the past, these types of learner experiences have not been facilitated by many traditional face-to-face teaching and learning episodes at the higher education level.

Teaching in Higher Education

In 1859 Charles Dickens wrote: "It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness" (Dickens, 2003, p. 5). These competing and contradictory attitudes resemble attitudes towards the use of ICTs in higher education today. The introduction of ICTs into learning creates complex challenges along with unique possibilities.

It would be inappropriate to say that universities have not changed over their 800-year history. Amirault and Visser (2009) suggest that "[t]he university's remarkable longevity can in no small part be attributed to its ability to reinvent itself over the centuries whenever intellectual, political or technological change has occurred" (p. 63). Although many universities have made changes to the way they present content using ICT, few have made significant changes to their pedagogical approaches to teaching and learning in the blended and online environments.

The rapid and extensive move to using ICT as part of the teaching and learning process at the tertiary level has resulted in academics often suffering from "a lack of articulated vision for appropriate technology use" (Finley & Hartman, 2004, p. 321). Other considerations are to increase cost-effectiveness, maintain quality teaching and learning, increase access and equity, and ensure sustainable practices (Oliver, 2001).

Researchers have found that many academics are resistant to changing their teaching to incorporate current (and older) technologies into their teaching practice (Finley & Hartman, 2004; Garrison & Anderson, 2000; Pajo & Wallace, 2001). This inertia may be the result of academics questioning why there is a need to change what has worked previously. The disparity between actual and expected use of ICT may also be a result of barriers such as "time pressures, a perceived lack of training and skills, and a scarcity of organization support and resources" (Pajo & Wallace, 2001). In addition, many academics have limited use of ICT in their personal lives or limited knowledge of authentic ICT use to draw from, and this restricts the transfer of ICT skills and knowledge to their professional lives when developing and implementing learning experiences mediated by ICTs (Albion & Redmond, 2008; Lankshear, Snyder, & Green, 2000). Because of this "[t]hose who are meant to be taught end up grasping the medium of education (if not the content that must be taught) at a faster rate than those who are meant to teach" (Reis, 2009, March 3).

It has been suggested by Jackson (1984) that place provides people with their identities. "So if educators are changing teaching places, they need to redefine themselves in light of the change in landscape" (Meloncon, 2007, pp. 37-38). There is a difference between teaching face-to-face and teaching online, and many academics' identities are encapsulated by their past face-to-face teaching. For the most part universities "did not provide a way for an educator to self-select or to explore in depth one's readiness, willingness or preparedness for the online setting" (Meloncon, 2007, p. 38). The decision to move teaching to a blended or online mode is regularly out of the control of the academic. With limited resources to assess the readiness of the academic and provide suitable training, the resulting teaching has often fallen short of what was expected, from both the faculty members' and the students' perspectives.

The move from face-to-face to online and blended learning has been problematic for many faculty members; for without training and time to reconsider their pedagogical approaches, they fail to "make a transformational shift in their approach to teaching from one of disseminating information to one of creating a learning environment where students co-construct knowledge through interactions with the process, their peers and the course content" (Vaughan, 2010, p. 61). Many faculty members may very well consider themselves an expert in face-to-face instruction, and they return to being a novice educator in blended or online instruction.

The ICT tools change regularly, returning all users to the position of novice, as do the ways in which information can be formed, modified, distributed, and utilised (Lorenzo, Oblinger, & Dziuban, 2007) using technology. However, it is not the technology itself which makes a difference; it is the way it is used (Boud & Prosser,

2002; Laurillard, 2000; Mehan, 1998) that will make an impact on learning. Laurillard (2002)suggested that "technology is a positive driver towards improving higher education" (p. 133). This may require instructors to gain new knowledge and skills, in addition to unlearning or relearning beliefs and assumptions which align with teaching and learning from the past. "The challenge is to systematically explore the integration of pedagogical ideas and new communications technology that will advance the evolution of higher education as opposed to reinforcing existing practices" (Garrison, Cleveland-Innes, et al., 2010, p. 31).

The facilitation of deep learning while achieving educational outcomes requires not only effective use of ICT but the alignment of responsive curriculum, authentic assessment, and flexible pedagogical approaches. Learning spaces are no longer restricted to those who can be at a certain place at a certain time or to the four walls of the traditional classroom. As educators, we should engage our students in purposeful work with ICTs that transforms learning opportunities in ways that make students more successful in achieving authentic learning outcomes.

This study will investigate the nature of teaching and cognitive presence in blended courses and presents principles of practice which will enable teacher educators to move beyond the status quo by enhancing student's participation in online discussions and effectively blending face-to-face and online environments.

Teacher Education

Within many tertiary institutions, the number of undergraduate students physically attending face-to-face components of course work is reducing due to a range of reasons. Within the Faculty of Education at USQ, academic staff have voiced concern regarding how students in face-to-face courses are: preparing themselves for the education profession; engaging with course content and other support material; engaging in discussions with other educators; and asking questions of and engaging with academic staff and their peers if they enroll in face-to-face courses but do not attend because attendance is not compulsory.

In addition, there has been widespread adoption of ICT in education at all levels. Teacher education is no different to other higher education disciplines where ICT has enabled a flexible approach to course delivery (Postle & Tyler, 2010). From pre-school to university, educators are using digital tools to transform learning. These new tools (learning management systems, electronic whiteboards, digital microscopes, document cameras, mobile devices, digital probes) enable educators to make teaching and learning more dynamic, authentic, and engaging. Digital learning tools and spaces also enable educators to break down the walls of the classroom so that learners are not restricted to those who are available at a particular point in time and location. The use of new tools and new pedagogical approaches in school classrooms should also have an impact on teacher education.

The integration of ICT into the curriculum in all levels of education is "an inseparable part of good teaching" (Pierson, 2001, p. 414). As educators, we should engage our students in appropriate purposeful work with ICTs that transforms learning opportunities in ways that make them more relevant to the needs of the

21st century. Although using ICTs, some educators fail to use online environments to "capture, motivate or retain the learning" (Prendergast, 2004, p. 2). Johnson and Liu (2000) commented that "we are at a point in time where everybody is talking about technology integration, but few practicing teachers profess to know exactly how to proceed" (p. 4). Peck, Cuban and Kirkpatrick (2002), found "that teachers most frequently used technology to support, rather than alter, their existing teacher-centered practices" (p. 477). The inconsistency of use and the apprehension of teachers can also be found at the teacher education level.

The role of teacher educators is to provide pre-service teachers with the opportunities to gain knowledge on how to integrate ICTs into their teaching, irrespective of whether they are teaching in face-to-face, blended, or online environments. ICTs can promote deep and meaningful learning in a number of ways. For example, ICTs provide: tools for knowledge creation and problem solving; an authentic means to communicate with others while fostering collaboration; access to a wide range of resources; and a forum for reflection (Jonassen, Howland, Marra, & Crismond, 2008; Jonassen, Peck, & Wilson, 1999; Pawan, Paulus, Yalcin, & Chang, 2003).

Within blended and online learning, we should look to the opportunities ICT provides for transformational learning enabling deep learning, enhanced communication, collaboration, critical thinking, and inquiry. It is essential that educators "design teaching and learning activities to support and encourage deep engagement" (Boud & Prosser, 2002, p. 238) with the content, the instructor, and their peers. The expected levels of student engagement, especially online, should be explicit and complement the learning and assessment tasks (Stacey & Gerbic, 2007).

Teacher education has gone beyond learning how to use certain tools, or being provided with a 'bag of tricks'. Constructivist teaching approaches and reflective practice are essential elements of an effective 21st century teacher educator (Beck & Kosnik, 2006; Loughran, 2007). The blended environment provides an ideal arena for both concepts to be taught and modelled by staff and for students to engage in constructivist activities and in reflection as a personal or shared experience. Given the common place of ICT with youth, the challenge is for educators to examine and develop an understanding of, and to try to address, the disconnect between what students do with ICT in their personal and academic lives and creating meaningful learning environments with ICT.

Disconnect

Within schools and universities, we have a generation of students who have "never known life without the Internet; they're the Net Generation" (Oblinger, 2005, p. 69) or digital natives (Prensky, 2001). Oblinger (2005) and Prensky (2001, 2005) both suggest that the Net Generation are used to being networked, multi-tasking, working with others, and receiving information immediately; their world is "digital, connected, experiential, and social" (Oblinger, 2005, p. 69). These learners

"are no longer the people our educational system was designed to teach" (Prensky, 2001, p. 1). University educators, most of whom are digital immigrants (Prensky, 2001), are struggling to address the disconnect between what students do with ICT in their personal lives and in their academic lives.

It has been argued that ICT has been

> marginalized and used in instrumental ways within the conventional educational framework. The nature of technology use by youth in their personal lives tends not to exist or not to exist to the same degree within the educational context. (Clifford et al., 2004, p. 24)

It has been posited by Miller (2010) that "how we learn should reflect how we live " (¶ 9). In addressing the disconnectedness between what students do with ICT in their personal and academic lives, educators must consider ways to create deep cognitive learning environments with ICT. If there is to be innovation and change "as the new technology requires, as the knowledge industry requires, and as students demand" (Laurillard, 2002, p. 22), we must find ways to meaningfully integrate ICT to support robust learning experiences for our students. This requires educators to develop technological pedagogical content knowledge (Mishra & Koehler, 2006) and innovative teaching approaches which reflect the digital world in which we now live. Educators need practical wisdom in the role of ICT to scaffold, reinforce, and improve learning and increase engagement and interaction.

Engagement and Interaction

"One of the most pressing issues is to discover how to support intellectually productive interaction and foster higher forms of cognition"(McLoughlin & Luca, 2000, ¶ 3). Fowler & Mayes (1999) advocated that "engagement and construction are both about doing and discovering" (p. 5). Interestingly, Bowen (2005) suggested that we don't have "consensus about what we actually mean by engagement or why it is important" (p. 3).

There have been many research studies which investigated levels of student engagement (Astin, 1999; Kuh, Schuh, & Whitt, 1991; Pascarella & Terenzini, 1991). In the late 1980's, Chickering and Gamson (1987) first presented their 'Seven principles for good practice in undergraduate education' and over time these have become one of the best known set of principles for designing for and exploring student engagement. Since their initial introduction the principles have been refined, and in 1996 Chickering and Gamson suggested how the principles might support teaching and learning when ICT is used as a lever. The seven principles of good practice are:

1. Encourages contacts between students and faculty;
2. Develops reciprocity and cooperation among students;
3. Uses active learning techniques;
4. Gives prompt feedback;

5. Emphasises time on task;
6. Communicates high expectations; and
7. Respects diverse talents and ways of learning (Chickering & Gamson, 1987).

The National Survey of Student Engagement (NSSE) was initially developed in 1998 to "probe the quality of the student learning experiences at American colleges and universities" (National Survey of Student Engagement, 2007, p. 3). From previous studies, five national benchmarks of effective educational practice have been created: Level of Academic Challenge; Active and Collaborative Learning; Student–Faculty Interaction; Enriching Educational Experiences; and Supportive Campus Environment (National Survey of Student Engagement, n.d.).

In 2007, Australian and New Zealand universities participated in the Australasian Survey of Student Engagement (AUSSE) for the first time (Australian Council for Educational Research, 2009). It was based on the American NSSE to enable international benchmarking, but it includes a work integration learning element. The AUSSE contains six key areas:

1. Academic Challenge – the extent to which expectations and assessments challenge students to learn;
2. Active Learning – students' efforts to actively construct knowledge;
3. Student and Staff Interactions – the level and nature of students' contact and interaction with teaching staff;
4. Enriching Educational Experiences – students' participation in broadening educational activities;
5. Supportive Learning Environment – students' feelings of legitimation within the university community; and
6. Work Integrated Learning – integration of employment-focused work experiences into study (Australian Council for Educational Research, 2010).

Surveys such as the AUSSE and the NSSE are regularly used by universities to explore levels of student satisfaction and engagement. This has become increasingly important in a 'user pays' environment where the student, as a customer, has a high expectation of teaching and learning. One might suggest that effective instructors and the institution as a whole should also be concerned with improving the quality of the teaching and support of learners as they interact with individual courses.

Learning and knowledge construction does not take place in a passive environment (Dewey, 1933). It is an active process requiring interaction. This interaction is a key component of the CoI framework. The term interact is defined by the Oxford Dictionary (2005) as to "act so as to have a reciprocal effect or influence of persons or things on each other". This seems to parallel Dewey's (1933) notion of transactional realism. The dynamic relationships in blended and online discussions create an environment which enables participants to build on their previous knowledge with knowledge contributed by others as they construct new knowledge through the ongoing interactions. This transaction means that when participants are learning from each other, the overall learning gain is more

than if students were to learn independently. We might also call it collective intelligence where 1 + 1 = >2. All learners benefit from the interactive nature of online discussion. Henri (1992) supported this notion when advising that

> [g]roup work, which involves reflection, decision making and problem-solving, has its own laws of energy: it consistently yields results of a higher calibre than those attained by the average group member … Not only does the work of the group improve, but the individuals involved also learn more than those of comparable skills working alone. (p. 120)

The earliest attempt to classify interactive relationships within learning was published by Moore (1989). He identified three different types of interactivity. Firstly, he identified Learner–Content interaction, which is the interaction between the learner and the subject matter. This requires that students process the content and relate it to their prior experience (Berge, 1995). The content can be presented by the instructor or explored by the student through problem-based or inquiry learning. Interaction at this level means that students "must *do something* with their knowledge" (Berge, 1995, p. 23). Secondly, Learner–Teacher interaction is interaction where the teacher establishes and organises an environment of support for the learner to understand subject matter. Finally, Learner–Learner interaction is interaction between the learner and other learners.

Since Moore's (1989) initial identification of interactivity, there have been a number of researchers who proposed other types of interaction. In 1994, Hillman, Eillis, and Gunawardena noted that the introduction to ICT into learning created a new type of interaction, that of Learner–Interface interaction (Hillman, Willis, & Gunawardena, 1994). Vicarious interaction was introduced by De Vries (1996) and exists when the learner does not publicly participate in dialogue but observes "the interactions of others" (Sutton, 2001, p. 232). This might also be known as 'lurking' or a 'spectator sport' where the student looks on rather than actively participating. Peng, Chou, and Chang (2008) suggest that Learner–Context is a sixth type of interaction, which refers to the impact of the context on the learner. Context can include things such as physical items, geographical location, or personal or group identity.

The seventh and final type of interaction which has been identified is that of Learner–Self interaction (Aminifar & Bahiraey, 2010; Soo & Bonk, 1998). This interaction "refers to the learner's reflection on the context, learning process and his new understanding" (Soo & Bonk, 1998, p. 3). An example of Leaner–Self interaction can be editing one's own writing. Self-talk as part of reflection and the learning process can occur immediately or in the future; looking back at previous experiences. Students engaging in Learner–Self interaction benefit from the reflective and personal management of the learning process (i.e. time and task management), and are able to monitor their progress from both a content and a process perspective (Peng et al., 2008). This is closely linked with the higher order thinking construct of reflection discussed later in this chapter.

When learning is predicated upon transactions among various participants and those transactions are mediated by technology; creating, sustaining, and managing interaction are critical aspects of blended and online teaching and learning activity. This activity begins with design. It takes considerable ingenuity to design learning

tasks in which interaction is not only important to the task, but essential to successful completion (Thorpe, 2002). Also, sustaining mediated interactions over a period of time challenges participants' ability to create engaging online personal presence (Warren & Rada, 1998), manage multiple interactive tasks, maintain focus in goal-directed activity, and manage the emergent nature of much of the dynamic content and communication within online learning programs .

We should remember that positioning content online and promoting online interaction does not guarantee effective interaction or learning (Garrison & Cleveland-Innes, 2005). Within the online environment (and the face-to-face environment), students may be lurking rather than contributing or the interaction (Hellsten, McIntyre, & Prytula, 2011; Sutton, 2001) could be disjointed or merely a proliferation of surface comments or experiences which do not require critical or creative thinking. For effective learning, there is a requirement that the online interaction be connected or interwoven with the theoretical concepts on which the course is focused.

Educators working in blended learning courses deliberately design and construct environments and activities for both online and face-to-face learning, encouraging quality interaction resulting in and from reflective dialogue and critical thinking through connecting theoretical constructs with prior knowledge and exposure to different perspectives. "[T]he focus is always on what the learner is actually *doing*: placing the learning and teaching activities at the heart of the process" (Mayes & de Freitas, 2004, p. 6). These activities may require students to interact with educators, peers, content, and experts and may result in them conceptualising and testing a solution to a real life problem. This research is interested in the role of online dialogue to enhance critical thinking.

Dialogue

Discourse is a natural part of life and learning, particular in higher education. Interaction and discourse have a significant role in promoting higher order thinking and deep learning (Aminifar & Bahiraey, 2010; Bereiter, 1992; Hoskins & Van Hooff, 2005). From a socio-constructivist perspective, discourse, collaboration, and ongoing engagement are crucial to learning and teaching (Schallert & Reed, 2003). Fowler & Mayes (1999) supported this notion when they advocated that education is "moving the emphasis of learning away from 'what' we learn to 'who' we learn from" (p. 14). However, to move discourse beyond a superficial level requires consideration of the learning design, with leadership and support from instructors.

The terms discourse, discussion, conversation, and dialogue are often used interchangeably. Discourse might be thought of as a form of communication yet discussion is an extended form of communication, or conversation. The differentiation between conversation and dialogue is in the cognitive load of the discourse and the resulting action or outcome. "A conversation is an exchange: of feelings, of thoughts, of information, of understandings. A dialogue is a mutual exploration, an investigation, an inquiry" (Lipman, 2003, pp. 87-88). A conversation requires cooperation whereas dialogue necessitates collaboration. Although the terms cooperation and collaboration are often used substituted for

each other; cooperation can be thought of as shared knowledge transmission whereas collaboration could be considered as mutual knowledge generation (Misanchuk & Anderson, 2001).

The notion that dialogue requires a higher cognitive level than conversation because it is purposeful and focused, is supported by Romney (2003) who stated that "[d]ialogue is focused conversation, engaged in intentionally with the goal of increasing understanding, addressing problems, and questioning thoughts or actions. It engages the heart as well as the mind" (p. 2). The participants in a dialogue need to be more active or engaged; they should be not just following the speaker but anticipating or predicting what will be said next (J. Shotter, personal communication, May 9, 2006). In a higher education context, the aim is to have dialogue rather than discussion or conversation; however, it is more difficult online, where the dialogue is via text, than in a face-to-face context.

Twenty-first century technology brings with it the benefit of effective and efficient access to information and experts. Bonk, Angeli, Malikowski and Supplee (2001) revealed that "(t)echnology tools can now bind students, peers, mentors, instructors, practicing teachers, and experts in an array of resources, discussions and curriculum recommendations" (p. 22). The technology permits students to interact with multiple others beyond the teacher-student interaction in the regular classroom context. This provides a diversity of interpretations; a variety of prior knowledge and experience leading to range of perspectives; and opportunities to test ideas.

In their study of student perspectives of blended learning, Stacey and Gerbic (2007) found that "online discussions helped all the students to learn, reading the online posting prompted engagement, writing the postings aided deeper understanding, [and] the need to communicate to peers clearly and persuasively also aided their understanding" (p. 5). However, some learners find the online discussion environment quite sterile, particularly if they are enrolled in a course which focuses on the transmission of information from the instructor to the students rather than one which actively invites dialogue. Courses which espouse a dialogical methodology have online discussions with an ongoing post/respond cycle. This results in a more active engagement by students, and focused dialogue.

Online communication tends to be text based, although it can also include audio and video communication and real-time dialogue. Asynchronous online learning environments are usually characterised by text-based communication with time for reasoned and reflective responses (Vaughan & Garrison, 2005) a permanent or semi-permanent record of communication and explicit dialogue (Garrison & Anderson, 2003; Meyer, 2003; Vaughan & Garrison, 2005) . The additional time afforded by asynchronous online communication enables students to reconsider their ideas and the ideas of others as they construct personal meaning prior to responding to their peers and instructor. It also enables them time to bring in information from research and other sources to support their comments.

In comparison, oral communication, which is at the heart of traditional face-to-face education, is generally distinguished by a verbal exchange of ideas which is fast paced with spontaneous responses; feedback from physical cues, for example, non-verbal communication; generation of on the spot enthusiasm from a spark; and

comments that are 'off the lip' (Garrison & Kanuka, 2004; Meyer, 2003; Vaughan & Garrison, 2005). This dialogue is in the moment, fleeting, and less structured than text based discourse, with feedback from paralinguistic and physical cues which are visible and audible.

Unlike face-to-face discussions, the teacher has less control over student participation in online discussions, especially if they are novices in the online environment and not familiar with the online discussion tools. In a face-to-face environment, the teacher is able to speak at any time; however, students can contribute only when permitted (Sinclair & Coulthard, 1992). There are a number of benefits for students when comparing face-to-face discussion with online discussion. When communicating online, students do not need to wait for their turn nor do they need to wait for an invitation to contribute. They can determine when and how often they wish to contribute and they can keep track of discussions or go back to the discussion at a later date, because there is a record of the communication as contributions are stored and can be revisited as students de-construct, re-construct, and co-construct knowledge.

Other advantages perceived from online discussion are that there is a sharing of air time and everyone can have their say; participation does not rely on place and space limitations; there is increased wait time to respond; discussions need not be dominated by the teacher; and the online space enables the sharing of different types of digital media (Henri, 1992; Stacey & Gerbic, 2007).

Having said that, learners sometimes are frustrated due to the pace and sequence of the conversation; either many posts have been made since their initial post and it is difficult to keep up, or the conversation is very slow, with the time between posting and receiving a response being unpredictable. Also, there is the lack of visual cues; and when posting online the limited screen space requires a precision of expression and brevity (Henri, 1992). In their research, Shallert and Reed (2003) shared that "online conversations are far more complex and students experiences are much less predictable than we had expected" (p. 105).

Some students find it easier to disagree and express honest opinions online when compared to face-to-face (Stacey & Gerbic, 2007). However, for others, "pathological politeness" (Archer as cited in Garrison & Anderson, 2003, p. 53) inhibits their ability to be critical of the contributions of others. It is the role of the facilitator to guide students and provide strategies or examples of how to engage in critical dialogue rather than serial monologues. The facilitator needs to ensure that the comments critique the thoughts and ideas shared rather than the person sharing. In other words, their contributions are "intellectually challenging yet respectful" (Garrison & Anderson, 2003, p. 50). This critical dialogue forms the basis of inquiry and higher order thinking.

Garrison, Anderson, and Archer (2000) wrote about "the reflective and explicit nature of the written word that encourages discipline and rigor in our thinking and communicating" (p. 90). Hudson (2002), quoted in Garrison and Kanuka (2004) proposed that "the very basis of thinking is rooted in dialogue, drawing on a socially constructed context to endow ideas with meaning" (p. 53). The blended environment enables dialogue in both verbal and written form, giving additional

opportunities for students to make personal meaning. This rigour from written communication and verbal dialogue is indicative of the types of outcomes we want in a tertiary environment.

Several studies (Garrison & Anderson, 2003; Heckman & Annabi, 2005; Meyer, 2003) have indicated that when learners are active in online discussions they demonstrate higher order thinking. “By externalising thinking processes, students make statements and counter statements, defend and challenge each other's assumptions, all of which are processes leading to higher-order thinking” (McLoughlin & Luca, 2000, p. 7). Newman and Wehlage (1993) suggested that substantive conversations have extended and focused dialogue, with students building on the ideas of others for the coherent promotion of collective understanding. This dialogue must also include “indicators of higher order thinking such as making distinctions, applying ideas, forming generalizations, raising questions, and not just reporting experiences, facts, definitions, or procedures” (Newmann & Wehlage, 1993, p. 10).

The quantity of discussion does not always reflect the quality of the discourse (Garrison & Cleveland-Innes, 2005): it is the role of the teacher to design, facilitate and structure the dialogue to achieve a high level of critical and reflective thinking. These substantive conversations should provide learners with the opportunity to actively construct and deconstruct their knowledge, drawing from their experiences, the retelling of the experiences of others, and the integration of academic literature. It should be noted, however, that students can also learn vicariously; that is, they can learn by reading the contributions of others (Schallert & Reed, 2003). Learners may be ‘actively listening’ or ‘lurking’; in other words, they may read contributions of others but not respond.

The lack of participation and limited cognitive presence enacted by the learners in online discussions could be the result of the facilitation. The design for the use of online discussion should be questioned: it could be that the questions or activities posed by the instructor do not lend themselves to inquiry and higher order thinking. Muilenburg and Berg (2004) advised that “asking the right questions is almost always more important than giving the right answers” (p. 10). Lipman (2003) also thought that the answer to promoting deep thinking is in the question: he proposed that “if the question is a meaningful one and the questioner does not know the answer, the classroom discussion that follows will likely demand that each participant think more and more judiciously” (p. 117). Irrespective of the mode of discussion, the questions posted by the instructor are crucial to improved learning outcomes, especially when trying to elicit critical thinking.

When trying to promote critical and reflective dialogue, the role of the online facilitator is critical. The role is a complex and difficult one and includes elements such as establishing ground rules; creating questions or activities that promote dialogue; ensuring adequate time is provided; and keeping the communication productive (Spector & de la Teja, 2001). Larreamendy-Joerns and Leinhardt (2006) explained that

> successfully orchestrating a dialogue demands fairly sophisticated skills. Conversational contributions need to be simultaneously parsed according to their disciplinary value, their location within the chain of collective argumentation, their relevance to the instructional goals, and their role as indicators of the student's ongoing understanding. The outcome of this complex appraisal is a sense of the amount and quality of the guidance that specific contributions and the conversation as a whole require to support learning. (p. 591).

Garrison, Anderson, and Archer (2000) revealed that learners are able to "construct meaning through sustained communication" (p. 89). They go on to suggest that it is "the reflective and explicit nature of the written word that encourages discipline and rigor in our thinking and communicating" (p. 91). Facilitation is required, however, to ensure deep thinking and deep learning as outcomes of higher education within an ICT enhanced learning space.

Critical Thinking

Knowledge is growing exponentially, with information and experiences being exchanged rapidly through the affordance of ICTs. Deep learning occurs "when the learner seeks information actively, uses it to produce knowledge, and integrates these into his or her cognitive structures" (Henri, 1992, p. 123). This requires a range of purposeful intellectual activities. In his connectivism theory, Siemens (2005a) speaks of learning as actionable knowledge. This may be attained through experience; however, it is strengthened through thinking and reflection. "The process of thinking involves organizing and structuring our learning networks" (Siemens, 2005b, ¶ 19). He also suggests that learning is a process of "coming to know, rather than of knowing" (Siemens, 2005b, ¶ 61). This is of particular importance in a world where we experience rapid change and swift development of knowledge.

A constructivist learning environment provides the opportunity for learners to move from being knowledge consumers to knowledge creators. This switch in roles for the learner requires them to gain the attributes of a lifelong learner such as being: a complex thinker; a creative person; an active investigator; and an effective communicator (Lawson, Askell-Williams, & Murray-Harvey, 2006). This is a move beyond the acquisition of information or knowledge. While our education systems are trying to achieve the development of lifelong learners we need to teach in ways which "improve the quality and quantity of thinking" (Lipman, 2003, p. 206).

With an acknowledgement that the quality of thinking should be improved comes the realisation that we need to know what comprises thinking. "[G]ood thinking is accurate, consistent and coherent thinking; ... it is ampliative, imaginative, creative thinking" (Lipman, 2003, p. 2). Lipman (2003) goes on to suggest that it is concerned with linking ideas so as to enact higher-order activities such as justification and making judgements. Halpern (2003) explained that we need thinking "that is purposeful, reasoned, and goal directed—the kind of thinking involved in solving problems, formulating interferences, calculating likelihoods, and making decisions" (p. 6). The question now is how best to teach it.

Within the context of teacher education, all teachers, including pre-service and beginning teachers, require the skills of reflective and higher-order thinking and the ability to teach higher-order thinking. In a teacher education program whose role it is to prepare future teachers, it is important for the pre-service teachers to learn not only how to think but also how to teach others how to think. As Bruning et al. (2004) commented, it is important that we are "teaching students how to think rather than what to think" (p. 180). This is affirmed by teacher employment and registration bodies.

Education Queensland is the largest employer of teacher graduates in Queensland. They have their own Professional Standards for Teachers (Education Queensland, 2005) which are generic competencies for their teachers. They provide 12 standards which "describe what teachers need to know and do" (p. 2). These include to "[p]rovide learning experiences in which students use higher-order and critical-thinking skills to solve problems and construct new meanings and understandings" (p. 14) and to "reflect critically on professional practice" (p. 30) in order to "develop and extend their skills and capacities" (p. 5).

In addition to the Education Queensland standards, the Queensland College of Teachers, which is the registering body for all teachers in Queensland and for all teacher education programs in Queensland, also have their own Professional Standards for Teachers. The Graduate Standard Three is to "[d]esign and implement intellectually challenging learning experiences", which requires them to know and understand "teaching and learning strategies for promoting higher order thinking skills, imagination, creativity, intellectual risk taking, reflection and problem solving in the context of the relevant content area, curriculum area or developmental phase" (Queensland College of Teachers, 2009, p. 5).

High quality teaching and learning requires active learning in which learners use "higher-order thinking skills such as evaluation, analysis, and synthesis, rather than simply rote memorization" (Berge, 1995, p. 22) or, as Mason (2008) reported, "one learns little by simply rehearsing what is already known: new knowledge develops by critically falsifying the known" (p. 1). Instructors need to design learning activities and assessment which provide opportunities for students to mindfully analyse, synthesis, infer, apply and reflect on information. Students therefore do not believe all they hear and read; they make informed decisions about what to accept as true. In Lipman's (2003) words: "*I think we are much better off construing critical thinking as nurturing in students a tentative scepticism then as nurturing in them a set of beliefs of dubious long-term reliability*" (p. 47).

Higher-order thinking is "the capacity to go beyond the information given, to adopt a critical stance, to evaluate, to have metacognitive awareness and problem solving capacities" (McLoughlin & Luca, 2000, ¶ 4). Learners should also be able to connect their knowledge to the world beyond the formal learning environment. It has been suggested by Lewis and Smith (1993) and other researchers, that the term higher-order thinking might include critical thinking, reflective thinking, creative thinking, decision making, and problem solving. They also posit that for "learning to be effective in higher order thinking is important for everyone" (p. 136). It is an essential skill for all learners.

When talking about levels of thinking Newmann et al. (1996) explained that higher-order thinking "involves students in manipulating information and ideas by synthesizing, generalizing, explaining, hypothesizing, or arriving at conclusions that produce new meanings and understandings for them"(pp. 228 – 229). In contrast, lower-order thinking "occurs when students are asked to receive or recite factual information or to employ rules and algorithms through repetitive routines" (Newmann & Wehlage, 1993, p. 2), which results in a superficial awareness and the inability to transfer this knowledge to new contexts. All levels of thinking have a place in learning; however the goal would be for learners to work and think at higher levels in addition to lower levels rather than use only lower-order levels of thinking.

In his 'Thinking in Education' book, Lipman (2003) spoke of four different dimensions of thinking: caring thinking, creative thinking, critical thinking, and reflective thinking. He proposes that creative thinking is "original, unique and distinctive" (Lipman, 2003, p. 243). It is characterised by originality, productivity, imagination, independence, experimentation, holism, expression, self-transcendence, surprise, generativity, inventiveness. It requires learners to view things from a new perspective and often results in unconventional responses.

The second dimension of thinking is caring thinking, which involves caring about the body of knowledge under inquiry and also respect and concern for others within the learning community. Lipman (2003) proposed that there was a strong link between good thinking and feelings and values.

> We fail to see how profoundly our emotions shape and direct our thoughts, provide them with a framework with a sense of proportion, with a perspective or, better still, with a number of different perspectives. Without emotion, thinking would be flat and uninteresting. (Lipman, 2003, pp. 261-262)

Caring thinking is appreciative, active, normative, affective, and empathic, and results in mindful contributions. It is the nature of the next two dimensions of thinking, critical and reflective thinking, that this research is exploring.

Critical thinking is the third dimension of thinking, and it is "*thinking that strives to be impartial, accurate, careful, clear, truthful, abstract, coherent*, and *practical*. Critical thinking is practical in the sense that it is *applied*" (Lipman, 2003, p. 58). It is often associated with "reasoning and argumentation, with deduction and induction, with form, structure and composition" (Lipman, 2003, p. 261).

Although embedding critical thinking into curriculum has the potential to empower learners (Lipman, 2003), it is difficult for learners to do; and also complicated for teachers to design for and implement. Bonk and Dennen's (2003) research found that instructors were searching for "more pedagogical tools, advice, and communities for their online teaching and learning efforts … In particular, they asked for tools that would foster greater student critical and creative thinking" (p. 332).

Although the terms critical thinking and problem solving are often used interchangeably they are different. "[P]roblem solving usually requires an

individual to solve specialized problems in a particular domain. These problems typically are well-defined and have one or perhaps two correct solutions"(Bruning et al., 2004, p. 180). However, Jonassen (1997) distinguished between well-structured and ill-structured problems; and researchers such as Rittel and Webber (1973) and Mishra and Koehler (2007) talk of tame and wicked problems. Wicked problems are those which are unclear or incomplete; often rely on judgement; have changing requirements and multiple perspectives; and tend to be resolved rather than solved. It appears that the use of the term problem solving in different disciplines means different things; and perhaps the difference is in the way the problem is articulated. Ill-structured or wicked problems require the skills of critical thinking.

Critical thinking can be distinguished from problem solving because it generally requires consideration beyond one discipline; the activities tend to be "ill-defined and have many possible solutions or even may be unsolvable" (Bruning et al., 2004, p. 180). Problem solving might be considered part of the critical thinking process. Facione (1990) considered that critical thinking should

> be purposeful, self-regulatory judgement which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential conceptual, methodological, criteriological, or contextual considerations upon which that judgement is based. (p. 2)

Critical thinking has been defined in a number of ways and there is also a range of approaches to teaching critical thinking. For example, Lewis and Smith (1993) suggested that critical thinking "has at least three distinct meanings: (a) critical thinking as problem solving, (b) critical thinking as evaluation or judgement, and (c) critical thinking as a combination of evaluation and problem solving" (p. 143). Whereas Sternberg (1985) defined critical thinking as "the mental processes, strategies and presentations people use to solve problems, make decisions and learn new concepts" (p. 46). Abrams (2005) also considered the cognitive element of problem solving as a key element of critical thinking; however he emphasised the evaluation and re-evaluation of information and assumptions. Lipman (2003) concluded that "critical thinking is realisable thinking" (p. 212).

There are differences in researchers' views of critical thinking. Some (Ennis, 1996; Paul, 1982) argue that critical thinking is a set of skills. Others (Facione & Facione, 2007; Lipman, 2003) maintain that that there are orientations or dispositions towards critical thinking. It is also viewed it as related to deep knowledge, either knowledge of critical thinking or knowledge of the discipline (McPeck, 1981). And a final school of thought is that critical thinking is a cognitive activity that leads to action (Lipman, 2003). These different perspectives are explored below.

The notion that critical thinking is based on skills is supported by Ennis (1996), Facione and Facione (2007), Lipman (2003), and Paul (1982). Ennis believed that the skills are deductive, and can be taught and then transferred from one discipline to another. On the other hand, Facione and Facione (2007) see critical thinking skills as "a combination of analysis, interpretation, inference, explanation, evaluation, fair-minded self-correction" (p. 44). In contrast, Bruning et al. (2004) suggest that "knowledge, inference, evaluation and metacognition" are the key

skills involved in critical thinking. In a different approach, Lipman (2003) proposes the following four major varieties of thinking skills: "inquiry processes, reasoning processes, information organizing, and translation" (p. 178). However, he goes on to say that "[m]erely to acquire a set of skills ... will not take one very far: It is necessary to know how and when and where to use them" (Lipman, 2003, p. 189).

Paul (1982) also highlights skills related to critical thinking; however, he talks about it in a 'weak sense' where learners can critically consider the perspectives of others, or in a 'strong sense' where the learners have the capacity to critically think about their own position and the position of others. He views a strong critical thinker as someone who sees the big picture and different perspectives; this is achieved through dialogue with others who have a different outlook. This dialogue is a vital element of critical thinking; it is through the sharing of values, experiences, and thoughts that we get different perspectives. Critical thinking requires the learner to continually assess their personal assumptions and beliefs as they participate in new experiences, or gain access to different perspectives.

Interestingly, although Paul (1982) endorses a skills based approach, he and McPeck (1981) consider it important that learners have a propensity or disposition towards critical thinking. Facione and Facione (2007) emphasise the critical thinking dispositions of "courageous truth-seeking, open-mindedness, persistence, thoroughness, intellectual integrity, confidence in reasoned decision-making, [and] maturity of judgment" (p. 44); whereas for Lipman (2003), the essential dispositions of those who think critically are "wondering, asking for reasons, judging with criteria, questioning" (p. 187).

A third train of thought is that irrespective of the skills and dispositions aligned with critical thinking, a depth and breadth of knowledge are required. Unlike Ennis (1996), who saw critical thinking as not being aligned to subject matter, McPeck (1981) considered critical thinking as inductive and argued that it must be taught within a discipline domain.

The belief that critical thinking leads to doing is strongly supported by Lipman (2003) who considered that critical thinking goes beyond process to action, that is

> [c]ritical thinking is applied thinking…it is not just a process – it seeks to develop a product….something said, made, or done. It involves using knowledge to bring about reasonable change…it is putting that judgement into practice. (p. 211)

This belief is also maintained by Facione and Facione (2007) who reported that there is a consensus of belief that critical thinking is "reflective decision-making and thoughtful problem-solving about what to believe and do " (p. 44).

Critical thinking has been characterised by many researchers as having a number of phases, processes, or categories. The phases are not necessarily linear: critical thinking is often a cyclical activity. In addition, each phase is not time related. Table 2.1 compares these phases.

Table 2.1
Phases of Critical Thinking

Phase or Levels	Brookfield (1987)	Norris and Ennis (1989)	Henri (1992)	Bullen (1998)	Garrison, Anderson, and Archer (2000)
Phase 1	Triggering event	Elementary clarification	Elementary clarification	Clarification	Triggering event
Phase 2	Appraisal	Basic support	In-depth clarification	Assessing evidence	Exploration
Phase 3	Exploration	Inference	Inference	Making and judging inferences	Integration
Phase 4	Development of alternative perspectives	Advanced clarification	Judgement	Appropriate strategies and tactics	Resolution
Phase 5	Integration	Strategies and tactics	Strategies		

Source: Developed for this research

Each of the five studies summarised above appears to have alignment in the way they perceive the process of critical thinking. From Table 2.1, it appears that critical thinking starts with some type of problem which triggers dissonance and requires clarification. The next two levels appear to support a review of what information might already be available to assist in solving the problem and in making inferences. The final step or two steps involves looking for solutions and making judgements about the strategies proposed to resolve the problem or issue. The process requires learners to justify and define their ideas.

There has been much research discussing the expected benefits from implementing critical thinking in the classroom. However, it has not yet fulfilled its promise, due to a number of reasons:

- Poor implementation;
- Inadequate teacher preparation;
- Insufficient teaching for judgement;
- Limited use of a community of inquiry as a pedagogical approach; and
- Inadequate connections between creative, caring, critical and reflective thinking (Lipman, 2003).

Critical thinking became disconnected not only from curriculum but also from the other dimensions of thinking. A renewed interested in critical thinking from a curriculum level, a cognitive outcome level, and as a societal expectation may lead to improved teacher preparation for this important element of children's education.

The fourth dimension of thinking is that of reflective thinking (Lipman, 2003). Wiske, Franz, and Breit (2005) noted that reflection occurs when you distance yourself

> from experience and examining it in ways that generate meaningful knowledge … Representing experience entails selecting aspects of experience, relating them, and expressing them in some form that communicates one's memory and interpretation of experience. (p. 104)

Reflective thinking results from the phases described in Table 2.1 above where a state of confusion or uncertainty results in the exploration of information to confirm or contradict the initial circumstances of doubt (Dewey, 1933). This enables learners to construct or confirm meaning.

> Reflective thinking is thinking that is aware of its own assumptions and implications as well as being conscious of the reasons and evidence that support this or that conclusion … Reflective thinking is prepared to recognise the factors that make for bias, prejudice, and self-deception. It involves thinking about its procedures at the same time as it involves thinking about its subject matter. (Lipman, 2003, p. 26)

Ennis (1987) highlighted the importance of "reasonable reflective thinking that is focused on deciding what to believe and do" (p. 10) and results in future action. The element of reflection as part of learning will be discussed further in the cognitive presence section of this chapter.

Effective blended learning environments require students and instructors to be involved in quality interaction resulting from critical thinking and reflection. This requires educators to re-think how they design and deliver their courses so that as lifelong learners both teachers and students "reflect critically on what we do before, while, and after we do it, mere practice becomes self-correcting practice and self-correcting practice is inquiry" (Lipman, 2003, p. 49).

For the purposes of this research critical thinking is considered to be a process that learners engage in which requires them to seek information to solve a problem; integrate multiple perspectives or sources information; make inferences from the information through reflection on current and/or prior knowledge and experiences; and finally make some sort of judgment or action to solve the initial problem. This aligns with the process of cognitive presence within the CoI framework.

Communities of Inquiry

In their report for UNESCO, the International Commission on Education for the Twenty-first Century (1996) recommended that we need to expand the notion of learning from that of knowing and doing. Simply speaking, the Commission felt that education throughout life should be based upon the following four pillars: learning to know, learning to do, learning to live together, and learning to be (International Commission on Education for the Twenty-first Century, 1996). Learning communities have the capacity to engage and support students in at least the first three of these pillars.

Much research has been completed on learning communities in online learning and collaborative learning in general. The education community is seeking pedagogies that promote critical inquiry and reflective discourse. It is thought that learning communities provide the support for this to occur and that the concept of learning can be extended. "The challenge will be for educators and higher education institutions to incorporate the information-age mindset of today's learners into our programs so as to create communities of lifelong learners" (Frand, 2000, p. 24).

A community of inquiry results in a move from a traditional education system where the learners regurgitate what has been told to them by the teacher, towards a student centred approach. Both Dewey (1933) and Lipman (2003) reflect that in the past we have "tried to get students to learn the solutions rather than investigate the problems and engage in inquiry for themselves" (Lipman, 2003, p. 20).

Inquiry is defined by Sutman (2000) as the "process of students asking relevant questions about issues to which they do not possess predetermined answers" (p. 8). Inquiry is a process rather than a product and over time results in self-correcting practice. The process is both inductive and deductive. As a consequence of inquiry approaches to teaching, learners become aware that knowledge is problematic and opinions and judgements must be justified as they connect new knowledge to old in the process of unearthing solutions to problems (Lipman, 2003).

Through a community of inquiry, participants learn from the experience of others: they are forced to hear values and opinions beyond those they already hold. It is also an opportunity to learn from the experiences of others. The idea of learning from other learners is often downplayed by learners. "They cannot conceive that their peers might have experience that complements their own, corroborates their own, or disagrees with their own" (Lipman, 2003, p. 94). This clashes with the concept of teacher as expert and expands the source of who we can learn from.

It is the engagement, partnerships, and interactions between and among people who gather together that define community (Riel, 1996). Learning communities have a distinct role in education and align with the goal of higher education which is to create "engaging communities of learning committed to critical discourse and construction of deep and meaningful learning outcomes" (Garrison & Anderson, 2003, p. 7).

Learning communities were defined by Cross (1998) as "groups of people engaged in intellectual interaction for the purpose of learning" (p. 4). Garrison and Anderson (2003) support this notion; they advised that a "critical community of learners, from an educational perspective, is composed of teachers and students transacting with the specific purpose of facilitating, constructing, and validating understanding, and of developing capabilities that will lead to further learning" (p. 23).

It has been argued by Lave and Wenger (1991) that participation in learning communities will result in learning, irrespective of whether the participation is peripheral, such as the observation of others (lurking), or through frequent, active, and complex engagement in the form of sharing information or questioning. Questioning often sets the stage for engagement and inquiry through a learning community. Lipman (2003) proposed that "questioning is the leading edge of inquiry: It opens the door to dialog, to self-criticism, and to self-correction" (p. 99).

Learning communities are based on the philosophy of collaborative learning (K. P. Cross, 1998; Gaspar & Santos, 2009) where students communicate, cooperate, and collaborate to construct, deconstruct, and reconstruct new knowledge. Knowledge within this concept is not absolute, that is, it is not a product but rather it is a process and it is built through dialogue and collaboration with others. Schrage (1989) commented that co-creating knowledge and a shared understanding is a different and more complex process than exchanging information. He reveals that "[t]he words are different, the tone is different, the attitude is different, and the tools are different"(Schrage, 1989, p. 5). Tinto (2003) supports this view, suggesting that when learners belong to a learning community it changes "the manner in which students experience the curriculum and the way they are taught" (p. 2).

In his book 'The courage to teach', Parker Palmer (1998) offered an alternative perspective on the community of inquiry, promoting that both the individual and the collective are important elements within the community to ensure learning.

> The space should support solitude and surround it with the resource of community. Learning demands solitude – not only in the sense that students need time alone to reflect and absorb but also in the deep sense that the integrity of the student's inner self must be respected, not violated, if we expect that student to learn. Learning also demands community – a dialogical exchange in which our ignorance can be aired, our ideas tested, our biases challenged, and our knowledge expanded, an exchange in which we are not simply left alone to think our own thoughts. (Palmer, 1998, p. 76)

This perspective is also maintained by Garrison and Anderson (2003) who advocated that participation in a learning community "encourages cognitive independence and social interdependence simultaneously" (p. 23). The interconnectedness between the learner and other learners has been explained by Cross (1998) as

> when students negotiate their own understandings by actively working to understand others' contributions and to fit them into what they already know, they develop ….. a kind of cognitive map that permits new learning to become understanding by making connections to what the student already knows. (p. 9)

It has been noted by Garrison (2005) that "the goal of the collaboration is to create a community of inquiry where students are fully engaged in collaboratively constructing meaningful and worthwhile knowledge" (p. 25). In the online space, an instructor must emphasise the development of a learning community within the design and facilitation of the course, and not assume that it will develop automatically as is often experienced in face-to-face learning.

When building a learning community, Brown (2001) proposes that there are three levels of community. The initial level is that of making online friends. This might be aligned with the beginning stages of social presence. The second level is that of community conferment, where learners begin to feel that their ideas are accepted by others. The final level is that of camaraderie, which is realised after intense or long-term communication with others in the community.

According to Lipman (2003) "[c]ommunities of inquiry are characterized by nonadversarial deliberations, shared cognitions, the cultivation of literacy and philosophical imagination, the encouragement of deep reading, and the enjoying of dialogical text" (p. 94). There is a range of benefits to be gained for learners participating in a community of inquiry as part of the education process, although it must also be noted that some students do not like learning with others, and other students find it difficult to find time to learn/work with others. Irrespective of context, there are a number of features of learning communities. These are presented below in Table 2.2.

Table 2.2
Common Features of Communities of Inquiry

Common Features	**What it looks like in practice**
Shared knowledge	Active learning Shared cognition
Shared knowing	Active participation Deliberation (consideration of alternatives and making judgement) Discussion Impartiality (takes into account all considerations and points of view) Modelling Quest for meaning Respecting the opinions of others
Shared responsibility	Feelings of social solidarity Inclusiveness Responsibility for the learning of others Social and learning relationships

Source: Summarised from Lipman (2003) and Tinto (2003)

While participating in a learning community, "students are asked to share not only the experience of the curriculum, but also of the learning within the curriculum" (Tinto, 2003, p. 2). In some cases they can also influence the curriculum. Learning communities evolve over time and require the support of the educator and the learners. Tinto's (2003) research has revealed a number of positive outcomes as a result of students' participating in a learning community.

The students:

- Formed self supporting groups;
- Spent more time learning together (inside and outside the classroom);
- Simultaneously made friends and learnt new concepts;
- Made greater intellectual gains;
- Were more engaged;
- Had improved retention rates; and
- Felt responsibility for their learning and the learning of others (Tinto, 2003).

He goes on to report that learning communities "alter the way students experience both the curriculum and learning" (Tinto, 2003, p. 1). Haythornthwaite (2006) is in agreement, stating "those joining an online community of practice must actually join two communities—the knowledge (or discourse) community and the online practice community" (p. 10).

Learning communities reflect a social constructivist approach to learning where all learners participate in and practise group knowledge building. Higher education sees the use of CoI framework as a fundamental way to support high levels of learning through the promotion of collaboration and dialogue (Garrison & Arbaugh, 2007).

Community of Inquiry as a Conceptual Framework

The unprecedented growth of online and blended learning in higher education has been paralleled by an increase in research and scholarship in the same areas. "Given this explosion it is crucial that we gain insight into how people learn online" (Shea, Hayes, Vickers, et al., 2010, p. 17). Over the last decade, many theoretical models have emerged to describe effective online learning (Agostinho, Oliver, Harper, Hedberg, & Wills, 2002; Alavi, Marakas, & Yoo, 2002; Henri, 1992; Sitzmann, Kraiger, Stewart, & Wisher, 2006; Tallent-Runnels et al., 2006). In recent years, Garrison, Anderson and Archer's (2000) CoI framework appears to dominate the contemporary literature as a tool for researching and conceptualising online and blended learning. According to Google Scholar, the seminal article has been cited 969 times as of May 2011. Researchers and academics have found that the CoI framework is valuable in defining, describing, explaining, measuring, and prescribing improvements in online learning communities (Arbaugh, Cleveland-Innes, Diaz, Garrison, Ice, Richardson, & Swan, 2008; Duncan & Barnett, 2010; Shea & Bidjerano, 2009; Swan & Ice, 2010).

A community of inquiry focuses on the dialogue involved in developing meaning for the participants. Online dialogue promotes learner centeredness and enables

democratic participation where each learner can take on a teaching role. It distributes the responsibility for personal and shared learning across all participants. When designed and facilitated well, it is a space to share and challenge beliefs both your own and others, while negotiating meaning. As Lipman (2003) disclosed

> [e]ach can offer hypotheses; each is free to build on or elaborate the hypotheses of others. Each can make claims, each can offer counterexamples or counterclaims. Each is free to question, to offer reasons or evidence, to express puzzlement, to portray ideals, to raise points of order. (Lipman, 2003, p. 122)

Heckman & Annabi (2005) offered that the CoI framework "identifies the intellectual content of message (cognitive presence), the instructional role (teaching presence), as well as the interaction among the members (social presence)" (¶ 11).

Early research in online learning focused on the social dimension and how it might impact on learning or perceived learning. In 1992, Henri began to investigate the cognitive dimension of learning. To move research beyond the superficial analysis of online discussion, that is, number of participants, number of messages, length of message, and student satisfaction, Henri (1992) provided a broad analytical framework to unpack the product and process of learning within computer mediated discussions. Although previous methods were available to explore discourse and communication patterns, they were designed as research tools for specialist linguists. She hoped to provide a tool that was useful to all educators in guiding learners through the learning process by interpreting messages and responding with appropriate pedagogical support. Her framework consists of five dimensions: participative, social, interactive, cognitive, and metacognitive. Table 2.3 provides the dimensions with corresponding definitions, indicators and categories.

Table 2.3
Henri's (1992) Content Analysis Model For Asynchronous Conferencing

Dimension	Definition	Example Indicators	Categories
Participative	Compilation of the number of messages or statements transmitted by one person	Number of message Number of statements	Overall Active participation in learning process
Social	Statements not related to formal content	Self-introduction Verbal support 'I'm feeling great.....'	Social

Interactive	Chain of connected messages	'In response to Celine....' 'As we said earlier ....' 'The problem under discussion....' 'I think that ....'	Explicit interaction Direct response/questioning Direct commentary Implicit interaction Indirect response Indirect commentary Independent statement
Cognitive	Statement exhibiting knowledge and skills related to the learning process	Asking questions Making inferences Clarifying concepts Referring to literature Formulating hypotheses Proposing solutions Making value judgements	Elementary clarification In-depth clarification Inference Judgement Strategies
Metacognitive	Statement related to general knowledge and skills and showing awareness, self-control, and self-regulation of learning	'I wonder...' 'I understand....' Comparing oneself to another Asking whether one's statement is true Predicting consequence of an action 'I'm discouraged at the difficulties involved .....'	Knowledge of self Knowledge of task Knowledge of strategies Evaluation Planning Regulation Self-awareness

Source: Compiled from Henri (1992) for this research

There have been a number of other models to investigate online discussions. For example, Gunawardena, Lowe, and Anderson (1997) performed a study to classify and explain learners' levels of reflection within online debates. They came up with five categories: sharing/comparing of information; discovery of dissonance and inconsistency; negotiation of meaning/co-construction of knowledge; testing and modification of proposed synthesis; and agreement/application of newly constructed meaning.

In addition, while researching electronic communication for learning Bonk et al. (2000) found twelve different forms of communication between learners and instructors. They were: social; questioning; direct instruction; modeling/examples; feedback/praise; cognitive task structuring; cognitive elaborations/explanations; push to explore; fostering reflection/self awareness; encouraging articulation/dialogue prompting; general advice; scaffolding/suggestions; and management.

A decade ago, Garrison, Anderson, and Archer (2000) first introduced the CoI framework. Interestingly, in a recent retrospective article on the CoI model, they revealed that they considered that their seminal paper "would very likely vanish into the academic ether, as do most academic publications" (Garrison, Anderson, et al., 2010, p. 8). At the time of the initial paper, the introduction of online discussions as part of distance and blended courses was new. This new way of

learning and teaching required a new theoretical perspective (Garrison, Anderson, et al., 2010), and the CoI construct addressed not only the needs of the time but also a current "need to provide order and a methodology to study the growing phenomena of online and blended learning" (Garrison, Anderson, et al., 2010, p. 8). Since then, hundreds of researchers and practitioners have modified or adopted the framework.

The framework consists of "three critical elements in the experience of conducting higher education using online communications media – Social Presence, Cognitive Presence, and Teaching Presence" (Garrison, Anderson, et al., 2010, p. 5). Table 2.4 presents the elements and categories within the CoI framework. This research will be investigating the cognitive and teaching presences only. Data around social presence will not be collected for this study. These elements will be explained in more depth later in this chapter.

Table 2.4
Community of Inquiry Categories and Indicators

Elements	Categories
Cognitive Presence	Triggering event Exploration Integration Resolution
Social Presence	Affective Open communication Group cohesion
Teaching Presence	Design and organisation Facilitating discourse Direct instruction

Source: Garrison and Anderson (2003, p. 30)

Although Henri's (1992) work was the catalyst for the development of the CoI conceptual framework, it drew from the work of many researchers, including Dewey (1933), Chafe and Danielewicz (1987), Ramsden (1988), Resnick (1991), Lipman (1991), Gunawardena (1995), and Newman et al. (1996). In particular, these researchers provided insights into social constructivism, online discussions, content analysis, text-based communication, and the relationships between social context and learning outcomes.

The authors revealed that when developing the CoI framework "the goal was to define, describe and measure the elements of a collaborative and worthwhile educational experience" (Garrison, Anderson, et al., 2010, p. 6). When looking at this from a social constructivist perspective of education where the "personal reconstruction of experience and social collaboration" (Garrison & Archer, 2000, p. 11) combine, Garrison, Anderson, and Archer (Garrison et al., 2000) suggested that "a worthwhile learning experience must consider the learner's personal world (reflective and meaning focused) as well as the shared world (collaborative and knowledge focused) associated with a purposeful and structured educational environment" (p. 92).

The CoI framework has a tripartite structure with the three key elements being: social presence, teaching presence, and cognitive presence. Presence provides "the ability to automatically identify the status and availability of communication partners" (Hauswirth et al., 2010, p. 1), in other words, the impression that others are close at hand. The three presences are considered essential to an educational transaction (Garrison et al., 2000). Figure 2.1 shows the interrelationship among the three presences when forming the educational experience.

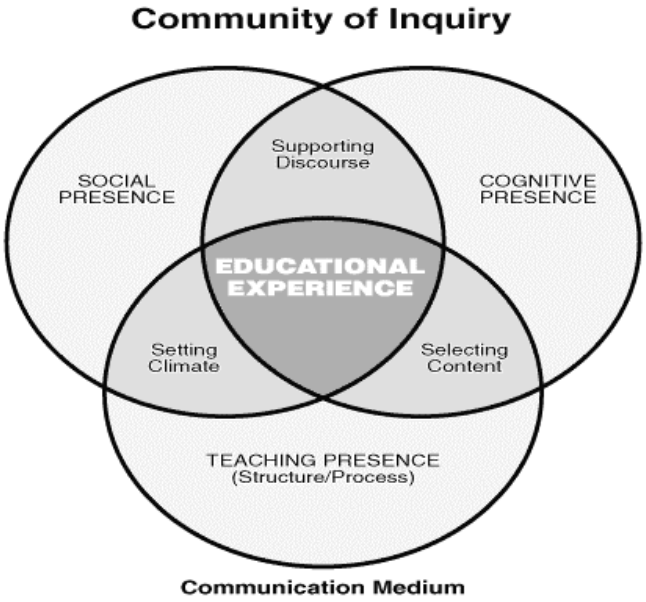

Figure 2.2. Community of Inquiry (Garrison & Anderson, 2003, p. 28)

Within this figure, the presences are central to the educational experience and being able to select the content, set the climate for learning and support the discourse of all participants. The next section will give a brief overview of each presence.

Social presence is closely related to the perception of community. Garrison, Anderson, and Archer (2000) define it as "the ability of participants in a community of inquiry to project themselves socially and emotionally as 'real' people" (p. 94). It is through this presence that learners develop trust which facilitates critical dialogue in the collaborative construction of meaning. What is sought is the sense of community and ability to share without the risk of emotional harm.

Cognitive presence has been defined by Kanuka and Garrison (2004) as "the extent to which learners are able to construct meaning through sustained communication" (p. 33). It is linked with critical and reflective thinking and occurs through a process of dialogue and inquiry. It involves the mental process of coming to know, or learning. The success of cognitive presence is dependent on all aspects of teaching presence (design, facilitation, and direction).

Teaching presence might be thought of as the glue which holds together the CoI. Although social and cognitive presences are required, the creation of a learning community can occur only through effective teaching presence. Put simply teaching presence is the work of the teacher (and others) before, during, and after

a course. Anderson, Rourke, Garrison, and Archer (2001) define teaching presence as "the design, facilitation, and direction of cognitive and social processes for the realization of personally meaningful and educationally worthwhile learning outcomes"(p. 5).

At the intersection of these three presences is where we see the educational experience and the outcomes of the community of inquiry. A community of inquiry is "an environment that is supportive intellectually and socially, and with the guidance of a knowledgeable instructor, students will engage in meaningful discourse and develop personal and lasting understandings of course topics" (Rourke & Kanuka, 2009, p. 21). However, in their review of the literature surrounding the community of inquiry, Rourke and Kanuka (2009) reported that "it is unlikely that deep and meaningful learning arises in CoI" (p. 19).

There has been speculation as to why students rarely reach higher levels of inquiry. Garrison, Anderson and Archer (2010) and others have suggested that "the design and expectation of the educational experience did not require students to move to these phases" (p. 6-7). Previous research has found that the bulk of the intellectual work is frequently at a surface level rather than engagement at a deep level where we would expect to see the promised higher order thinking processes and actions (Garrison et al., 2001; Kanuka & Anderson, 1998; Kanuka et al., 2007; Meyer, 2003, 2004; Redmond & Mander, 2006; Schrire, 2004; Stein et al., 2007). These researchers suggest that teaching presence which designs, facilitates, and directs learners through all phases of inquiry is required.

It has been suggested that the lower levels of learning developed in some courses may lead to higher levels or deep learning in future courses (Akyol et al., 2009), where "such knowledge may not emerge as a result of a single within-course inquiry but may come as a result of the cumulative effect of multiple within-course inquiries or engagements with course content" (p. 128). Higher levels of learning and critical thinking require time to process.

The outcome of students' learning is reliant on the activities, expectations and implementation of design by the teacher. Many of the above researchers (and others) who commented that students may not reach higher levels of learning suggest that it is due to ineffective design, facilitation, or direction by the instructor (Bangert, 2008; Ice, Akyol, & Garrison, 2009; Luebeck & Bice, 2005; Meyer, 2003; Redmond & Mander, 2006; Shea & Bidjerano, 2009). Having said that, there are other studies that have shown that learners have engaged in the inquiry process at higher levels (Akyol & Garrison, 2008; Meyer, 2004; Pisutova-Gerber & Malovicova, 2009). Other studies reveal that it is difficult to measure cognitive presence and perhaps we need to look at a broader range of artefacts beyond the traditional online discussion archives and surveys (Archer, 2010).

The transactional nature of the presences means that cognitive presence is influenced by social presence and teaching presence (Akyol et al., 2009). That is, social presence impacts on cognitive presence; teaching presence impacts on social presence and so on. "[C]ognitive presence is an outcome of teaching and social

presence rather than a variable that coexists at the same level" (Bangert, 2008, p. 56). Educational experiences must be designed so that higher order constructs such as reflection and critical thinking can be achieved and cognitive presence is visible at high levels.

When learners are asked to co-construct knowledge through learning communities, educators "seek to involve students both socially and intellectually in ways that promote cognitive development as well as an appreciation for the many ways in which one's own knowing is enhanced when other voices are part of that learning experience" (Tinto, 2003, p. 2). The role of the educator is key in designing and promoting social and cognitive interactions in a community of inquiry. Social presence, cognitive presence, and teaching presence form the foundation of the CoI framework and the next three sections of this chapter will explain each of the presences in detail.

Social Presence

Social presence might be thought of as the quality of the personal relations among the participants. "Social presence encompasses the ability of participants to coalesce for a common purpose" (Garrison, Cleveland-Innes, & Fung, 2004, p. 63). Terms such as connectedness, proximity, accessibility, and relationship are often used when discussing social presence. Recently Kim (in press) defined social presence as "the specific awareness of relations among the members in a mediated communication environment and the degree of proximity and affiliation formed through it" (p. 4).

Social presence is largely about a learner's perception about others online: both the other learners and the instructor. It is a reflection of the social dynamics and relationships learners have with others (Biocca, Harms, & Burgoon, 2003). When communicating with others online, frequently with people they have never met and often about very personal perspectives or experiences, learners must feel a sense of trust (Rourke, Anderson, Garrison, & Archer, 1999). These social relationships are important to develop learning or cognitive relationships.

While researching measures representing a sense of community due to social connectedness Abedin et al (2010) found that features such as a feeling of connectedness, lack of isolation, cohesion, respect, interdependence, sense of belonging, and awareness of others had significant impact. These features encourage active participation in a community of inquiry which "shapes not only what we do, but also who we are and how we interpret what we do" (Wenger, 1998, p. 4). Not only is social presence important when becoming a member of a community of learners but it is also an important part of the learning process. Many researchers have found social presence impacts on the learners' perceptions of achievement and satisfaction with learning experiences (Kim, in press; Picciano, 2002; J. Richardson & Swan, 2003; Shea, Fredericksen, Pickett, Pelz, & Swan, 2001; Swan & Shih, 2005). Kim (in press) found that the perceived social presence of both the instructor and peers within the learning community is "a strong predictor of perceived learning achievement and learning satisfaction" (p. 13).

Not only are the elements of social presence important from a student perspective; they are also important from a design and facilitation perspective. The first two of seven principles of good practice in education developed by Chickering and Gamson (1987) are to encourage contacts between students and faculty and to develop reciprocity and cooperation among students. Effective social presence is required for these two principles to be enacted successfully.

Social presence requires consideration as part of course design; and information should be communicated to the learners regarding the expectations and importance of the frequency and tone of online interactions (Garrison, 2006). Frequently in blended and online courses, social and introductory forums are provided by the instructor to provide opportunities for students to get to know one another before the collaborative and cognitive discussions occur. Over time, social presence becomes less visible: it is an additional layer of communication which is not restricted to posts at the beginning of the course but acknowledges "the importance of explicitly establishing social presence and a sense of community" (Stacey & Gerbic, 2007, p. 173) as part of the learning experience rather than as an added extra. Learners need to feel that there is someone behind the technology who is concerned about their learning; it also allows learners to feel connected to one another.

In a blended environment, social presence can be afforded by digital communication tools such as online discussions, text chats, audio conferencing, video conferencing, and wikis. However, it is the involvement of the participants themselves that makes the difference. In blended learning environments, the face-to-face interactions "can have an accelerating effect on establishing social presence and can shift the group dynamics much more rapidly toward intellectually productive activities" (Garrison & Anderson, 2003, p. 54). Blended learning environments have an advantage while developing the elements of social presence.

The three categories of social presence described by Garrison and Anderson (2003) are affective, open communication, and group cohesion. Table 2.5 provides the indicators for each category and examples at the indicator level.

Table 2.5
Social Presence Categories and Indicators

Category	Indicators	Example
Affective	Expression of emotions	'I just can't stand it when .... !!!' 'ANYBODY OUT THERE!'
	Use of humour	The banana crop in Calgary is looking good this year ;-)'
	Self-Disclosure	'Where I work, this is what we do ...' 'I just don't understand this question'

Open Communication	Continuing a thread	Software dependent, e.g. 'Subject: Re' or 'Branch from'
	Quoting from others' messages	'Martha writes: ... '
	Referring explicitly to others' messages	'In your message, you talked about Moore's distinction between ... '
	Asking questions	'Anyone else had experience with WEBCT?'
	Complimenting, expressing appreciation	'I really like your interpretation of the reading'
	Expressing agreement	'I was thinking the same thing. You really hit the nail on the head'
Cohesive	Vocatives	'I think John made a good point' 'John, what do you think?'
	Addresses or refers to the group using inclusive pronouns	'Our textbook refers to ... 'I think we veered off track ...'
	Phatics, Salutations	'Hi all' 'That's it for now' We're having the most beautiful weather here'

Source: (Garrison & Anderson, 2003, p. 51)

As indicated in the above table, the affective category includes expression of emotions; humour; and the sharing of personal information, beliefs, and experiences. The second category of open communication is exemplified by interactions in which participants acknowledge, make direct reference to, or reply to the posts of others; they offer compliments and encouragement to others; question or invite responses of others; agree and disagree with others; and provide personal advice to classmates. The final category of social presence is one of group cohesion and is illustrated by postings which include: greetings and closures; names and group pronouns (us, we, our); social or non-course related personal information.

The categories and indicators were developed in 1999 and have undergone some modifications over time. Rourke, Anderson, Garrison, and Archer (1999) initially labelled the Open communication category as Interactive responses. Some additional social presence indicators have been recommended by Swan and Shih (2005) and Shea et al. (2010). However as social presence is not the focus for this study, they will not be explored here.

It is through social presence that learners create a feeling of community and develop trust. Social presence is an enabler for students to engage in substantive conversation and higher-order thinking within cognitive presence (Garrison & Anderson, 2003). In an online environment, learners often experience feelings of "alienation, loneliness and indifference" (Kim, in press). Social presence is required to break down the barriers among participants to increase their willingness to share experiences and contribute to robust dialogue through critiquing the contributions of others and asking probing questions. Social

presence provides the groundwork for high level dialogue rather than that of "pathological politeness" (Archer as cited in Garrison & Anderson, 2003, p. 53), where learners' comments are not challenged nor treated with scepticism. Garrison and Anderson (2003) recommended that an environment that supports "intellectually challenging yet respectful" (p.50) dialogue will result in critical thinking and higher levels of learning. According to Garrison, Cleveland-Innes, and Fung (2010) social presence "is a responsibility of teaching presence and a condition for creating cognitive presence" (p. 32). The level of cognitive presence is impacted by the quality of the interaction between members of a community of inquiry and also the social relationships amongst its members.

Cognitive Presence

According to Newman, Marks, and Gamoran (1996), cognitive work within inquiry learning has the following three features. Firstly, it builds on or makes connections to prior knowledge from a range of disciplines; secondly, it develops deep understanding by making connections to other information or knowledge; and finally, it enables students to engage in elaborative dialogue or substantive conversation.

Within a community of inquiry, Lipman (2003) suggests that learners will engage in the cognitive acts of "wondering, questioning, inferring, defining, assuming, supposing, imagining, [and] distinguishing" (p. 95). Cognitive presence describes "the intellectual environment that supports sustained critical discourse and higher order knowledge acquisition and application" (2003, p. 55). It is a process of thought or knowing and a result of perception, learning, and reasoning.

"(T)he extent to which learners are able to construct and confirm meaning through sustained reflection and discourse in a critical community of inquiry" (Garrison et al., 2001, p. 11) is known as cognitive presence. Garrison (2003) comments that "[c]ognitive presence reflects the intellectual climate" (p. 49) of an educational experience and that it is shaped by reflection, critical thinking, and collaboration through discourse. According to Garrison and Anderson (2003), cognitive presence "concerns the process of both reflection and discourse in the initiation, construction and confirmation of meaningful learning outcomes" (p. 4) within the CoI framework.

The higher order thinking constructs of "discourse, collaboration, management, reflection, monitoring and knowledge constructions" (Kanuka & Garrison, 2004, p. 30) fit within the CoI framework. The concept of cognitive presence is congruent with Dewey's (1933) view of critical thinking. "[C]ognitive presence is the key element in critical thinking, a necessary element for higher levels of thinking and learning" (Kanuka & Garrison, 2004, p. 33). Garrison et al. (2001) commented that cognitive presence "reflects high-order knowledge acquisition and application" (p. 11) and "is grounded in the critical-thinking literature " and "focuses on higher-order thinking processes" (p. 8).

It is within cognitive presence that students engage in meaningful and worthwhile educational experiences, where learners, educators, and others share and compare knowledge and experiences, reflect, connect, construct, deconstruct, monitor,

discuss, and apply what they have learned through discussion (Kanuka & Garrison, 2004). It is Clark's (2002) belief that "cognitive engagement is a necessary condition for success in learning" (p. 600). He goes on to suggest that high levels of cognitive engagement can occur as a result of high levels of online interaction.

It is within cognitive presence that learners engage in what Fowler and Mayes (1999) considered the learning cycle. Learners move within the cycle both as individuals and as a member of a learning community in an effort to construct understandings. The three elements within the cycle include conceptualisation where students gather information and deconstruct relevant personal experiences in order to make sense of the information. The second phase is construction where learners create knowledge by investigating and analysing the relationships among different sources of information. In the final phase of the cycle students test and apply their knowledge largely through dialogue. Fowler and Mayes (1999) concept of a learning cycle is aligned with the process of practical inquiry.

Practical Inquiry

The practical inquiry model shown in Figure 2 was created by Garrison et al. (2000) to operationalise the cognitive presence element of the CoI framework. This model traces its roots back to Dewey's (1933) writing on critical and reflective thinking where he suggested that reflective thinking involves "a state of doubt" (p. 12) and "searching to find information that will resolve the doubt" (p. 12). He proposed that critical thinkers go through the processes of problem awareness; imagining and deliberating on solutions and implications; and finally confirming ideas through action.

Akyol, Arbaugh, Cleveland-Innes, Garrison, Ice, Richardson, and Swan (2009) commented that the practical inquiry model describes the types of learning activities learners engage in, and descriptions of deep learning. They go on to say that it includes "understanding an issue or problem; searching for relevant information; connecting and integrating information; and actively confirming the understanding in a collaborative and reflective learning process" (p. 125).

The CoI framework recognises that learners move between a private world where individual meaning is constructed and deconstructed and a public world where experiences are reconstructed and connected and meaning is shared in an effort to derive understanding of concepts. A "worthwhile learning experience must consider the learner's personal world (reflective and meaning focused) as well as the shared world (collaborative and knowledge focused) associated with a purposeful and structured educational environment" (Garrison & Anderson, 2003, p. 92). In a community of inquiry, the construction of meaning occurs at both the individual and the shared levels and students are asked to become "responsible to each other in the process of trying to know" (Tinto, 2003, p. 2).

Figure 2.2 illustrates the separation between the cognitive processes undertaken in the private, reflective world and a student's shared world where meaning is made through dialogue. Also, on the vertical dimension, it shows a continuum involving the learner's action enhanced by practice or doing and deliberation or

real world application. The horizontal plane indicates growth from abstract ideas or conception to concrete experiences and increased perception or awareness.

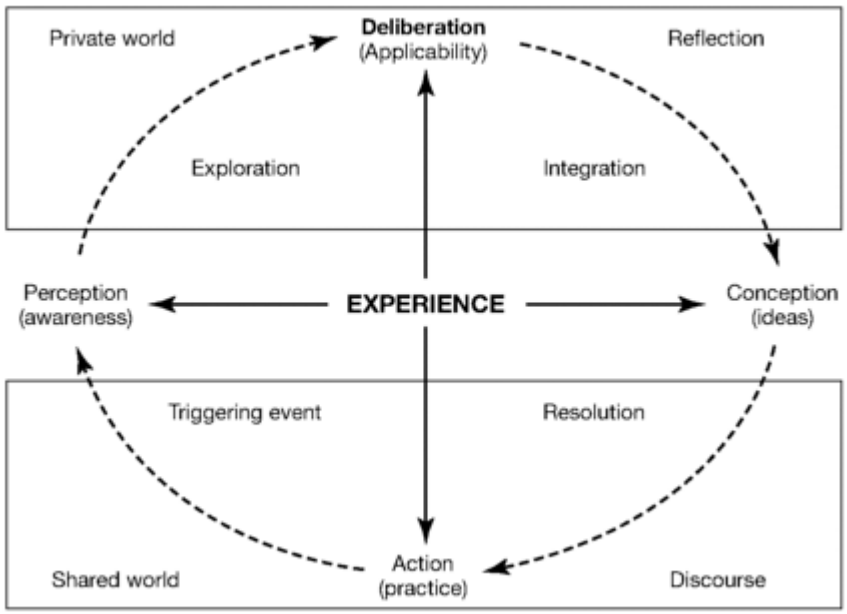

Figure 2.3. Practical Inquiry (Garrison & Anderson, 2003, p. 59)

The practical inquiry model is a "multi-phased educational process designed to construct meaning and confirm understanding" (Garrison & Anderson, 2003, p. 28). The phases within the model are not linear but represent the intersection of two continua as shown in Figure 2.2. It represents a cycle of inquiry rather than a linear process.

"The practical inquiry model reflects the critical thinking process and the means to create cognitive presence" (Garrison et al., 2001, p. 11). There are significant parallels between Dewey's (1933) and Garrison et al.'s (2000) frameworks. The practical inquiry model is characterised by four phases. These phases are: Triggering Event, Exploration, Integration and Resolution.

The first phase is a Triggering event where information, questions or tasks are presented which make the learners feel cognitive dissonance because they engage with information that is not connected to other knowledge or conflicts with their prior knowledge or beliefs. At this point learners are puzzled or perplexed and it "is a yearning for balance that in turn drives the learner to do something to resolve it—namely, to start the process of inquiry" (Rodgers, 2002, p. 850). The aim of the triggering event is to promote questions and curiosity from the learners.

Triggering promotes evocative or inductive activities from the learner in their attempt to fill the gap between their prior knowledge and the new information: they are involved in knowledge re-construction. This disequilibrium or unsettledness is the starting point for inquiry. As Lipman (2003) described, "[f]or there to be inquiry, there must be some doubt that all is well, some recognition that one's situation contains troubling difficulties and is somehow problematic" (p. 94).

Learners are more likely to recognise a problem or have a sense of puzzlement when they are within a community of inquiry: "cognitive conflict, which is not always detected by learners working alone, can be facilitated during interactions among peers" (Choi, Land, & Turgeon, 2005, p. 484). This is largely due to the fact that multiple perspectives provide different ways of looking at issues which an individual may not have thought of.

The second phase is that of exploration, where learners look for information to resolve the cognitive dissonance experienced in the triggering phase. Exploration is a phase dominated by information exchange, and ambiguities are discussed; the problem itself may be poorly defined and trying to define the problem becomes part of the exploration phase also (Garrison & Anderson, 2003).

Exploration is an inquisitive or divergent phase, within the CoI framework, where learners brainstorm a range of ideas and perspectives and they evaluate these different suggestions. Within this stage learners are forced to recognise alternative points of view and search for new information in an attempt to determine ways to resolve the initial problem.

The third phase of practical inquiry is that of integration: where participants connect the ideas collected in the exploration phase and attempt to create solutions(Garrison & Anderson, 2003). The integration of information from multiple sources ensures that learners contribute to discussions with an informed voice. They compare, contrast, and connect ideas from other participants and from relevant literature. Learners are encouraged by instructors to continue to share and question for understanding and to engage in higher order thinking by justifying statements and building on the ideas of others.

Without the assistance of instructors, learners frequently get stalled at this phase. This phase "typically requires enhanced teaching presence to probe and diagnose ideas so that learners will move to higher level thinking in developing their ideas" (Garrison & Arbaugh, 2007, p. 161). It is a tentative yet convergent phase, with learners integrating and synthesising information and experiences from phase two or from their prior knowledge to constructive tentative explanations or solutions.

The final phase of the practical inquiry model is that of resolution. It is where new ideas are applied or solutions are critically assessed. The proposed solution can be "vicariously tested" (Garrison et al., 2001, p. 11) or learners can "apply the newly gained knowledge to educational contexts or workplace settings" (Garrison & Arbaugh, 2007, p. 161).

Resolution is the end product of the learning processes within the CoI framework. At this stage learners are committed to testing and defending their solution (Garrison & Anderson, 2003). Application of the solution is often through experimentation and the outcomes often result in going back to the initial stage and starting the inquiry cycle again.

As part of the CoI framework for each of the three presences, the authors have articulated participant behaviours and processes or indicators. These indicators can be used to analyse the nature and quality of the academic discourse. Table 2.6

presents the practical inquiry model which shows for each of the four phases sample indicators and processes or examples of the content that might form part of the category.

Table 2.6
Practical Inquiry Phases and Indicators

Practical inquiry Phase	**Indicators**	**Socio-cognitive processes**
Triggering Event	Recognize problem	Presenting background information that culminates in a question
	Sense of puzzlement	Asking questions Messages that take discussion in a new direction
Exploration	Divergence – within the online community	Unsubstantiated contradiction of previous ideas
	Divergence – within a single message	Many different ideas/themes presented in one message
	Information exchange	Personal narratives/descriptions/facts (not used as evidence to support a conclusion) Sharing of literature/resources Questions of clarification
	Suggestions for consideration	Author explicitly characterizes message as exploration, e.g., "Does that seem about right?" "Am I way off the mark?"
	Brainstorming	Adds to established points but does not systematically defend/justify/develop situation
	Leaps to conclusions	Offers unsupported opinions
Integration	Convergence – among group members	Reference to previous message followed by substantiated agreement (e.g., "I agree because . . .") Building on, adding to others' ideas
	Convergence – within a single message	Justified, developed, defensible, yet tentative hypotheses
	Connecting ideas, synthesis	Integrating information from various sources – text book, articles, personal experience
	Creating solutions	Explicit characterization of message as a solution by participant
Resolution	Vicarious or real world application of solutions/ideas	Providing examples of how problems were solved Results of application
	Defending solutions	Defending why a problem was solved in a specific manner

Source: (Garrison & Anderson, 2003, pp. 15-16)

Table 2.6 shows the practical inquiry model, which forms the backbone of identifying cognitive presence indicating four phases of critical thinking. This table provides a framework from which work can be analysed to evaluate the levels of cognitive presence made visible by learners.

Cognitive presence within this study is the link between content and the supporting discourse between participants. The learners' active and intellectual engagement with the content, one another, and the instructor promotes critical reflection and gives rise to positive educational experiences. The discourse within a community of inquiry requires the participants to make public their private thoughts and concerns. It provides learners with time to reflect, gives a permanent or semi-permanent record of the discussion, and it requires participants to move beyond vague understandings and to make their thinking clear through the use of written language.

Reflection as an Element of Cognitive Presence

The CoI framework is based on the tenets of inquiry and constructivism and provides a framework which can guide educators and researchers in their approach to directed and collaborative inquiry with each element within the framework, focusing on the core educational processes of dialogue and reflection. "The premise of this framework is that high-order learning is best supported in a community of learners engaged in critical reflection and discourse"(Garrison, Cleveland-Innes, et al., 2010, p. 32). This section of the literature review will present a case for the modification of the indicators for cognitive presence at the resolution phase to include a reflection indicator which will be then investigated in practice during the data analysis in chapter 4.

Often terms such as reflection, inquiry, and critical thinking are used interchangeably. Rodgers (2002) lamented that "reflection has suffered from a loss of meaning. In becoming everything to everybody it has lost its ability to be seen" (p. 843). She goes on to comment that it is difficult to define, distinguish, access, and research due to the lack of common language and shared meaning. Educators often demand learners strive for reflective thinking; however, it is difficult to distinguish what it is.

From a constructivist perspective, meaning making "is the goal of learning processes, it requires articulation and reflection on what we know" (Jonassen, Davidson, Collins, Campbell, & Haag, 1995, p. 11). An effective educational experience has learners question, actively seek information, think, reflect, and evaluate during their learning (K. P. Cross, 1998; Duncan & Barnett, 2010).

Reflective thinking has been defined by Dewey (1933) as "*[a]ctive, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends*" (p. 9). It can be used to improve learning and thinking and it includes "recursive thinking, metacognitive thinking, self-corrective thinking" (Lipman, 2003, p. 27) related to both the content and the learning process. "An important facet of developing

higher order thinking skills is the ability to reflect on the learning experience and incorporate new knowledge with pre-existing knowledge" (Stoney & Oliver, 1999, ¶ 26).

As discussed previously in this chapter there are a number of forms of interaction, and learner—self interaction (Aminifar & Bahiraey, 2010) is a form of reflection. Soo and Bonk (1998) see "reflection as conversing with oneself – a sort of 'inner dialogue', where the learner takes on both the protagonist and the antagonist roles sequentially in an attempt to reframe his understanding" (p. 3). The interaction within oneself "is considered to be self reflection and internalization of the materials read or received through others or books against personal experience and prior knowledge making interaction meaningful, leading to changes that are referred to as learning" (Aminifar & Bahiraey, 2010, p. 414). Soo and Bonk (1998) have suggested that "[r]eflection is critical to learning. In fact, this is ultimately where learning occurs and learners retreat from interaction to focus on individual and internal reflections" (p. 6).

Reflection occurs from and in practice and leads to future actions. Facione and Facione (2007) observed that "reflective decision-making and thoughtful problem solving [is] about what to believe and do" (p. 44). Abrams (2005) perceived that reflection is vital for critical thinking.

In an attempt to clarify the term reflection, Rogers (2002) distilled the works of Dewey and others and distinguished six criteria which characterise reflection:

- Reflection as a meaning-making process;
- Reflection as a rigorous way of thinking;
- Reflection in community;
- Reflection as a set of attitudes;
- Reflection requires curiosity; and
- Reflection for a desire to grow (Rodgers, 2002).

The first criterion suggests that when we use reflection to make meaning it requires learners to move beyond an experience and to consider what to do with the experience to weave meaning and "deeper understanding of its relationships with and connections to other experiences and ideas" (Rodgers, 2002, p. 845). The second criterion, reflection as a rigorous, systematic, disciplined way of thinking, assumes that learners are open to potential meanings rather than taking on board only that evidence which substantiates prior ideas. The third criterion is that reflection needs to happen with others, by interacting with others in a learning community. Rodgers (2002) suggested that collaborative reflection has three benefits. Firstly, it affirms and values personal experience; secondly, it enables participants to see things from other perspectives or provides alternative meanings; and thirdly, it provides support for ongoing inquiry.

The fourth criterion for reflection "requires attitudes that value the personal and intellectual growth of oneself and of others" (Rodgers, 2002, p. 845). Reflection which is supported by the affective traits of whole-heartedness, directness, open-mindedness, responsibility, and readiness is more likely to extend one's knowledge and understanding. Whole-heartedness refers to an enthusiasm for all elements of a subject matter. Directness means having confidence in yourself and your

judgement. Open-mindedness might be seen as a willingness to consider multiple perspectives. Intellectual responsibility "acknowledges that the meaning we are acting on is our meaning" (Rodgers, 2002, p. 862) and may not represent the same meaning to others. The previous four characteristics ensure that learners are ready to engage in reflection.

Curiosity is the fifth criterion that is considered significant for reflective thinking. Curiosity "bespeaks a positive, wide-eyed attitude toward both one's own and others' learning" (Rodgers, 2002, p. 851). The final criterion is a desire for growth and the ability to let go of what one believes, in search for improved outcomes.

Reflection is a process rather than an outcome. It is a means from which raw experience might be transformed into meaning which is grounded in both theory and experience for the purpose of growth (Rodgers, 2002). Reflection requires both cognitive and emotional restraint to ensure we value different interpretations.

Undertaking the activities of reflection is not limited to learners (both at the K – 12 levels and in higher education); teachers must also engage in these activities as a means of continuous improvement. As Parks (2010) indicated "[w]ithin teacher education, reflection is widely used as a strategy to help teachers become more aware of their teaching practices and … to foster change" (p. 84). This is also expected by the Queensland College of Teachers who are the registering body of teachers in Queensland. The final of 10 professional standards is for teachers to "[c]ommit to reflective practice and ongoing professional renewal" (Queensland College of Teachers, 2009, p. 16). When teachers reflect on their practice, it might also be said that they are inquiring into their practice in an attempt to make changes to practice for improved learning

outcomes (Lipman, 2003). Not only do teacher educators need to be able to enact reflection, they need to be able to teach their learners how to engage in reflective thinking.

The practical inquiry model "provides a comprehensive framework that reinforces the development of critical thinking skills within a context of reflective pedagogies" (Guthrie & McCracken, 2010, p. 5). Elements of cognitive presence and the practical inquiry model that are associated with reflection include:

- Thinking for oneself;
- Reasonableness (employ rational procedures in a judicious manner, capacity of listening, to be open to reason);
- Reflective (reflective reading, deep reading, reflective questioning, and reflective discussion including attentive listening);
- Provoking in the quest for meaning; and
- Questioning (Lipman, 2003; Tinto, 2003).

Dewey's (1933) significant influence on the practical inquiry model is identified in his account of the processes involved in reflective thinking: "(1) a state of doubt, hesitation, perplexity, mental difficulty, in which thinking originates, and (2) an act of searching, hunting, inquiring, to find material that will resolve the doubt, settle and dispose of the perplexity" (p. 12).

These align with the phases identified by Garrison et al. (2000) in their cognitive presence. However, the term reflection does not appear within the categories or indicators of the framework, although one of the authors contends that learners move through the four phases "in an environment of reflection and discourse; analysis and synthesis" (Garrison, Cleveland-Innes, et al., 2010, p. 32). It is from this thinking that this research recommends an additional indicator be added to the resolution phase, that of Reflection. Table 2.7 presents the modified indicators, with the socio-cognitive processes of reflecting on learning outcomes and learning processes included.

Table 2.7
Recommended Modification to Resolution Phase of Teaching Presence

Phase	Indicators	Socio-cognitive processes
Resolution/Application	Vicarious or real world application of solutions/ideas	Providing examples of how problems were solved Results of application
	Defending solutions	Defending why a problem was solved in a specific manner
	Reflection	Reflecting on learning outcomes Reflecting on learning processes

Source: Modified for this research

Garrison (2003) reflected that the "dimensions of high-order learning emerge from the concepts of reflective inquiry, self-direction and metacognition" (p. 1), and these can be made explicit in the practical inquiry model. It is the task of the instructor through their teaching presence to facilitate dialogue which will foster critical thinking and reflection (Garrison & Arbaugh, 2007; Soo & Bonk, 1998).

Teaching Presence

Critical thinking and discipline knowledge are key outcomes of higher education. Vaughan (2004) suggested that the combination of roles and functions required to create and sustain a dynamic learning environment and facilitate higher levels of learning is known as teaching presence. Teaching presence "brings all the elements of a community of inquiry together" (Garrison & Anderson, 2003, p. 29), as the instructor manages and monitors the cognitive and social dynamics of the class to create a purposeful community of inquiry.

The concept of teaching presence has been expressed in a number of different ways. Shea and Bidjerano (2010) see teaching presence as the "online instructional orchestration" (p. 17) whereas Jones, Naugle and Kolloff (2008) talk about it as an instructional relationship in that the instructor designs, communicates and models the intellectual climate of the course. They go on to suggest that teaching presence is established at the beginning of a course because "students form opinions and make assumptions about the instructor, and the

organisation of the course, from the first meeting" (Jones et al., 2008). However, the design aspect of teaching presence must occur prior to the learners' entering the learning space to ensure that assessment tasks and learning materials are created.

Students, however, might consider teaching presence to be how visible the instructor is in the online space (Shea, Frederickson, Pickett, & Pelz, 2003). The quantity and quality of teaching presence is important in designing and facilitating the co-construction of knowledge. It is more than being present; it is also what the instructor does when they are there. Teaching presence requires the instructor to focus on the learner, the learning materials, the content, and the learning interface.

Salmon (2003) conceptualised online teaching presence in five stages. These stages are linear within one course. Stage 1: Access and motivation, where the instructor sets up the online teaching and learning space and makes that space available to the learners. The role of the instructor at this point is to welcome and engage the participants; they may also be required to provide technical assistance about how to access the site, for instance.

Stage 2: Online socialisation, is the initial sending and receiving of online discussion posts. The participants are familiarising themselves with the interface and expectations. At this time, the instructor should provide activities which build cultural and social links among the participants within the learning environment.

Stage 3: Information exchange, is where students start searching and personalising the learning activities. The instructor should facilitate tasks that encourage learners to interact with the learning materials provided within the course.

Stage 4: Knowledge construction, exploits the collaborative nature of the online space; the instructor role at this point is to facilitate the collaborative construction of knowledge. Both the learners and the instructor may provide links to resources external to the course to assist in the construction of knowledge. The instructor should also respond and support the students in their individual meaning making.

The final stage is Stage 5: Development, where learners take on the responsibility for their own learning. It is a student centered stage, where learners explore the concepts at a higher level, using critical thinking and reflection as they articulate their personal meaning. The process of making meaning requires interactions which are under the control of each learner, including engagement with the content and context, and consideration of the emotions and experiences of the learner as well as those of other learners.

Teaching presence can be thought of as "the design, facilitation and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (Anderson et al., 2001, p. 5). This role is largely taken on by the instructor, but all participants can demonstrate this form of presence (Garrison et al., 2000). It includes the intentional design of learning experiences, the provision of resources and scaffolds to extend learning, and providing feedback to learners as they work through what Mayes and Fowler (1999) describe as a 'learning cycle' which comprises the three phases –

conceptualization, construction and dialogue. Teaching presence can "support and enhance social and cognitive presence for the purpose of realising educational outcomes" (Garrison et al., 2000, p. 90).

Garrison et al. (2000) see teaching presence has having three key roles: design and organisation, facilitating discourse, and direct instruction. Other researchers (see Table 2.8) have also attempted to categorise the role of a teacher.

Table 2.8 presents a comparison of the different teaching roles. There is some general consistency in the different perspectives. In general there seems to be agreement that teachers perform the following types of activities: managing; designing, organising, and assessing; facilitating; supporting; instructing; and providing technical assistance. These form the active and visible roles of teaching and impact the levels of social and cognitive presence.

Table 2.8
Teaching Roles

Berge (1995)	**Garrison, Anderson and Archer (2000)**	**Berge and Collins (2000)**	**Goodyear et al. (2001)**	**Morris, Xu and Finnegan (2005)**	**Weltzer-Ward (2011)**
Managerial		Manager	Manager/ administrator		Managing
Pedagogical	Design and Organisation	Editor	Designer	Course customiser	
			Assessor	Grading and assessment	
	Facilitating discourse	Discussion leader	Facilitator	Course facilitator Process facilitator	Guiding discourse
Social		Firefighter filter	Adviser/ counsellor		Supporting
	Direct instruction	Content expert	Content facilitator		Instructing
Technical		Helper and marketer	Technologist		

Source: Created for this research

The design and leadership elements of teaching presence are important in providing opportunities for students to reach high levels of critical thinking and deep learning (Duncan & Barnett, 2010). Garrison and Arbaugh (2007) stress that it is important that "[i]nstructors must have both content and pedagogical expertise" (p. 164). This is reaffirmed in Shulman's (1986) concept of pedagogical content knowledge. Mishra and Koehler (2006) built on this concept and suggested that instructors need to have proficiency in Technological Pedagogical Content Knowledge (TPACK). This move beyond content and pedagogical knowledge acknowledges the importance of an understanding of the impact that ICT has on content and teaching and learning. Figure 2.3 demonstrates the

interrelatedness of the three key elements. The instructor's expertise in all areas of TPACK should be observable irrespective of the mode of teaching and learning.

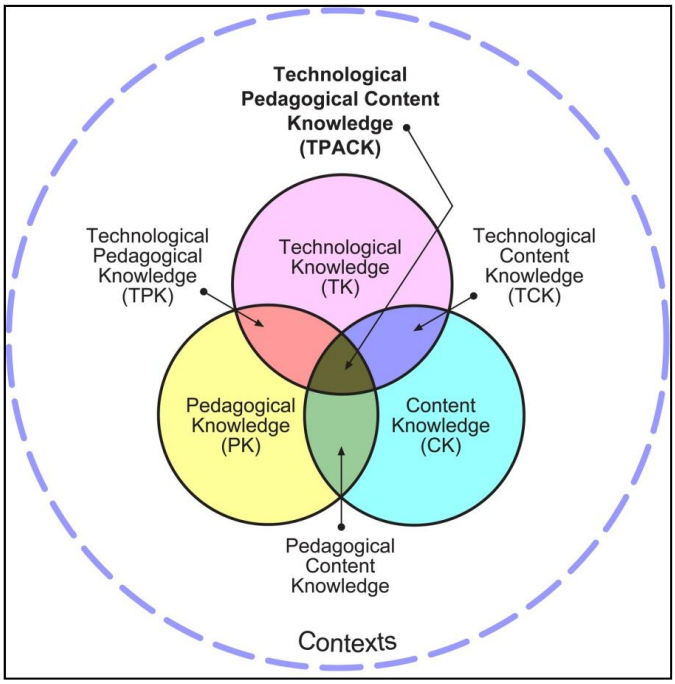

Figure 2.4. TPACK (Koehler & Mishra, 2010)

The seven sections of TPACK are defined below. These different sets of knowledge are central to teachers practice in contemporary teaching and learning environments.

- *Content Knowledge* (CK) "is knowledge about the actual subject matter that is to be learned or taught" (Koehler & Mishra, 2008, p. 13).
- *Pedagogical Knowledge* (PK) can be thought of as "the process and practice or methods of teaching and learning and encompasses (among other things) overall educational purposes, values, and aims" (Koehler & Mishra, 2008, p. 14).
- *Technological Knowledge* (TK) is considered knowledge about how to use long established technologies, such as the blackboard and textbooks; in addition to contemporary computer-based technologies, such as Web 2.0, software, digital probes, computer microscopes, and electronic whiteboards (Mishra & Koehler, 2006).
- *Pedagogical Content Knowledge* (PCK) is appreciating the value of, and implementing different "ways of representing and formulating the subject that make it comprehensible to others" (Shulman, 1986, p. 9).
- *Technological Content Knowledge* (TCK) is the "understanding of the manner in which technology and content influence and constrain one another" (Koehler & Mishra, 2008, p. 16).
- *Technological Pedagogical Knowledge* (TPK) can be defined as "an understanding of how teaching and learning changes when particular technologies are used" (Koehler & Mishra, 2008, p. 16).
- *Technological Pedagogical Content Knowledge* (TPACK) "is the basis of effective teaching with technology" (Koehler & Mishra, 2008, p. 17).

The seven sets of knowledge briefly characterised above have not traditionally been "held by technologically proficient subject matter experts, or by technologists who know little of the subject or of pedagogy, or by teachers who know little of that subject or about technology" (Mishra & Koehler, 2006, p. 1029). This framework specifies the knowledge required by educators when teaching in ICT enhanced learning environments.

Technological expertise is not restricted to skills in using ICT tools, nor the pedagogical awareness of how ICT can be used in teaching and learning. In a blended or online environment, it is essential that the instructor's teaching presence is visible and supportive. Hara, Bonk, and Angeli (2000) have revealed that the visible presence of a facilitator within online discussions increases the quality and quantity of the dialogue. Increased learner participation and increased complexity of learner interactions should result in improved depth of knowledge and critical thinking or cognitive presence.

Instructor immediacy "refers to communication behaviours that reduce social and psychological distance between people" (Arbaugh, 2001, p. 43). These immediacy behaviours result in learners' having a positive motivation toward the instructor and the content in a course. It is a predictor of a sense of community, perceived learning outcomes, and learner satisfaction (Bangert, 2008; Garrison & Arbaugh, 2007; Garrison, Cleveland-Innes, et al., 2010; Rodríguez, Plax, & Kearney, 1996; Shea, Hayes, & Vickers, 2010). It is speculated that this is the primary area where action by the teacher can have an effect on learning. It involves regular participation in activities such as explaining, modeling appropriate online dialogue, acknowledging, and encouraging ongoing engagement with learners. When instructors personalise the tone of the discussion and the content, learners see the instructor's enthusiasm and passion for the content, which in turn can be motivating for the learner.

It has been recently posited by Shea, Hayes and Vickers (2010) that teaching presence (including the frequency and the behaviours) impact on student results. More work needs to be done in this area to describe the correlation between teaching presence and learning outcomes in depth and to validate the claims.

As previously indicated, Garrison, Anderson, and Archer's (2000) model of teaching presence has three categories: design and organisation, facilitating discourse, and direct instruction. The indicators for each of the three categories along with examples are shown in Table 2.9.

Table 2.9
Teaching Presence Categories and Indicators

Category	Indicators	Examples
Instructional design and organisation	Setting curriculum	'This week we will be discussing … '
	Designing methods	'I am going to divide you into groups, and you will debate … '
	Establishing time parameters	'Please post a message by Friday … '
	Utilising medium effectively	'Try to address issues that others have raised when you post'
	Establishing netiquette	'Keep your messages short'
	Making macro-level comments about course content	'This discussion is intended to give you a broad set of tools/skills which you will be able to use in deciding when and how to use different research techniques'
Facilitating Discourse	Identifying area of agreement'/disagreement	'Joe, Mary has provided a compelling counter–example to your hypothesis. Would you care to respond?'
	Seeking to reach consensus/understanding	'I think Joe and Mark are saying essentially the same thing'
	Encouraging, acknowledging, or reinforcing student contributions	'Thank you for your insightful comments'
	Setting climate for learning	'Don't feel self-conscious about "thinking out loud" on the forum. This is a place to try out ideas after all'
	Drawing in participants, prompting discussion	'Any thoughts on this issue?' 'Anyone care to comment?'
	Assessing the efficacy of the process	'I think we're getting a little off track here'
Direct Instruction	Present content/questions	'Bates says … What do you think'
	Focus the discussion on specific issues	'I think that's a dead end. I would ask you to consider … '
	Summarise the discussion	'The original question was … Joe said … Mary said … We concluded that … We still haven't addressed … '
	Confirm understanding through assessment and explanatory feedback	'You're close, but you didn't account for … This is important because … '
	Diagnose misconception	'Remember, Bates is speaking from an administrative perspective, so be careful when you say … '
	Inject knowledge from diverse sources, e.g., textbook, articles, Internet, personal experiences (includes pointers to resources)	'I was at a conference with Bates once, and he said … You can find the proceedings from the conference at http://www … '
	Responding to technical concerns	'If you want to include a hyperlink in your message, you have to … '

Source: Modified from Garrison and Anderson (2003, p. 61)

As is identified in Table 2.9, successful teaching presence includes the design and organisation of the educational experiences through setting curriculum and content, setting assessment, establishing time lines, and considering a range of teaching methods and activities (Garrison & Anderson, 2003). Technology-enabling pedagogy provides a different approach to teaching: "[i]nstead of presenting content/information/knowledge in a linear sequential manner, learners can be provided with a rich array of tools and information sources to use in creating their own learning pathways" (Siemens, 2005b, ¶ 60). During the design stage of a blended course, consideration must be given to what activities will be best facilitated online and which should remain face-to-face.

Although Garrison et al.'s (2000) CoI model is based on the concept of constructivism, there is a role for direct instruction where educators or experts would provide information, focus and summarise the discussion, give feedback to confirm understanding, diagnose misconceptions throughout the learning experience, and assist students to make connections to their prior knowledge and experiences (Garrison & Anderson, 2003).

In their 2010 publication where they re-examined the CoI framework, Shea et al., (2010) suggested some significant revisions to the direct instruction category. The seven indicators from Garrison, Anderson and Archer's (2000) original model are replaced with five different indicators as follows.

Table 2.10
Proposed Modifications to Direct Instruction

Garrison, Anderson and Archer's (2000) Direct instruction indicators	**Shea, Hayes, & Vickers (2010)suggested indicator modifications and explanations**
Present content/question	*Providing valuable analogies:"*[a]ttempts to rephrase/reformulate course material in ways that highlight similarities between content assumed to be understood and new content with the goal of making the material more comprehensible" (p. 19). *Offering useful illustrations:* is exemplified when the instructor provides substantive examples to advance understanding
Focus the discussion on specific issues	
Summarise the discussion	
Confirm understanding through assessment and explanatory feedback	
Diagnose misconceptions	*Supplying clarifying information in* and may be seen when, in an attempt to reduce confusion or misconceptions about course content, additional explanations are provided

Inject knowledge from diverse sources	*Making explicit reference to outside material:* This is where the instructor (or others) explicitly names and refers to additional relevant resources from websites, articles, texts, and personal experiences.
Responding to technical concerns	
	Conducting supportive demonstrations: illustrated when the instructor shows how to complete processes

Source: Created for this research

The modifications recommended by Shea et al. (2010), also include an additional category called *Assessmen*t which has the following six indicators. The first indicator is G*iving formative feedback for discussions,* which includes explicitly evaluating the discussion, offering feedback or diagnosing misconceptions. The second indicator is labelled: *Providing formative feedback for other assignments,* and takes account of the instructor explicitly evaluating previous assignments, offering feedback, or diagnosing misconceptions. The third indicator is entitled *Delivering summative feedback for discussions,* which is where the instructor provides post mortem feedback discussions including grades. The next indicator is named *Supplying summative feedback for other assignments,* which incorporates providing post mortem feedback of previous assignments including grades. The fifth indicator is described as *Soliciting formative assessment on course design and learning activities from students and other participants,* and is defined as seeking feedback upon completion of modules or during mid-course. The sixth and final indicator added by Shea et al. (2010) has the label *Soliciting summative assessment on course design and learning activities from students and other participants*, and could transpire when the instructor seeks meta-level feedback at the close of the course. It should be noted that the majority of the assessment items are not necessarily found in online discussions but in other areas of the course.

There seems to be some overlap between the indicators and descriptors of the modifications suggested by Shea et al. (2010). Indicators one and two are both about providing formative feedback, firstly for discussions and secondly for assessment. Similar links appear for indicators three and four, which focus on the provision of summative feedback for discussions and supplying summative feedback for other assignments. This is of particular concern when participation in discussion forms part of the assessment items: and raises the question as to whether they are distinct enough to be separate indicators.

The new proposal does not seem to provide space for the R*esponding to technical concerns* indicator which appears in the original model. Also, two of the indicators that previously appeared as part of direct instruction, *Focus the discussion on specific issues* and *Summarise the discussion*, now appear as part of the facilitating discussion category.

Timing of this publication meant that it was unable to be included in the methodology and analysis of the research for this study. Moreover, the new model lacks statistical testing through means such as factor analysis.

There has also been ongoing debate in regard to the number of dimensions or categories of teaching presence. In the original model, teaching presence has three dimensions: design and organisation, facilitating discourse, and direct instruction. However, Shea, Li, and Picket's (2006) research shows learners can indentify only two constructs, with facilitating discourse and direct instruction combining into one, and this is supported by Shea, Hayes, and Vickers (2010). In response, Garrison, Anderson and Archer (2010) suggest that "depending on the design and pedagogical approach, students may not differentiate between design and direction or facilitation and direction" (p. 7).

When facilitating online discussions, the instructor must contribute to the dialogue but not dominate (Garrison, 2003). Within online discussions ,the instructor can play many roles and their contributions to the discussions should clarify, challenge, model, seek elaboration, diagnose misconceptions, negotiate meaning, justify, and guide the discussion (Garrison et al., 2000; Pawan et al., 2003) towards deep levels of understanding. This function of the instructor, or teaching presence, is one of the pivotal elements of the CoI model as described by Garrison et al. (2000).

Effective facilitation of discourse enables discussion to move from the sharing of experiences or opinions to the co-construction of understanding and knowledge through a rich and exploratory dialogue which draws from the perspectives of others and research. Facilitating discourse also includes setting the climate for learning, asking questions, drawing all students into the discussion, and acknowledging student contributions (Garrison & Anderson, 2003).

An effective approach to teaching presence is one which will cultivate a cognitive relationship between the learners and the instructor, in addition to providing intellectual and social leadership within the course (Redmond & Lock, 2006). In blended learning, teaching presence should be apparent in both the face-to-face and the online learning.

A limitation to the teaching presence categories and indicators is that the research has previously been limited largely to analysis of online discussion threads. This research study will look at documentation beyond online discussions and use the construct in a new context. This study aims to investigate a range of tasks and roles undertaken by the instructors in their enactment of teaching presence.

Research Gaps

The CoI model has been successful in describing the nature of the interactions of the participants in online discussions of post-graduate courses. The authors of the CoI framework recognise that the model can be applied to any educational experience, and can provide a framework to analyse face-to-face, blended, and online learning in primary, secondary or undergraduate contexts. Toth, Amrein-Beardsley, and Foulger (2010) have suggested that future research is required in the areas of collaborative communication and critical thinking in an undergraduate setting. Early research using the CoI framework concentrated on using it to analyse

students' posts in post-graduate online learning in the education discipline. Vaughan (2004) expanded its use to a blended learning environment within a faculty development context.

Recently, Archer (2010) reflected that "the use of the community of inquiry framework has been largely restricted to analysis of online discussions" (p. 69); and the results of previous studies often indicated that within online discussions the high levels of cognitive presence, the integration and resolution phases, are rarely achieved (Garrison et al., 2000; Garrison et al., 2001; Kanuka et al., 2007; Redmond & Mander, 2006; Stein et al., 2007; Vaughan & Garrison, 2005). Given discussion on most topics last for 1 – 2 weeks, one must question if it is realistic to believe that students will move through all four phases in such a short time.

It is important to understand why students rarely achieve higher levels of thinking. Archer (2010) has also suggested that "we have been looking for these phases in the wrong place" (p. 69), and that students would reserve their work at these high levels for inclusion in their assessment responses; assuming their assessment tasks were designed for this to occur. Integration is more likely to be observed in more extended writing tasks such as essays, rather than within the online discussions. Exploration is more likely to be observed in items related to the 'real world', for example reflections from professional experience placements.

Previous research has focused on identifying the nature and level of online discussion, which has not encapsulated all of the work from both the learners and the instructors. Although a survey instrument has been added to collect data, this still does not represent the whole course. Interestingly, in 2010, as this research study was coming to an end, two teams of researchers (Archer, 2010; Shea, Hayes, & Vickers, 2010) recommended that CoI framework needed to represent whole courses rather than just online discussions and surveys.

In response to these concerns about the previous data being restricted to exploring the online discussions and perceptions of post-graduate learners or blended experiences of faculty, the data sources for this study have been expanded to include the assessment tasks and other course documentation in addition to the traditional sources.

Over the last decade where CoI model has been used to frame research it has often been of a qualitative nature and largely represents only one of the presences (Anderson et al., 2001; Redmond & Mander, 2006; Rourke et al., 1999; Shea et al., 2003; Shea et al., 2006; Swan & Shih, 2005) as the key research aspect (Garrison, Cleveland-Innes, et al., 2010). Garrison, Cleveland-Innes, and Fung (2010) believe that "it is crucial that we begin to study the causal connections amongst its elements" (p. 31).

It is important that we have an understanding of how each of the presences impacts the others in a range of educational contexts. Recently there have been a few papers that have focused on more than one presence (Akyol & Garrison, 2008; Shea & Bidjerano, 2009). However, there is scope for research which focuses on more than one presence in a more than qualitative method. This research has a focuses on cognitive and teaching presence and uses both qualitative and quantitative data collection in a mixed method approach.

In their original work, Garrison, Anderson and Archer (Garrison et al., 2001) suggested that the indicators provided in the practical inquiry model "characterize the process that is occurring in the particular phase" (p. 14). They provide illustrations of the types of activities being undertaken rather than a definitive list (J. Richardson & Ice, 2010).

Given the increase in blended and online courses there is value in investing in the development of reflection online and the creation of coding schemes for analysis (Weltzer-Ward, 2011). The work of Dewey (1933) and Henri (1992) emphasised the benefits of reflection on learning. Given their work is the basis of much of the past research in the area of critical thinking and online discussions, including the development of the CoI framework which now dominates research in the blended and online spaces, it seems prudent to modify the CoI framework to include the reflective elements of the learning process. That being the case, it is time to re-examine the indicators within the practical inquiry model (J. Richardson & Ice, 2010) with reference to the reflective elements.

This study's contribution to the literature is concerning the impact of teaching presence on cognitive presence using the lens of the CoI model in the context of undergraduate blended courses. In addition, it will also review the concept of reflection as part of cognitive presence. This study will build on previous research using the CoI model which uses either online transcript analysis or survey. Unlike other studies, the data analysis or coding will occur at the indicator level rather than the higher level; it will use qualitative and quantitative data, while developing an understanding of how teaching presence impacts on cognitive presence and the dynamics of the categories within both presences.

Chapter Summary

There has been increased use of technologies as part of blended learning opportunities across all levels of higher education. This review of selected literature suggested that despite the ubiquitous nature of ICT in learning, it has yet to transform the teaching practices of many educators. Nor do the current pedagogical practices consistently result in learners' engaging in critical and reflective thinking transforming learning outcomes. One of the most challenging parts of the redesign of courses when moving from face-to-face to blended learning is the decision about which elements should continue to remain in the face-to-face mode and which elements can be effectively dealt with online.

It has been demonstrated by other research studies that the CoI model is effective in providing an "understanding and a methodology for studying the potential and effectiveness of computer conferencing" (Garrison, Anderson, et al., 2010, p. 6). It was initially developed to explore higher-order thinking in post-graduate online communication, but it has now also been used in other contexts. This research aims to use the CoI model as a lens to unpack the relationship between what the instructor does (teaching presence) and the quality of the students' response (cognitive presence) within undergraduate blended environments.

This chapter has presented a review of selected literature related to this study, along with the CoI framework which forms the conceptual framework that underpins the research. The chapter discussed the broad issues and enabled the reader to gain insight into the key elements of the study. The following chapter, Chapter 3, describes the design of the multi-case study within this research. It will articulate the methods used to investigate the research problems of this study. The design of the study has been informed by the literature presented in this chapter.

CHAPTER 3: METHODOLOGY

Overview

In the previous chapter, the literature was reviewed and research issues were identified. This chapter will describe the methodological approaches used within the study, including the research setting, research design, data collection, participants, data integrity, data analysis and ethical considerations.

Within a naturalistic paradigm this study investigated how teaching presence impacted on cognitive presence of undergraduate teacher education students within blended courses. The research study was exploratory because of the lack of earlier research investigating undergraduate blended learning and critical thinking. It used a mixed methodology with a multi-case study approach. Multiple methods were used to collect and analyse data and to triangulate results while exploring relationships between teaching presence and cognitive presence.

Research Design and Methodology

The purpose of this research was to investigate how teaching presence might promote critical thinking, particularly in online discussions within blended courses. In addition the study also sought to explore how students make their cognitive presence visible in other elements of a course.

This research examined three undergraduate courses taught in blended mode in an Australian regional university. This thesis describes each course in detail and analyses the data collected to provide a deep understanding of the relationship between what teachers do and the cognitive responses of their students. This research was stimulated from the researcher's thoughts about how to support undergraduate students enrolled in blended courses to meaningfully interact online in ways which will enhance their depth of knowledge.

The study draws from contemporary real life experiences and uses the CoI framework as a lens to inquire about how teaching presence influences cognitive presence and the development of critical thinking within a blended course at the undergraduate level. A review of the literature in Chapter 2 demonstrated a gap at the intersection of these elements.

This research was exploratory in nature and was conducted using a concurrent mixed methodology. A mixed method approach was used to better understand the complexity of the research problem and to explore and build on the participant views with other data. As previously indicated, data was collected from multiple sources of evidence including archived online discussions, student surveys, course examiner survey, and semi-structured interviews.

A naturalistic inquiry approach (Lincoln & Guba, 1985; Wellington, 2000, ¶ 11) was used to guide the research process. Naturalistic inquiry involves "studying real-world situations as they unfold naturally" (Patton, 2002, p. 40). The researcher and the research methods were non-manipulative and non-controlling. Some of the

relevant naturalistic inquiry characteristics which were found in this research include natural setting, human instrument, case study reporting mode, and tentative application. Each element will be briefly discussed below.

Natural setting: A real world research setting was used to carry out the inquiry and provide data for a detailed description; the researcher (naturalist) became "part of the context" (Lincoln & Guba, 1985, p. 192). The researcher's goal was to "be true to the nature of the phenomena under study" and to "tell it like it is" (N. Norris & Walker, 2005, p. 132). One of the cases from which data were collected was a course where the researcher was also the course instructor. The research was teaching in the same faculty as the other instructors and was able to provide a big picture perspective for each case and the cross-case analysis. Lincoln and Guba (1985) commented that within a natural setting "realities are wholes that cannot be understood in isolation from their contexts, nor can they be fragmented for the separate study of the parts" (p. 39).

Human instrument: The researcher used herself "as well as other humans as the primary data-gathering instruments" (Lincoln & Guba, 1985, p. 39). In addition, after drafting the case descriptions, the researcher sought feedback from the course instructors for each case to confirm the accuracy of the information. The researcher brought tacit background knowledge to the research which Wellington (2000) suggests "is a valuable addition to other types of knowledge" (p. 19).

Case study reporting mode: Teaching and learning environments are complex and contextually different. The complexities of the cases were explored and reported in depth using a case study approach. Case study is defined by Nisbet and Watt (1984) as "a systemic investigation of a specific instance" (p. 74). They suggested that case study research is particularly suited to an individual researcher, and that the results are more easily understood by a wide readership outside professional research circles. Lincoln and Guba (1985) put forward that case study reporting "is more adapted to a description of the multiple realities encountered at any given site" (p. 41). With this in mind, the researcher used a multi-case study framework to report the research, with each course being a different case.

Tentative application: The conclusions drawn from the research were tentative. The researcher would be "hesitant about making broad application of the findings because realities are multiple and different" (Lincoln & Guba, 1985, p. 42). "[F]uzzy generalisations" (Bassey, 1999, p. 52) could be made across the three cases. However, conclusions drawn from observations are time and context dependent.

Setting, Participants and Scope

The context of this study was within the teacher education program in the Faculty of Education at the University of Southern Queensland (USQ) from a regional Australian university located in Toowoomba, Queensland. Many undergraduate face-to-face courses have become blended courses, utilising the online environment to provide discussion areas, upload lecture notes, and provide access to other supporting resources, experts, and dialogue amongst participants. In discussion with colleagues within the faculty, it became apparent that it was not understood why undergraduate learners within the online discussions of blended learning

environments participated less regularly than post-graduate students and at a surface level rather than a deep level. The study contributes to an understanding of the nature of the educational transaction and the relationship between teaching presence and cognitive presence.

To explore the role of teaching presence and its impact on cognitive presence in blended courses, data were collected from three courses where the instructors had different levels of experience in teaching blended and online courses. Each instructor (and their class) was selected as a case because they had different patterns of teaching presence. Although the CoI framework is the conceptual framework for this research, it was not used to assist in the design and facilitation of any of the courses/cases described below. The course instructors volunteered their courses as a data collection site and their students consented for their contributions to be used as data.

Within the university there is a mandate for all courses, irrespective of mode (e.g. face-to-face, online, external print), to have an online presence. This online presence may include a number of elements; however it commonly includes a welcome to the course, course materials, and opportunity for online discussion. The instructors of all three cases within this study made a conscious decision to blend their face-to-face and online elements.

The research was conducted within a constructivist learning environment. The instructors in all three courses would consider themselves as constructivist educators, believing that student centered teaching approaches and reflective practices are essential elements in the practice of an effective 21st century teacher and teacher educator

Each course draws from a different domain within education: Early Childhood leadership and management; Diversity and inclusivity in Primary education classrooms; and Pedagogical issues for the middle years learners situated within Secondary classrooms. Different areas within the education discipline were selected "to randomize any possible subject-matter effects that might influence results" (Garrison, Cleveland-Innes, et al., 2010, p. 33). Because all of the cases come from education, the results may not be able to be generalised to other disciplines, although Wolcott (1995) argues that "[e]ach case study is unique, but not so unique that we cannot learn from it and apply its lessons more generally" (p. 175). Yin (2009) also suggests that multi-case study can be used to cumulatively produce some generalisations.

Each case study will be described in detail in chapters 4 and 5 as part of the data analysis and presentation of the findings.

Research Questions

To build an understanding of the relationship between teaching presence and cognitive presence the following questions were explored:

Key research question:

In what ways can teaching presence enhance the development of cognitive presence in a blended undergraduate teacher education course?

Subsidiary questions:

1. What is the nature of student cognitive presence in the online discussion element of a blended course?
2. What is the nature of teaching presence in a blended course?
3. What aspects of teaching presence promote cognitive presence?
4. How can teaching presence in the online component of undergraduate blended courses be modified to enhance cognitive presence and the development of critical thinking?
5. How might reflection be positioned within cognitive presence?

Case Study Methodology

A case study methodology was selected for this research as it enabled the researcher to explain the complexity of real-life events. Case studies "involve systematically gathering enough information about a particular person, social setting, event, or group to permit the researcher to effectively understand how it operates or functions" (Berg, 2001, p. 225). Case study entails a "social construction of meaning *in situ"* (Stark & Torrance, 2005, p. 33) while exploring complex meanings. They go on to claim that

> case study seeks to engage with and report the complexity of social activity in order to represent the meanings that individual social actors bring to those settings and manufacture in them. Case study assumes that 'social reality' is created through social interaction, albeit stated in particular contexts and histories, and seeks to identify and describe before trying to analyse and theorize (Stark & Torrance, 2005, p. 33).

This case study inquiry addressed a natural phenomenon which is bounded by space and time. The data come from courses which run over one semester. This type of inquiry enabled the researcher to complete an in-depth analysis in order "to understand complex social phenomena … [yet] retain the holistic and meaningful characteristics of real-life events" (Yin, 2009, p. 4). Yin also suggested that case study "will typically be about complex events and behaviour, occurring within possibly more complex, real-life context[s]" (Yin, 2009, p. 129).

"[C]ase study research comprises an all-encompassing method – covering the logic of design, data collection techniques, and specific approaches to data analysis" (Yin, 2009, p. 18). It is grounded in a variety of sources of information and tends to provide a rich description of the real-life phenomenon under exploration. It is often difficult to distinguish between the phenomenon and the context in case study

inquiry. In this case study, the participants' interactions and responses from both part of the phenomenon and part of the context in the undergraduate courses which became the cases under investigation. "Case researchers seek out both what is common and what is particular about the case" (Stake, 2008, p. 125).

One of the benefits of case study is that it provides the ability to take a real activity bounded in a complex context and research it in depth. Another strength of case study is that it can take an activity "and use multiple methods and data sources to explore it and interrogate it" (Stark & Torrance, 2005, p. 33). This chapter provides a description of how a number of data collection devices have been used to collect data for the multi-case study, including archived discussion posts, course documentation, surveys, and interviews.

Chapter 4 presents an account of the three cases exposing the multiple realities of the participants in blended undergraduate teacher education courses. The experiences of both students and instructors are depicted and analysed through the lens of the CoI framework. This study aimed to present a narrative of the research "in order to represent it from the participant's perspective" (Stark & Torrance, 2005, p. 33). A multi-case study approach made it possible to capture the multiple perceptions and experiences of course examiners and students within undergraduate blended courses.

Multiple Case Study

Multisite case studies "address the same research questions in a number of settings using similar data collection and analysis procedures in each setting" (Herriott & Firestone, 1983, p. 14). Stark and Torrance (2005) suggested that it is "helpful to compare and contrast across cases" (p. 34). Through a cross-case analysis, the researcher searched for patterns and consistencies.

By seeking linkages between cases, the "findings [are] likely to be more robust than having only a single case" (Yin, 2009, p. 156); but rigorous within-case analysis is required prior to cross-case comparison (Rihoux, 2006). After synthesising the multiple cases it is then possible to "draw a single set of 'cross-case' conclusions" (Yin, 2009, p. 20).

The three cases selected have a small number of participants and Rihoux (2006) suggests that "one should not broaden too much the variety of the cases" (p. 687). Having a number of similar features assists in making comparisons and is particularly important if trying to generalise from the findings. However, it is also important that "comparable cases display enough diversity" (p. 688). A detailed description of each case will be provided in Chapter 4.

Research indicates that there are four common limitations of case study inquiry (Stark & Torrance, 2005; Wellington, 2000; Yin, 2009). Firstly, the conclusions from case studies may not be generalisable to the population as a whole. This is particularly evident in terms of statistical generalisations from a single or small number of cases. Secondly, the case or cases selected may not be representative of the whole. Thirdly, there is the possibility of bias of the investigator, which might

impact on any or all aspects of the research, for example, conducting an interview or determining the direction of findings. Finally, the researcher may not follow systematic procedures throughout the investigation.

It is anticipated that these limitations will be reduced through the following techniques:

1. Use of fuzzy generalizations (Bassey, 1999). The generalisations made from this research may be used to inform teaching and learning in other USQ blended courses. In addition, a goal of this research is to expand and generalise theories to those sites similar to the cases within this study.
2. Specific selection of purposeful and convenience sampling for the cases.
3. The concept of bias is not restricted to case study and can enter into any method of research. The researcher aims to "[r]eport all evidence fairly" (Yin, 2009, p. 14).
4. Use of highly structured data collection technique: using a survey previously validated by others and a "priori" (B. Johnson & Christensen, 2008) coding of the conceptual framework of the CoI.

The case study approach to exploring a phenomenon is preferred when the researcher has little or no control over real-life events (Burns, 2000; Yin, 2009). That condition is true of this study, which is naturalistic and involves no treatment or manipulation. Case study has distinct advantages when (how or why) questions are being "asked about

- a contemporary set of events,
- over which the investigator has little or no control" (Yin, 2009, p. 13).

In summary, the case study methodology is appropriate for this research on three counts. Firstly, this research investigates 'how' and 'why' question types. Secondly, the behaviour of learners in response to teaching presence cannot be controlled by the researcher. And finally, the phenomenon of critical thinking in blended courses is a contemporary issue.

Mixed Methodology

This was a concurrent mixed method study with the intent of gathering both qualitative and quantitative data and integrating them to expand the capacity to explore the research problem in detail. "Concurrent mixed methods procedures are those in which the researcher converges or merges quantitative and qualitative data in order to provide a comprehensive analysis of the research problem" (Creswell, 2009, p. 228).

Mixed methods research has been defined in multiple ways. Johnson & Onwuegbuzie (2004) considered mixed methods research to be a "class of research where the researcher mixes or combines quantitative and qualitative research technology, methods, approaches, concepts or languages into a single study" (p. 17). However Tashakkori & Creswell (2007) identified it as "research in which the investigator collects and analyzes data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study or a program of inquiry" (p. 4). Although there is increased acknowledgment of mixed methods as a

third methodology, there is still debate surrounding it, particularly in the areas of "basic definitions, research designs, and how to draw inferences in mixed methods research" (Tashakkori & Teddlie, 2008, p. 101).

"[T]here is no one mixed methods methodology, and the term can be applied to widely divergent approaches to research" (Bazeley, 2004, p. 141). Mixing can happen at the design stage, the data collection stage, the data analysis stage, and the writing stage of the research. Tashakkori and Teddlie (1998) suggested that when qualitative and quantitative approaches are mixed "throughout several phases of a study [it] more accurately reflects the research cycle" (p. 52).

According to Greene, Caracelli and Graham (1989), there are five different purposes for mixed methods research:

1. Triangulation, which seeks to corroborate results from different methods to increase the validity;
2. Complementarity, which seeks to enhance the results in one method with results from another method to increase meaning and validity;
3. Development, which seeks to use the results from one method to inform the other method to improve validity;
4. Initiation, which seeks contradictions or new perspectives from the results of one method when compared with the results of the other method; and
5. Expansion, which seeks to extend the depth and breadth of the inquiry.

Mixed methodologies are frequently used because their use can eliminate or reduce bias; enhance the understanding and exploration of phenomena; or improve validity (Creswell, Plano Clark, & Garrett, 2008). However, there is very little written on "how mixed methods research *should* be done" (Bryman, 2008, p. 89). As yet there are no best practice statements or principles to guide researchers in how to combine qualitative and quantitative data. Having said that, Creswell et al. (2008) suggested that data integration can occur in three ways: "(1) designing and implementing comparable topics or questions for both arms; (2) transforming the data so that it can be more easily compared; and (3) using matrices to organize both sets of data into one table" (p. 73).

Within this research, mixed methods were used to triangulate the data and to provide an expanded overview of each case. The research design includes both quantitative and qualitative data sets to address the same questions. The qualitative data enabled expansion of the data provided in quantitative formats. The CoI framework and practical inquiry model were used to analyse both types of data, enabling them to be transformed into one form of data. For example, the qualitative online postings were analysed according to themes and frequencies of posts at different levels and then statistical analysis was performed on the data.

Mixed methodology affords a number of benefits to researchers (Creswell et al., 2008; R. B. Johnson & Onwuegbuzie, 2004; Wiersma & Jurs, 2005). For example, words, pictures, maps and narrative can add meaning to numbers or codes; whereas numbers can add precision to narrative. It also avoids the bias of a single research method while providing quantitative and qualitative strengths. Mixed methods research provides a stronger base of evidence for conclusions and an increased

opportunity to generalise results. In addition, it affords the ability to look at issues from a variety of perspectives and to explore a broad, diverse and complex range of questions.

Having said that there are also identified weaknesses of mixed methodology (Creswell et al., 2008; R. B. Johnson & Onwuegbuzie, 2004). It is difficult to carry out because the researcher has to learn multiple methods and it is more time consuming. Moreover, there can be problems with sampling, data integration, bias, and the interpretation of conflicting results.

"Concurrent triangulation strategy in mixed methods is an approach in which the researcher collects both quantitative and qualitative data concurrently and then compares the two databases to determine if there is convergence, differences, or some combination" (Creswell, 2009, p. 228). This strategy can enable the researcher to form meta-inferences or "an overall conclusion, explanation or understanding developed through an integration of the inferences obtained from the qualitative and quantitative strands of a mixed methods study" (Tashakkori & Teddlie, 2008, p. 101). These inferences can occur both during the process of investigating and in the emerging conclusions.

This research study has used a concurrent mixed method research design. The qualitative and quantitative data were collected side-by-side. Figure 3.1 illustrates the data collection and data analysis process using this research design.

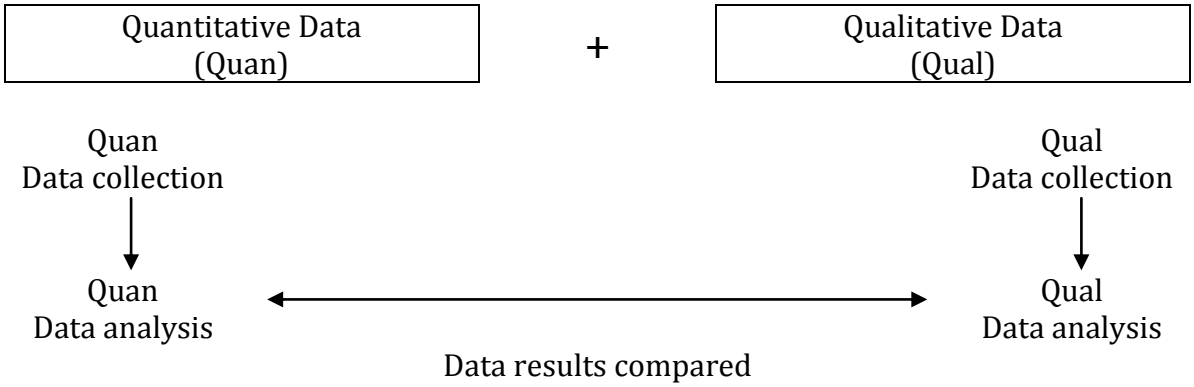

Figure 3.1. Concurrent research design, Modified from Creswell (2009)

Using mixed methodology in this study can be justified because, when compared to a single method, using a mix of methods enables a researcher to explore more complex issues and collect a rich and robust range of data and a more complete account of the inquiry (Bryman, 2008; Yin, 2009). All research methods have strengths and weaknesses. The advantage of mixed methods research is that the weaknesses of one methodology can be offset by the researcher using an additional method which has complementary strengths in those areas (Bryman, 2008; R. B. Johnson & Onwuegbuzie, 2004). Finally quantitative and qualitative data can be merged to afford triangulation or enhanced validity (Bryman, 2008; Creswell, 2009).

Role of the Researcher

This research is situated in the real world environment. It was suggested by Green (1988) that this type of research "cannot be carried out by people who see themselves as detached, neutral observers concerned with the kinds of observation, measurement, and prediction that are presumed to be unbiased" (p. 175). Within this study, the researcher took on three distinct but sometimes overlapping roles: firstly, that of an instructor; secondly, one of a colleague to the other instructors; and thirdly, one of a researcher. This resulting participant researcher position was restricted to Case C. As a participant observer the researcher participated "in the events being studied" (Wellington, 2000, p. 95).

There are a number of advantages and disadvantages of participant research. Potential advantages include prior knowledge of context; easier access to participants and data; established relationships; and familiarity (Wellington, 2000). In contrast, the potential disadvantages of participant research, which must be accounted for, are pre-conceptions; close mindedness; other distractions; exaggerated assumptions; and confusion about role (Kemmis & McTaggart, 2005; Wellington, 2000).

The researcher's role in this study varied in anticipation that participant researcher could be balanced with general researcher and a range of data evidence. Within Cases A and B the researcher's role was confined to that of a researcher. However, in Case C, the researcher undertook the role of participant researcher in that she was a participant: an instructor and a researcher. As a participant instructor she was involved in the design, facilitation and instruction of the learning experience within Case C. As a researcher the roles included the collection, analysis, and interpretation of the data. In all cases the researcher was a "noninterventionist" (Stake, 1995, p. 44). Table 3.1 clarifies the role of the participant researcher.

Table 3.1
Case C Role Clarification

Course Examiner and Reflective Practitioner	**Researcher**
Design blended course to develop learners' deep knowledge, critical thinking skills and online collaborative skills.	Observation and analysis of course documentation
Direct Instruction	Observation and analysis
Facilitate learning, including online discussions	Analysis and mapping of online contributions
Develop assessment tasks: including a reflective task to be posted for all participants to view	Analyse participants reflections about the learning outcomes and process (what and how they learned)
Review course materials, assessment and learning activities	Document materials; survey and interview participants
Reflect on cognitive and teaching presence	Document processes and outcomes

Source: Created for this research

In Case C, the researcher was part of the context but as a researcher she minimised how much she "disturb[ed] the context" (Lincoln & Guba, 1985, p. 192) by ensuring that data analysis was completed after the teaching of the course was completed and results had been provided to students. The researcher viewed this study as an opportunity to investigate the pedagogical practices of blended teaching but also to reflect on her own teaching and explore how this study could impact on her future teaching (and those of her colleagues).

Within these dual roles, there was a "horizon of pre-understanding on the part of the researcher, even as there is a[n] horizon of pre-understanding in the situation being studied" (M. Greene, 1988, pp. 175-176). The researcher's pre-understanding in Case C was extensive, and there was some pre-understanding of Cases A and B in that they were set in the same faculty in the University. The course examiners in Case A and B were colleagues, who volunteered their courses to be involved, and who had a similar view of learning as a social construction of knowledge.

A heurist has been provided by Anderson (2010) to explore the evolution of pedagogies in flexible learning. He provides three generations (to this point). The first generation is that which uses a behaviourist/cognitive approach to teaching. This is a self paced or single learner model of learning. The second generation is that of constructivism which focuses on learners in groups constructing new knowledge through an active and dialogic approach. The third generation is that of connectivism where learning is collective and networked.

In this dissertation, social constructivism, connectivism, and situated learning formed part of the author's world view. Constructivist learning theories are based on the premise that learners construct new knowledge based on existing knowledge and experiences while attempting to make meaning of new information (Bransford, Brown, & Cocking, 2000; Kanuka & Anderson, 1998; Rourke & Anderson, 2002). The term 'constructivism' describes teaching and learning experiences where "(1) learning is an active process of constructing rather than acquiring knowledge, and (2) instruction is a process of supporting that construction rather than communicating knowledge" (Duffy & Cunningham, 1996, p. 171).

It was suggested by Driscoll (1994) that the objectives of constructivist approaches to education are problem solving, critical thinking, reasoning, and the active and reflective use of knowledge. Social constructivists emphasise that learning is a social activity and that learners make meaning through dialogue, communication, collaboration, and interaction (Jonassen et al., 1999; Rourke & Anderson, 2002; Swan, 2005).

Connectivism theory is next in the evolution of learning theories, and builds on theories such as chaos, network, complexity, cognitivism, constructivism and social constructivism. The theory of connectivism is based on the premise that learning involves forming connections between nodes such as "thoughts, feelings, interactions with others, and new data and information" (Siemens, 2005b, ¶ 9). It is also thought to be the third generation of flexible learning pedagogies (Anderson, 2010). Meaning is created through the formations of connections and encoding nodes, which is a messy and iterative process. Elements of the learning cycle can include data, information, knowledge and meaning.

It has been suggested by Siemens (2005b) that patterning is an important component of learning and that "recognizing the nature and organisation of various types of information and knowledge" (¶ 18) is critical to meaning-making. Experience or triggers are the "catalyst for both acquiring new nodes and forming connections between existing nodes" (Siemens, 2005b, ¶ 21) and "[c]onnections are the key to network learning" (Siemens, 2005b, ¶ 11). New information is connected to existing knowledge and over time widens the network. It is important to recognise that the theories of both connectivism and social constructivism form the basis of the researcher's views about teaching and learning.

Guba and Lincoln (1994) commented that a paradigm is the world view or belief system that guides the researcher. Johnson and Onwuegbuzie (2004) state that a research paradigm is a "set of beliefs, values and assumptions" (p. 24). The researcher acknowledges her own leaning towards social constructivism and naturalistic inquiry; in particular, her belief that learners construct and reconstruct their own reality through integration of prior knowledge and experiences with current experiences within a social environment. This research draws data from within a constructivist learning environment.

Within this research, the researcher comes with the voice of the "passionate participant" (Lincoln, 1991). The researcher's previous teaching and research experience has enabled her to develop meaning informed by prior knowledge, experiences, and beliefs; and these may have impacted on the interpretation of any evidence, which is subjective. When re-presenting the research, the researcher acknowledges that she is influenced by her world view.

The case study and mixed methods approaches in this research align with the researcher's personal research paradigm or world view and are suitable methodologies for this research study from a number of perspectives. Yin (2009) confirms that the case study approach to research can use a "mix of quantitative and qualitative evidence" (p. 19). This is verified by Mackenzie and Knipe (2006) who reiterate that researchers in a constructivist paradigm can use mixed methods of data collection. In addition, Norris and Walker (2005) explained that "[b]ecause of the importance of context, naturalistic enquiry is often best conceived as case study. … The preferred methods of research are observation, … interview and the collection of documents and other social artefacts" (p. 133). This justifies the data collection tools described later in this chapter.

Conceptual Framework

A number of theoretical frameworks have been developed to interrogate online learning (Berge, 1995; Garrison et al., 2000; Henri, 1992; Sengupta, 2001); and other existing constructs have previously been used to examine the cognitive element of teaching and learning in a range of contexts, for example, Bloom's Taxonomy (Bloom, Engelhart, Frust, Hill, & Krathwohl, 1956).

Various methods for evaluating the quality of online interactions and critical thinking were discussed in Chapter 2. The CoI framework (Garrison et al., 2000) was

used as the conceptual framework for this research. As has been previously described in detail in Chapter 2, the CoI model melds social, cognitive, and teaching presences when creating educational experiences.

Vaughan and Garrison (2005) commented that the CoI model has been successful in guiding research and learning experiences. However, it has been "applied almost exclusively to online learning" (p. 3) within graduate courses and faculty development contexts (Garrison et al., 2001; McKlin, Harmon, Evans, & Jones, 2002; Meyer, 2003; Pawan et al., 2003; Shea et al., 2003; Vaughan, 2004; Vaughan & Garrison, 2005). This research explored the cognitive presence and teaching presence elements of the CoI framework within the context of blended undergraduate courses, where the model has yet to be widely employed.

Given the range of data collected it was important to use a coding scheme to pull together results for different sources of evidence. Because this research builds on the work of others, it was decided to select some instruments and coding systems that had been developed and used in previous research rather than develop new coding schemes (Gall, Borg, & Gall, 1996; Rourke & Anderson, 2004). A number of empirically tested frameworks and data collection instruments based on the CoI framework were used or adapted for use within the study. This enabled results to be compared with other studies.

Other researchers have validated the CoI as a conceptual structure through factor analysis (Arbaugh, 2007; Arbaugh, Cleveland-Innes, Diaz, Garrison, Ice, Richardson, Shea, et al., 2008; Shea & Bidjerano, 2008). The coding system and survey instrument have also been validated by a number of other researchers. Garrison and Arbaugh (2007) confirmed that "recent empirical research certainly supports the CoI as a parsimonious and coherent theory of online learning, [although] this work needs to be supported by additional study" (p. 159).

Previous research using the categories and indicators in the CoI framework has been limited to the use within online discussions and surveys. This research viewed the elements of teaching presence and cognitive presence beyond the discussion archives and included further documentation from the cases. The constructs of teaching presence and cognitive presence will be used to analyse a wider range of data sources.

As previously explained, the construct of cognitive presence is operationalised by the practical inquiry model and it "can be used as a tool to assess critical discourse and reflection" (Garrison et al., 2001, p. 7). The phases and indicators from the practical inquiry model were utilised for the coding protocol. As indicated previously, in the past this protocol has been applied to online discussion forums; this is the first time that the protocol has been used to review other course documentation. An overview of the protocol to assess cognitive presence is provided in Table 3.2 and Table 3.3 provides the protocol for teaching presence.

Table 3.2
Cognitive Presence Coding Protocol

Practical Inquiry Phases	Indicators	Code
Triggering Event	Recognise problem	CP-TE-1
	Sense of puzzlement	CP-TE-2
Exploration	Divergence – within the online community	CP-EX-1
	Divergence – within a single message	CP-EX-2
	Information exchange	CP-EX-3
	Suggestions for consideration	CP-EX-4
	Brainstorming	CP-EX-5
	Leaps to conclusions	CP-EX-6
Integration	Convergence – among group members	CP-IN-1
	Convergence – within a single message	CP-IN-2
	Connecting ideas, synthesis	CP-IN-3
	Creating solutions	CP-IN-4
Resolution/Application	Vicarious or real world application of solutions/ideas	CP-RE-1
	Defending solutions	CP-RE-2
	Reflection	CP-RE-3

Source: Adapted from Garrison and Anderson (2003)

Table 3.3
Teaching Presence Coding Protocol

Category	Indicators	Code
Instructional Design and Organisation	Setting curriculum	TP-DO-1
	Designing methods	TP-DO-2
	Establishing time parameters	TP-DO-3
	Utilising medium effectively	TP-DO-4
	Establishing netiquette	TP-DO-5
	Making macro-level comments about course content	TP-DO-6
Facilitating Discourse	Identifying area of agreement/disagreement	TP-FD-1
	Seeking to reach consensus/understanding	TP-FD-2
	Encouraging, acknowledging, or reinforcing student contributions	TP-FD-3
	Setting climate for learning	TP-FD-4
	Drawing in participants, prompting discussion	TP-FD-5
	Assessing the efficacy of the process	TP-FD-6

Direct Instruction	Present content/questions	TP-DI-1
	Focus the discussion on specific issues	TP-DI-2
	Summarise the discussion	TP-DI-3
	Confirm understanding through assessment and explanatory feedback	TP-DI-4
	Diagnose misconception	TP-DI-5
	Inject knowledge from diverse sources, e.g., textbook, articles, internet, personal experiences (includes pointers to resources)	TP-DI-6
	Responding to technical concerns	TP-DI-7

Source: Garrison and Anderson (2003)

Presence in the CoI model is experienced as a property of the learning environment rather than necessarily being associated with a particular actor. The researcher acknowledges that teaching presence may be experienced through the posts of students as well as in the posts of the instructor and the design of the learning environment. In the same way, cognitive presence may be manifested in the posts of instructors. However, the focus of this study was on the manifestation of cognitive presence, specifically that which could be identified as representative of higher order thinking, by students. Hence the coding for this study focused on those aspects.

One of the goals of this study was to understand the impact of teaching presence on students' critical thinking. The CoI framework developed by Garrison et al. (2000) was selected for this study because it is a framework widely used to analyse online learning in higher education, and provides detailed categories and indicators to enable the analysis of teaching and cognitive presence within online dialogue and course design and implementation.

The CoI model assumes that effective teaching presence impacts positively on student cognitive presence which, in turn, promotes deep learning and higher-order thinking. This study aims to verify this within blended undergraduate courses and provide examples of effective practice for other educators in this context.

Sampling

Within naturalistic research, it is common to use purposeful sampling rather than representative or random sampling (Wellington, 2000). Purposeful samples are regularly used for case study because they provide a depth of information which provides insight about the phenomenon being researched (Patton, 2002). A convenience sample relies on subjects that are easy to access or close at hand (Berg, 2001).

Purposeful and convenience sampling were used as sampling strategies to select courses and tutorial groups as cases to answer the research questions in this study. The sample aimed to i) select the target case courses based on the level of blending of face-to-face and online; ii) identify courses where the instructors had a range of online teaching experiences; and iii) select courses from a range of content areas.

The sampling frame for this study was one tutorial group from each of three different undergraduate Education courses on the Toowoomba campus. More details of each sample will be provided within the case analysis in Chapter 4. The instructors were selected because they have different approaches to design and facilitation and also experience in blended and online teaching and learning. The tutorial groups were selected based on convenience of access to the students and the instructor for the researcher. This approach was viewed as a low cost and easily managed method.

Data Collection

This mixed method research used a multi-case study approach. According to Yin (2009) "a major strength of case study data collection is the opportunity to use many different sources of evidence" (pp. 114 – 115). The findings as a consequence of multiple modes of data collection and multiple sources of data are "likely to be more convincing and accurate" (Yin, 2009, p. 116) in corroborating the results. There was a wide range of data collection devices to ensure sufficient data were collected to explore important aspects of the case; create credible inferences; validate trustworthiness of both data and inferences; and provide an audit trail for other researchers.

Data for case studies can be gathered from a variety of sources such as archival records, interviews, direct observations, and documentation (Yin, 2009). Multiple sources of evidence assist in data triangulation and enhance the validity of the research. In this research, data comes from archival discussion posts, surveys, interviews, and course documentation. The principal data sources were the archived discussion posts and the interviews with the course examiners. Survey data and course documentation such as the assessment outline, and course structure supplemented the interview data.

Previous "research on the CoI has been limited largely to survey methods or content analysis, the latter focuses solely on the discussion transcripts within a single course" (Shea, Hayes, Vickers, et al., 2010, p. 11). This research was designed to move beyond these using a mixed method and utilising more than one course. The next section will describe each of the data collection instruments in detail.

Student Experience Survey

A student survey was administered to the students in each case at the end of the semester. The survey was administered within face-to-face tutorials of the blended courses. The researcher explained the purpose of the survey; instructors left the room when the students were completing the survey; and all completed surveys remained anonymous. Of the 60 questionnaires dispatched, only 34 were completed and returned. It was thought that administering the survey during face-to-face classes would result in an increased response rate, but the survey was administered at the end of the semester when many students had stopped coming to tutorials. The questions were modified slightly and the survey was also given to the instructors of each course after the course results were finalised.

To avoid misleading or ambiguous questions the survey was adapted from Garrison, Cleveland-Innes and Fung's (2004) 'student role adjustment' questionnaire developed from the elements of the CoI model "to study the role adjustment of students new to an online community of inquiry" (p. 61). The original survey has undergone many modifications and as of 2010 was up to version 15 (Díaz, Swan, Ice, & Kupczynski, 2010). The survey instrument used in this study was an earlier version of the survey which continues to be refined in other studies.

Past researchers have confirmed the validity and the reliability of the survey instrument through confirmatory factor analysis with direct obliminal rotation (Swan, et al., 2008). Very high internal consistencies were recorded for teaching presence and cognitive presence. Recently Diaz et al. (2010) reported Cronbach's Alpha of .96 for teaching presence and .95 for cognitive presence. This was supported by Swan et al. (2008) who reported reliabilities of .94 for teaching presence and .95 for cognitive presence using Cronbach's Alpha; and Shea, Li and Picket (2006) recorded a reliability coefficient of .98 for teaching presence. These levels are all beyond .7, which is the generally acceptable benchmark. The researchers reported a Cronbach's alpha of above .90 which indicates excellent internal consistency within the survey.

The intent of the survey was to provide a verbal and numeric description of attitudes of the students in relation to the effectiveness of the online and face-to-face elements of a blended course. The items on the survey were mapped against the teaching presence and cognitive presence categories using the information provided in the most recent version of the survey (Díaz et al., 2010). Although some of the items have been expanded or modified, the items available within the earlier version of the survey used for this research were able to be matched against the categories provided in the most recent version.

The self-administered survey had four parts. Part A was biographical, and it elicited information on age, sex, previous online discussion experience, and computing skills. Part B required respondents to determine how effective the online environment was in respect to a number of activities aligned with teaching and cognitive presence, and also had room for unstructured comments. Part C used the same questions, but they were related to the students' perception of the effectiveness of the face-to-face component of their blended course and again space was provided for unstructured comments. For each question, the students had to select from a 5-point Likert scale ranging from very effective to very ineffective. Part D consisted of open-ended questions about the impact of teaching presence on cognitive presence and their perceptions of the online and face-to-face elements of the blended course. Part B and C of the survey were also completed by the course examiners to gain their perceptions of their own ability to promote cognitive and teaching presence online and face-to-face. A copy of the survey can be found in Appendix A.

PASW® Statistics was used to analyse the responses from the Likert scale questions. Due to the small sample size, the quantitative analysis was completed at the cross-case analysis stage rather than for each case analysis. The non-parametric Wilcoxon Signed Ranks Test was used to calculate positive ranks, negative ranks, z scores and p values. This Wilcoxon test "compares two conditions [in which] the same participants take part in each condition" (A. Field, 2009, p. 558). In addition, effect

sizes were calculated to measure "the magnitude of [the] observed effect" (A. Field, 2009, p. 785). Cohen's benchmark of 0.5 represents a large change; 0.3 - 0.5 indicates a medium change; and <0.3 corresponds to a small change (A. Field, 2009).

Online Discussion Archives

In their recent joint publication, Garrison, Anderson and Archer (2010) suggested that "transcript analysis is just one of many lenses through which research can investigate and measure the development of a community of inquiry" (p. 8). They go on to point out that although the analyses of archived student posts provide a concrete view of the "educational transaction … it does not reveal all the complex variables of context, personality, discipline and timing that make up a unique education transaction" (p. 8). This, however, enables researchers and instructors to see only what students make visible (Redmond, 2010), and will not reveal actual thinking and learning processes.

Dialogue Mapping

Within blended and online courses cognitive presence is measured by the academic discourse. The frameworks created to clarify effective online learning have been based on two hypotheses: "(1) dialogue is essential to the facilitation of successful learning in higher education, and (2) successful web-based education requires the cognitive dimension to be addressed" (Hoang, Mat, Toran, Chiu, & Yusri, 2010, p. 2). Dialogue is linked with the social constructivist idea of constructing knowledge through sustained discussion and the cognitive dimension of learning might be considered the intellectual activities or higher levels of learning such as complex, creative, and critical thinking.

In her meta-analysis of coding schemes for online asynchronous discussions Weltzer-Ward (2011) found that from 2002 - 2010 over 50 different coding schemes have been used to describe and categorise postings in online discussions as a form of content analysis. The tools assist in dialogue mapping and have been used to analyse the cognitive element of student posts. In particular, many of these focus on the thinking phases and skills made visible by students when posting in online discussions. The widespread growth and evolution of tools and practices in the areas of blended and online education suggest that it is important to gather more data and information to assist in developing consensus and to inform the ongoing development of appropriate analysis tools. The different coding schemes available tend to focus on "identifying critical thinking, describing social [and cognitive] interactions, or characterizing online discussion" (Weltzer-Ward, 2011).

There are several advantages of using online discussion archives as a data source. Firstly, it used the metalanguage or 'words' of the participants; secondly, no transcription was required; and finally, the data was easy to access (Creswell, 2009). However, there are also a number of disadvantages. For example, there was a range of levels in articulation from the pre-service teachers, and the discussions may have been dominated by a few participants (Creswell, 2009). Another disadvantage is that many of the higher-order thinking activities, that is, integration and resolution phases, may occur during the completion of assessment items, and students may not

be willing to reveal their thinking in these public areas due to the competitive nature of tertiary education. It is expected that the use of multiple sources of data has gone some way to overcome these issues.

When selecting forum posts for analysis in each case, the initial module was not included as both the students and the course examiner were still establishing their social presence at this stage. Modules specific to their student professional experience placement were also excluded (if part of the course). Discussions from approximately eight weeks of a 15-week semester were included for each case. Gerbic and Stacey (2005) commented that it is appropriate to use a sample of the interaction when it is one of several data sources.

Content Analysis

Quantitative content analysis is "a process that includes segmenting communication content into units, assigning each unit to a category, and providing tallies for each category" (Rourke & Anderson, 2004, p. 5). Content analysis can be used to map "the intellectual path of the conversation" (Schallert & Reed, 2003, p. 109) and enables the researcher to make systematic and objective inferences (Holsti, 1969).

After selecting the sample discussion forums for each case, content analysis of the instructor and pre-service teacher posts was undertaken. The instructors' posts were analysed against the indicators of teaching presence provided in Table 3.3 and the pre-service teachers' posts were analysed against the phases and indicators within the practical inquiry model provided in Table 3.2. Each post was assigned at the indicator (or micro) level and tallied to gain the frequency of occurrences for each indicator.

In addition, Compendium software was used to visually map the dialogue showing the relationship between teaching presence and cognitive presence. In particular, the researcher was interested in viewing the types of instructor posts and noting the patterns of subsequent student contributions.

Units of Analysis in Online Discussions

A number of different units of analysis for online discussion posts have been identified by researchers. These include sentence as a unit, proposition units, paragraph units, illocutionary unit, thematic units, and message units. There has been common use of theme and message as units of analysis. Selecting a unit can also be problematic because a message could contain a single phrase or a single sentence or a single paragraph (Garrison, Cleveland-Innes, Koole, & Kappelman, 2006).

While accessing critical thinking processes in a computer conference, Fahy (2002) concluded that "the finer granularity of sentence-level analysis results in several advantages" (p. 10), including: increased reliability; richer description of social interactions; and confirmation of gender differences. However in her meta-analysis of online coding schemes, Weltzer-Ward (2011) found that using a 'post' as a unit of analysis had consensus amongst researchers and claimed it provided "reliable and valid analysis" (p. 18). When using a post as a unit the participant rather than the researcher decides on the length and content of the unit.

When coding the posts, if a post was suitable for multiple categories it was coded to the highest level. If more than one indicator was present, again it was coded at the most complex indicator. In cases where the level of category was unclear, these posts were coded down. Garrison, Anderson, and Archer (2001) recommended these heuristics because the higher levels include elements from earlier levels.

Reliability

The quality and consistency of the coder's analysis of the content are critical to ensure reliability (Ng & Murphy, 2005). The researcher has no control over the nature or content of the online discussions. In content analysis, "[r]eliability is a function of coders' skills, insight, and experience, clarity of categories and coding rules which guide their use; and the degree of ambiguity in the data" (Holsti, 1969, p. 135). Reliability of this coding has been improved because the coder had already used the coding protocol described above in other research and had also previously used Henri's (1992) coding categories as a means of improving their coding ability. Also, the coding protocol used in this research has previously been used in other research.

In other research, the inter-rater reliability is often provided. This is "the extent to which different coders, each coding the same content, come to the same coding decisions" (Rourke, Anderson, Garrison, & Archer, 2001, p. 11). However, in this research there is only one coder so intra-coder reliability, meaning there is consistency within an individual's coding (B. Johnson & Christensen, 2008) will be reported.

Reliability of coding is commonly presented as a percentage agreement statistic. There are a number of ways this can be calculated. For example, Holsti's (1969) Coefficient of Reliability; Scott's Pi (Scott, 1955); Cohen's Kappa (Cohen, 1960); Agreement Coefficient (Krippendorff, 1980) or Krippendorff's Alpha; and Composite Reliability (Holsti, 1969).

Holsti's (1969) Coefficient of Reliability (C.R.) provides the following formula to calculate the percentage agreement:

C.R. = 2m/(n1 + n2)
Where:
m = number of coding decisions on which the codes agree
n1 = number of coding decisions made by the first coder
n2 = number of coding decisions made by the second coder.

However, this formula is considered inferior as it does not account for the chance agreement between coders (Banerjee, Capozzoli, McSweeney, & Sinha, 1999). To overcome this, both C.R. and Cohen's Kappa will be also reported in this research (see below).

Cohen's (1960) Kappa "is a chance-corrected measure of inter-rater reliability" (Rourke et al., 2001, p. 12) and has the same formula as Scott's (1955) Pi and is similar to Krippendorff's (1980) Alpha.

Cohen's Kappa is calculated using the following formula:

Kappa = $(P_o - P_e)/(1 - P_e)$
Where:
P_o = observed agreement
P_e = expected agreement.

The expected agreement or agreement by chance (P_e) can be calculated as follows:

Count the number of times a category from the coding scheme is used

1. This number is then converted to a percentage of all coding
2. The percentage is then squared
3. The squared percentages for all categories are summed (Eugenio & Glass, 2004).

The level of agreement may be influenced by the number of categories, number of posts, and the uniqueness of the research. There is a range of perspectives as to what level of agreement should be gained and, without consensus or established standards, published recommendations for what might be reliable vary upwards from .70. Riffe, Lacy and Fico (1998) believed that the agreement levels will differ depending on the type of research and that "a minimum level of 80% is usually the standard"(p. 128). However Banerjee, Capozzoli, McSweeny and Sinha (1999) considered that

> "values greater than 0.75 or so may be taken to represent excellent agreement beyond chance, values below 0.40 or so may be taken to represent poor agreement beyond chance, and values between 0.40 and 0.75 may be taken to represent fair to good agreement beyond chance". (p. 6)

To strengthen the internal consistency of the content analysis of discussions, check-coding (Miles & Huberman, 1994) was implemented. The researcher completed the initial coding of the dialogue and at some later time check-coded a sample of the dialogue. Miles and Huberman (1994) suggest an internal consistency for intra-coding should be above 90% using Cohen's (1960) Kappa.

Intra-coder Reliability for Coding of Online Discussions

To test for coding reliability the researcher selected two forums within Case C. These forums contained almost 50% of the total posts for this case. The 88 separate student and instructor posts were coded using the CoI coding frameworks described above. These items were coded a second time several months later by the researcher to determine the consistency within a single individual coder.

Items within the discussion forums were coded at both the indicator level (micro level) and at the category level (macro level). Previous researchers have coded at the macro level only. At the category level or macro level the reliability of the intra-coding process had an agreement level of 92% for Holsti's (1969) coefficient reliability. To ensure that the probability of agreement between codings was not due to chance Cohen's (1960) kappa was computed and the level of agreement at 88% was achieved. Both tests exceed the minimum level and "represent excellent

agreement beyond chance" (Banerjee et al., 1999). At the micro level or coding at the indicator level the levels of agreement were not as high but still reliable. For Holsti's (1969) coefficient reliability the level was 81% and for Cohen's (1960) kappa the level was 71%.

The high observed level of agreement between coding sessions may have been because the researcher has been using the CoI model (Garrison et al., 2000) and Henri's (1992) coding protocols for a number of research projects with other researchers prior to this investigation. The coder was comfortable with the process and had confidence in her ability to map the content analysis of discussion posts against the CoI indicators.

The same coding protocols and coder were used to analyse all discussion forums, open ended survey data, interview data and materials which form the course documentation.

Semi-structured Interview with Course Instructors

Interviewees who are experienced in the context or issue under investigation are able to provide significant insights (Yin, 2009). "Semistructured interviews are particularly well-suited for case study research" (Hancock & Algozzine, 2006, p. 40). A semi-structured interview is one where researchers pose pre-determined questions to the interviewee, who provides their perspective on the context or issue. The interviewer is then able to "ask follow-up questions designed to probe more deeply issues of interest to interviewees" (Hancock & Algozzine, 2006, p. 40) in addition to issues of relevance to the interviewer.

As a method of data collection, interviews have been identified by researchers as having a number of strengths (Creswell, 2009; Hancock & Algozzine, 2006; B. Johnson & Turner, 2003; Wilkinson & Birmingham, 2003). For example, interviewees can add historical and future orientation perspectives/information: they often see the interview as an opportunity to voice opinions openly and freely, and can define the world from their own perspectives. Researchers can control the questioning and probe further to gain in-depth information to explore or confirm concepts. In addition, a high response rate is usually attainable.

However, the same researchers also identify a number of limitations with interviews. These include the low anonymity perceived by interviewees, and the possible bias due to presence of interpretation of the interviewer. Also, the articulation and perceptiveness of all interviewees is not the same: each interviewee filters the information shared at an interview so the whole picture is not always received. Finally, interviewing can be time-consuming both in organisation and analysis.

This research is case study research and used semi-structured interviews because they provide some control by the interviewer but are also flexible. Both the interviewer and interviewee guided the ongoing questions and discussion.

The interviewer (who in this case is also the researcher) attended to a number of responsibilities prior to the interview, including: identifying interviewees; developing an interview protocol; creating open ended interview questions;

negotiating a time and place for the interview; and providing the ability to record the interview (with the interviewee's permission) (Hancock & Algozzine, 2006). During the interview it is important that the interviewer "limit comments as much as possible to allow more time for the interviewee to offer his perspectives" (Hancock & Algozzine, 2006, p. 41).

A face-to-face semi-structured interview was conducted with the course instructors of two of the cases. The instructor of the third case was the researcher herself and she free-wrote responses to the interview questions. The interviews with the instructors were recorded for later transcription, and additional notes were taken by the researcher. At the interview the instructors were able to describe their perceptions and experiences. There was a 1½ hour initial interview to gather data, followed by another 1 hour follow-up interview as part of the "member checking" (Stake, 1995, p. 115) process. "*Member checking* is a particularly powerful technique for determining the trustworthiness of interpretations that involves asking informants … to check on the accuracy of the themes, interpretations, and conclusions" (Bergman, 2008, p. 109). The instructors reviewed the case materials and analysis for accuracy and provided feedback at a second interview. This provided an increased depth of data and enhanced credibility.

Both interviewees provided informed consent prior to the interviews: they participated and provided access to multiple data sources of their own free will (Berg, 2001). Issues of confidentiality and anonymity; the purpose of interview; and the obligations of the interviewees in terms of member checking were discussed prior to the interview.

The interview protocol included the creation of the interview questions (shown below) which were related to the blended learning environment and teaching and cognitive presences. The questions were open-ended to assist in drawing out information from respondents to answer the research question and address the research issues. The interview was conducted in the instructors' rooms where it was anticipated the interviewees felt safe and secure.

Open Ended Initial Interview Questions

1. How did the face-to-face work within the blended course enhance the work online?
2. How did the online work within the blended course enhance the face-to-face work?
3. What did you do (teaching presence) to assist with the successful movement through the practical inquiry phases (cognitive presence)? Share some examples.
    - Trigger
    - Exploration
    - Integration
    - Resolution/reflection
4. What would you have liked to do to assist with the successful movement through the practical inquiry phases (cognitive presence)? Share some examples.

5. How do you see yourself behaving differently (or the same) in the face-to-face components and the online components within a blended course?
6. What are some ways that you demonstrate indicators from the survey?
7. Other comments, suggestions or recommendations.

The information gained from the initial interview, survey, online discussion posts and other documentation was collated for each case and a draft was sent to the interviewees for comment and/or correction. The second interview unpacked all of the case information provided in the draft and the interviewees served as a check for accuracy, with ongoing dialogue regarding the researcher's interpretations of the data. The semi-structured interviews were used to triangulate the data and to clarify and deepen the understanding of the data gained from all the data sources.

The interview enabled the researcher to gain data from items that were experienced, perceived, and observed by the instructor. It provided opportunities for the multiple realities to be foregrounded; and the second interview provided an opportunity to discuss the interpretation of the data for both the researcher and the interviewee.

Course Documentation

To gain a fuller understanding of each case as a separate course, other course artefacts and documentation were accessed. This information added depth and detail, and enabled the researcher to develop a personal understanding of the courses as a whole. This type of documentation has advantages as a data source in that it is inexpensive and efficient to gather, is trustworthy, can be accessed at a time of convenience for the researcher, and is grounded in the real setting which is an important aspect of case study research (Creswell, 2009; B. Johnson & Turner, 2003; Patton, 2002; Wellington, 2000).

Having said that, an articulated limitation of using documentation is that some of the documents were not publically available, and it required permission from the course instructor to access them; documentation is also time consuming to analyse and because the documentation was course (or case) specific, it would not apply to larger populations (Creswell, 2009; B. Johnson & Turner, 2003; Wellington, 2000).

All of the documentation was pre-existing to the research, but was not collated and analysed until well after the completion of the course. This meant that access to the data was unobtrusive and its access did not impact on the participants. The types of documentation collected and analysed for this research, not already discussed, included the course specification, which provides students with an outline of the course; assessment tasks and marking guides; lecture materials; course readings; and other items which were located in the virtual classroom space.

Data Analysis and Data Reduction Procedures

In this mixed method study, individual and cross-case analysis has occurred. The analysis required the researcher to probe, categorise, tabulate, and recombine the data. Analysis occurred within each case, where coding was performed on data from each case. Data from each source of evidence were analysed against the categories

within cognitive and teaching presences of the CoI framework and other emerging themes. Coding was completed for each case prior to any cross-case comparison. Handcock and Algozzine (2006) noted that researchers require "repetitive, ongoing review of accumulated information in order to identify recurrent patterns, themes, or categories" (p 61).

Prior to the cross-case analysis, it was important to gain familiarity with each of the cases examined. This involved going back over each case to examine it as a whole rather than as individual data collection items. Cases were then reinterrogated at the cross-case analysis stage. The mixed method approach of this research required the collection and analysis of qualitative and quantitative data at each case level and across cases.

The data collected were analysed using the constant comparison method (Wellington, 2000). This required the researcher to search for patterns and themes in the data while also looking for contrasts or irregularities. Data were also mapped against the pre-existing codes within the CoI model to provide conceptual categories and assist with identifying themes or concepts. The research used pre-established or "a priori codes" (B. Johnson & Christensen, 2008, p. 539). The codes have been used in previous research and were applied to the new data to extend the previous line of research using CoI framework. However, during coding, new codes were created when the data did not clearly coincide with the previously developed coding scheme (Stake, 1995).

Each data source required specific analysis techniques as described in the following sections, although the CoI provided the conceptual framework for all of the analysis.

Survey

Information from the survey was input into PASW® Statistics to enable quantitative analysis including the calculation of Means, Standard Deviations, and Wilcoxon Signed Ranks tests.

Quantitative and qualitative analysis of survey data occurred, to examine demographic data and online user profiles of the participants and to identify relationships between the instructors' and pre-service teachers' perceptions of teaching presence and cognitive presence both face-to-face and online. Students identified what types of teaching presence enhanced their cognitive presence and revealed how they chose to blend their interactions. Data from the open-ended questions of the survey were combined and the researcher identified common themes and areas of conflict.

Online Discussions

The online discussions were analysed using established protocols for content analysis of discussions. The four phases of practical inquiry within cognitive presence were coded against the categories and indicators in Table 3.2 and the elements of teaching presence were coded against the categories and indicators in Table 3.3. After coding each post, a table was created to present the frequency of occurrences, and to enable some numerical testing. In addition, visual mapping of the relationship between teaching presence and cognitive presence was completed.

Interviews

The interviews were recorded, transcribed, reduced to narratives, and then summarised. The research then linked the interview data with those in the categories of teaching presence. Common themes and patterns that related to the research issues were identified. Finally, data were displayed in tables within the each case.

Data from the open-ended questions from interviews were analysed to support demographic and online user profiles of the participants. In addition, data from the interview and the survey responses were analysed to identify common themes and areas of conflict which were mapped against the indicators from the CoI framework and the research questions at both the case and cross-case levels.

Documentation

Data from other documentation provided the researcher with a more in-depth picture of each case and provided an explanation as to what type of information was provided to pre-service teachers within the virtual space when compared with the face-to-face component of the blended course. Documentation assisted in providing thick case descriptions.

Mixed method research enables the use of both thematic analysis and descriptive statistics to corroborate and deepen the understanding. The course documentation and interviews created a substantial amount of information that was required to be coded and categorised. This needed to be done in a manner that did not distort the validity or richness of the data gathered. For each interview question, typical statements were noted, and the researcher looked for common and unusual responses. During the data reduction process, the researcher looked for the emergence of significant patterns while maintaining rich descriptions.

Integrity of the Data and Conclusions

This section of the chapter discusses how this case study research has achieved trustworthiness, credibility, authenticity, conformability, data dependability, and plausibility through the use of the four tests commonly used in social research including case study (Yin, 2003). This research was designed to attain construct validity, internal validity, external validity, and reliability.

Validity is concerned with accuracy of research findings and assumes that the research provides evidence to justify conclusions. Within case study research construct validity can sometimes be problematic because subjective judgements are used to collect and interpret data. The use of triangulation helps to validate judgments and conclusions. The multi-case approach, in addition to using multiple sources of evidence, gives the advantage of *"converging lines of inquiry*" (Yin, 2009, p. 115), resulting in corroboration and triangulation.

Methodological triangulation has been achieved through the mixed methods approach to studying the research problem (Denzin, Lincoln, & Giardina, 2006; Tashakkori & Teddlie, 1998). Data triangulation was achieved through multiple data sources (Denzin et al., 2006; Tashakkori & Teddlie, 1998). When multiple sources of data provide the evidence for conclusions, these findings are more credible than

those created from only one or two sources of information (Hancock & Algozzine, 2006). The multiple sources of evidence include in-depth interviews, archival discussion posts, survey, and documentation as previously discussed.

Tactics and processes for how this case study design supports data integrity will be explained through each of the four commonly applied tests of construct validity, internal validity, external validity, and reliability. The tactics used within this research to strengthen the quality of the research design were informed by Yin's (2009) recommendations.

Construct Validity

Different researchers point out that different key aspects of this test, in broad terms, it could be seen as the adequacy of procedures for measuring the constructs under investigation. Yin (2009) stressed the identification of correct research procedures; Creswell (2009) emphasised the use of appropriate definitions and measurement of variables; whereas Trochim (2006) saw it as the "degree to which inferences can legitimately be made from the operationalizations in your study to the theoretical constructs on which those operationalizations were based."

Within this case study, a number of tactics or processes were put in place to deal with construct validity within the design and implementation of the research. Firstly, relevant literature was reviewed and key definitions established (see Chapters 1 and 2). As previously explained in this chapter, multiple sources of evidence were used in data collection. The accuracy of the interpretations of data from the interviews and other sources was checked by the course instructors as part of "member checking" (Stake, 1995, p. 115), and this corroborated the analysis of the data. Yin (2009) observed that "the opportunity to review the draft also produces further evidence, as the informants and participants may remember new materials that they had forgotten during the initial data collection period" (p. 183). He went on to say that "this process will enhance the accuracy of the case study, hence increasing the *construct validity* of the study" (p. 183).

Internal Validity

Internal validity is the extent to which the data represent reality and means that the inferences or conclusions of the research can be drawn with accuracy and confidence (Wiersma, 2000). Internal validity aligns with the credibility of the research. One of the threats to internal validity in case study is the "problem of making inferences" (Yin, 2009, p. 43) based on events that have not been observed.

The naturalness of this study enhances internal validity. The use of multiple data sources and the online discussions increases the visibility of those elements of the study which might traditionally be unobserved. The use of models which have been previously tested, such as the CoI framework, Practical Inquiry, and the survey, enables inferences created from the data collected in this study to be drawn with confidence. Pattern matching and explanation building are supported by the mixed method approach and multiple case studies. To strengthen the internal consistency of the content analysis of the online discussions, check-coding (Miles & Huberman, 1994) has been implemented. The researcher completed the initial coding of the

dialogue and several months later check-coded a sample of the posts. In addition, the use of mixed methodology enabled the use of statistical tests where appropriate to detect differences.

External Validity

This relates to "whether a study's findings are generalizable beyond the immediate case study" (Yin, 2009, p. 43). In case study research it is important to "strengthen its ability to generalize while preserving in-depth description" (Herriott & Firestone, 1983, p. 14).

The tension between generalisability and description has been reduced through the shared definitions across the cases and common structures of data collection (Herriott & Firestone, 1983) within and between cases. Some of the types of data sources (the survey, online discussion) have been used in previous research and link directly to the CoI as the conceptual framework for the study. This also enables correlations with other works and comparisons between cases (Yin, 2009).

When making generalisations of the findings to a wider population, they will be made using "[g]eneral statements with built-in uncertainty" also known as "fuzzy generalisations" (Bassey, 1999, p. 52). Fuzzy generalisations recognise a level of uncertainty, particularly in complex phenomenon such as blended education where contexts and people are unable to be controlled. The term acknowledges that it may apply more widely but there may also be exceptions to these generalisations.

Reliability

This "refers to whether scores to items on an instrument are internally consistent, stable over time, and whether there was consistency in test administration and scoring" (Creswell, 2009, p. 233). External reliability relates to whether other researchers would discover the same phenomena in similar settings, and this is addressed by using case study protocol, by detailed operational explanations, and by keeping detailed notes and records. Internal reliability is determined by whether other researchers interpret data in the same way; a single researcher is conducting this study and there will be no other researchers to interpret the data.

Tactics suggested by Yin (2009) and used to enhance validity within this research include using a well-defined case study protocol which "is a major way of increasing the reliability of case study research and is intended to guide the investigator" (Yin, 2009, p. 79) and is essential within multi-case research. Specific protocols were established for the interview and the survey implementation. Data coding protocols for the online discussion were established and piloted. Check-coding (Miles & Huberman, 1994) was implemented and percentage agreement statistics were calculated to improve reliability. In addition, a database was established to contain the multiple sources of evidence.

Additional techniques to ensure reliability of the research recommended by Creswell (2009) include a detailed description of the research purpose; the role of the researcher; the content of the research and the selection of cases and their participants; and the multiple methods of data collection and data analysis, in

addition to multiple case studies. Finally, this thesis provides a detailed narrative of data collection and analysis to provide an explicit portrayal of the methodology used in the study.

Ethical Considerations

Normal ethical clearance for research involving humans was sought from USQ. As part of the USQ ethics clearance, approval was sought from the Dean to gain access to the study participants. All participants completed a written informed consent form before they engaged in the research. The informed consent form acknowledged the protection of participants' rights during the collection of data and distribution of results. The participants were informed that they had the right to withdraw from the study at any time.

Care was taken to maintain confidentiality and anonymity of participants and their responses. Individual identities were not revealed and the use of pseudonyms has occurred in the presentation of the information and participant quotes.

The researcher sought to minimise the disruption of the natural setting. This study did not involve deception, harm, or treatment (experimental) of the participants. Only the informed consent and the survey elements were completed during the semester of study. The interviews, access to the archived postings, and other course documentation were completed after the semester had finished. Permission was sought from the interviewees to record the interview. As previously explained, the accuracy of the data and interpretations was checked by the course instructors through member checking.

Chapter Summary

Laurillard (2002) noted that academics can no longer rely solely on their academic knowledge. They are under pressure to develop pedagogical content knowledge and innovative teaching approaches which reflect the digital world in which we live: to gain practical wisdom in the role of technology to scaffold, reinforce, and improve

learning "as the new technology requires, as the knowledge industry requires, and as students demand – then it follows that academics must become researchers in teaching" (Laurillard, 2002, p. 22).

The focus of this research study was to explore the relationship between teaching presence and cognitive presence in undergraduate blended learning courses. There is little research on cognitive presence in undergraduate blended learning environments. This research seeks to discover how the teaching presence impacts on cognitive presence and the processes by which learners make their critical thinking visible in online discussions. This research used a mixed methods approach across three different cases in which the teaching approaches and teaching presence varied.

This chapter has presented the conceptual framework for this research and highlights the researcher's dual role within the study. It reviewed and justified the use of the case study methodology for this research. The issues of validity and reliability were discussed and each data collection device was described. Data collection tools and the protocols for the survey, interviews, and data analysis techniques were then discussed. Finally, ethical considerations were explored. This lays the groundwork for Chapter 4 where the results from the data analysis are discussed.

CHAPTER 4: FINDINGS

Introduction to Chapter

The previous chapter discussed the research methodology utilised within this mixed method multiple case study. This chapter includes an examination, analysis and interpretation of data from all three cases. The multiple data sets enabled a detailed description of the cases and cross-case data analysis for all three cases. There is a blend of qualitative features and descriptive details. This chapter presents data including both the big picture perspective and the supporting details to authenticate the patterns described.

This chapter will present the essence of what and how the case study participants shared information through interviews, surveys, and online discussions. It will include a narrative by the researcher to clarify and make meaning from the data and the process of the research. This chapter presents the stories of the participants within each case study.

The purpose of this study was to investigate the extent of critical thinking exhibited by three different groups of undergraduate students enrolled in blended courses. This chapter will describe the types of roles and interactions the course instructor took in each of the cases, and the resulting learner responses. Each instructor had diverse ways of interacting with their students. The research was framed by the CoI framework (Garrison et al., 2000), which enabled the researcher to explore the impact of teaching presence on cognitive presence.

This research was an in-depth examination of a multifaceted construct, and the qualitative and quantitative results of each of the three cases are described. The results from the thematic analysis of the interviews, surveys, and course documentation data are illustrated. Statistical tests from both the survey and the online discussion forums are presented.

The data from discussion forums were explored from two perspectives. Firstly, the posts were analysed at the content level of the message to detect *what* was being said and at what phase of the practical inquiry model they aligned to. Secondly, the posts were analysed and mapped to determine the types of interaction within the forums. This procedure explored *how* students respond to different types of instructor posts. Individual quotations and other examples of data to enhance common themes are presented to ensure the richness of the data is not lost.

The chapter has been structured to provide an overview of the analysis process, a presentation of each of the three individual case analyses, followed by a cross-case analysis of the data. The purpose of the cross-case analysis was to identify any similarities or differences between the cases and also to form a bigger picture of the impact of teaching presence on cognitive presence.

Case A

Context

Case A was a course from the Early Childhood specialisation in a teacher education program. The course was taken by students in their final semester of a four year or a three year program. The purpose of the course was to prepare proactive leaders in the field of Early Childhood beyond that of a strong advocate. The course had four key topics: visioning, administration, management, and community engagement. Alongside those four areas, the learners were to investigate the culturally diverse nature of leadership and the importance of leaders in early childhood settings having effective relationships.

Over half of the students in the course were mature age and were already working in the field of early childhood and upgrading their qualifications. The remainder of the cohort were traditional students coming to university straight from school to gain a teaching qualification in early childhood.

There were 20 students in the sample tutorial group. Within the sample only two students returned the survey and thirteen students provided informed consent for their online discussions to be analysed.

The course involved a blend of face-to-face and online elements. There was no obligation on the students to interact online nor was there a mandate for them to come to every class. The instructor was mandated to include information to students within the Learning Management System. There were no minimum standards in terms of what must be provided or how the online space should be used in conjunction with face-to-face courses. As a novice in the online space the instructor uploaded course documentation and created online discussion forums however did not articulate how this space should be used by the students. Students self selected their means of interaction with content, instructor, and peers according to personal needs (for example, timing and location of their professional experience placement; work and family commitments).

Results

Course Documentation:

The assessment for this course consisted of two related items. In both cases, students were to select an early childhood setting (e.g., primary school, child care centre, kindergarten) from which to draw data and in which to situate their work. Assignment One consisted of an organisational analysis and environmental scan where students related the practices within an early childhood setting in relation to visioning, program, staff, financial operations, community engagement, and so on with contemporary leadership and management theory. Assignment Two required the students to develop a strategic plan for the organisation based on their research in Assignment One and to consider the implications and implementation process for the plan.

Other types of documentation available in the online space for the course included: links to formal course material; additional supporting resources; access to resources from the Early Childhood online community of practice; and promotion of local professional development events.

The theoretical background for the course design was that of constructivism. The instructor felt it was important to ensure that the content, activities, and assessment were meaningful, relevant, and provided opportunities for face-to-face and online engagement. The course provided opportunities for ongoing links between theory and practice through problem-based learning and situated learning (that is, workplace links).

The researcher considered that the Case B instructor was a reflective practitioner, making use of feedback from past cohorts as data to inform ongoing course improvement. The instructor also scaffolded the activities and assessment and provided models or examples of best practice which were underpinned by the key theoretical constructs making the link between theory and practice.

The online environment was seen as an additional way for learners to interact with course material, peers, and the instructor. It provided a space for both core and supplementary information or resources and ongoing discussion. There was online replication of many of the face-to-face materials, discussions and activities. For example, lectures, guest speakers, and interviews were recorded and made available online for those students who could not make the face-to-face classes. The online environment also provided a space to extend the face-to-face discussions and opportunities for those not in the face-to-face class to ask questions and comment on the recorded information.

From the analysis of the course documents, it was apparent that there were a number of items which provided access to additional data which were not presented in the data sources previously used in other research, for example, within the online discussions, instructor interview, and survey.

Course Instructor Interview:

From the interview, it was evident that the instructor was a novice blended and online educator yet experienced in teaching face-to-face. The instructor viewed blended teaching as the "use of ICTs to complement face-to-face" learning. Having said that, the instructor was very aware that the students responded to assessment type forums most frequently and that there was limited interaction in other forums. She commented that "overall there were limited posts which was disappointing ... not a lot of sharing of real experiences". By not asking students to add theory to their messages it was hoped that there would be an increase in the quantity of postings. In the content forums at the end of the semester there were no student posts, and the instructor suggested some reasons for this might have been because at that time in the semester students "spent time in different ways, for example, more students were out on prac or students were focused on completing assignment two".

There was a perception that social presence had little cognitive impact. However, social presence was required for a supportive online environment. From the instructor's experience, she commented that it was harder online to get the same

quality outcomes as in face-to-face teaching. The instructor felt that she behaved differently online when compared to face-to-face discussions, suggesting that "I find online more formal because it *stays*". She went on to explain that "work that is online is *set in stone* and I find that it holds me back". She commented that the way she interacted with students, the development of relationships, the use of language, differed between face-to-face and online, and found that it differed again when face-to-face or information sessions were being recorded for students to access at a later date. She made the following comments: "I display humanness in different ways and I use different language when it is permanent".

Interestingly, the instructor also felt that the students had different expectations in the online space. "There is a 24/7 expectation from the students and when you are teaching in a number of courses it is difficult to be as responsive when the students need it". The instructor was disappointed with the social presence and level of online interaction of her students because she felt that she modelled an active social and teaching presence. Table 4.1 provides a summary of the reflective comments from the instructor during the interview.

Table 4.1
Case A Instructor Perceptions of Blended Teaching

Positives	Issues	Suggestions for improvement
• Increased access to different types of materials • Easy to show passion and get on soapbox in face-to-face environment • Easy to respond to students face-to-face immediately based on body language etc • Face-to-face provides opportunity to spin off ideas of others, with immediacy and spontaneity • Online able to reuse artifacts • Able to have pre-set responses that can be customised online • Online more formal because it has a permament record • Easy to see who is NOT engaged online and make contact	• Need to increase engagement with theory • Need to increase interaction with peers • 24/7 expectation of students, sometimes difficult to be responsive • Difficult to read body language online and underlying issues often not identified for a long time • Difficult to create nurturing relationships • Pre-set responses more robotic/less spontaneous • Permanency of recordings and discussions can change the the 'flavour' of the discussions	• Increase tasks to support assessment • Continue to scaffold, but provide more models or ensure students provide more models • Consider student peer review draft work • Restructure activities and increase choice in activities and assessment • Decrease content to provide additional time to increase quantity and quality of posts • Consider models for appropriate online posts

Source: Analysis of interview data from Case A

The instructor felt that she was more effective face-to-face; however, she also found that the online space provided convenience of access for her students. She

acknowledged a number of issues, mostly in terms of the online space within her blended course. However, she also identified ways in which she could improve the effectiveness of the course.

It is evident from Table 4.1 that the instructor was a reflective practitioner and because she had recently moved to teaching in a blended course with embedded online elements, the perceptions are those of a novice considering ways in which the course could be further developed in future iterations. When mapping the course activities and assessment to the cognitive presence element of the CoI model, the instructor was able to provide examples at all four phases and also considered what modifications might be necessary in the future to ensure practical inquiry forms part of the learners' experience within the course.

During the interview, the instructor made many insightful comments when mapping the course to the practical inquiry model, and demonstrated a desire to improve course design, teaching, and discourse facilitation to assist students in moving through the four phases of cognitive presence more effectively. For example, providing model posts and requiring students to make explicit links between theory and practice. Figure 3.1 shows how the course might be mapped against the phases of cognitive presence.

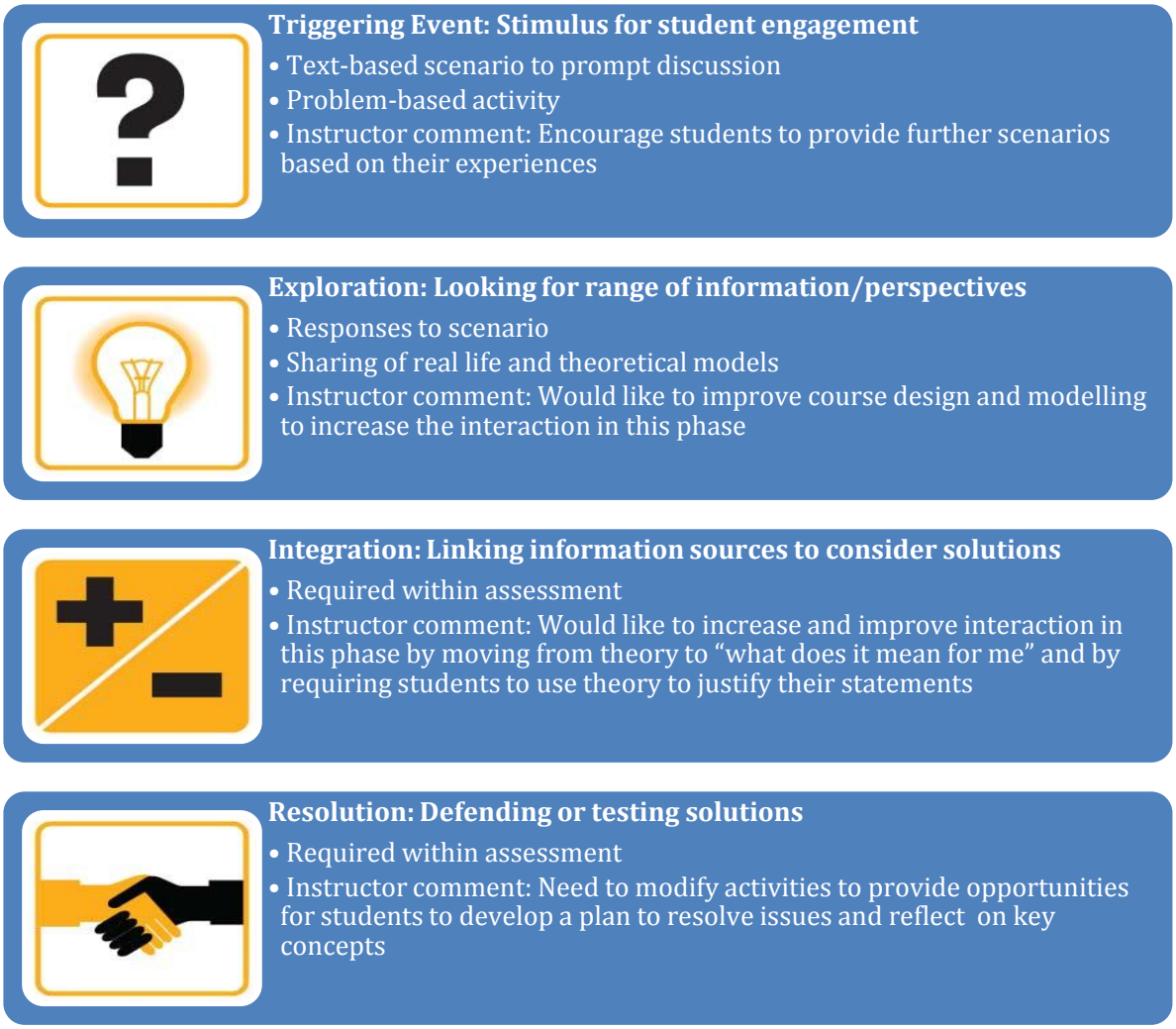

Figure 4.1. Case A mapping the course against Cognitive Presence phases

The instructor acknowledged that teaching presence is important both online and face-to-face especially when students experience frustration and express it publicly. She revealed: "underlying issues are often not seen and you feel like you are putting out fires". There is a need to address it quickly and defuse the situation to ensure that ongoing negativity does not impact on learning for all participants.

Course Instructor Survey

As indicated in Chapter 3, Parts B and C (See appendix A)of the student survey were completed by the course instructors to identify their perceptions of their own effectiveness in the online and face-to-face segments of the blended courses. The responses to the survey were scored using a scale 1 = Very Ineffective to 5 = Very Effective

The results for Case A are presented in Figures 4.2 and 4.3.

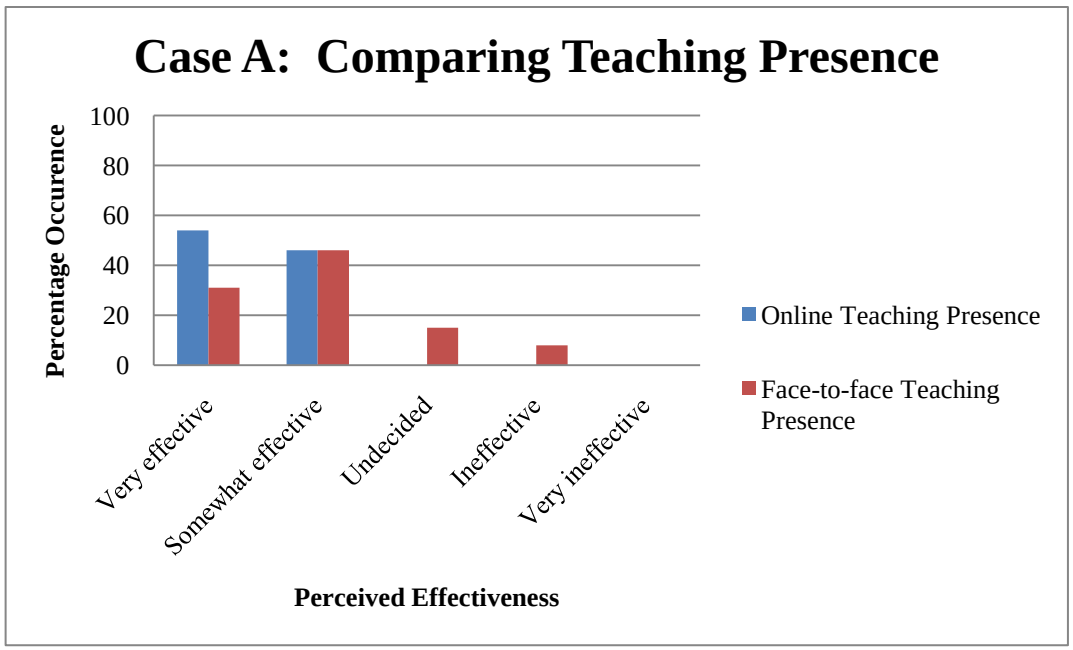

Figure 4.2. Instructor perceptions of Teaching Presence

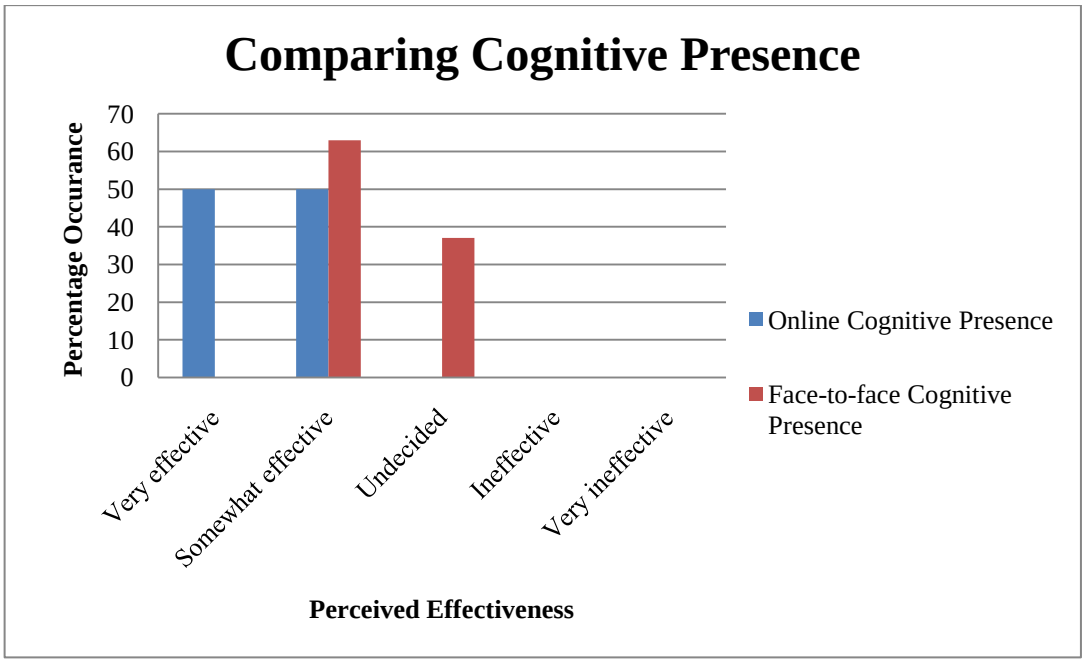

Figure 4.3. Instructor perceptions of Cognitive Presence

The instructor self-rated herself higher overall in the online element of both teaching presence and cognitive presence in the blended course when compared to the face-to-face element. For example, on a five point Likert Scale, she self-rated 'receiving teacher assistance in reaching consensus' as *ineffective* face-to-face and *somewhat effective* online. This was remarkable, because within the interview the self-report comments indicated that she had more difficulty developing and maintaining relationships and effective dialogue in the online space when compared to the face-to-face teaching.

Student Survey

While completing the course, students were also involved in professional experience placements in early childhood settings. The timing of these placements was varied and there were only two weeks in the course where every student was available for face-to-face classes. This resulted in a limited response rate for the student survey (N = 2) and insufficient data to discuss in this case.

However, the two students did provide a large number of responses to the open ended questions. In particular, they commented positively about the instructor's teaching presence. Alex revealed that "the teacher was really interested in helping us achieve good result ... she provided lots of information and discussed the assignment in depth so we understood what to do". She went on to praise the instructor because she "had examples of practical applications for all topic areas which enabled us to get a better understanding of what was to be developed." Nicole revealed that the "teacher tried to make it interesting and relevant for us".

The pre-service teachers also commented on the relationship between the online and face-to-face elements of the blended course. Nicole related that "the teacher was open to talking to us face-to-face and online to discuss ideas". She also commented that within the online space "it had the theory to back up the practical

applications that were discussed in face-to-face work". The other student commented that "I find I get the most benefit out of face-to-face work. The face-to-face element didn't really enhance my work online at all".

Analysis of Instructor and Student Online Discussion Archives

Not all students posted within the discussion forums. There were many 'lurkers' and this was evidenced by comparing the number of posts against the statistical data gained from the learning management system, WebCT, regarding the number of students who accessed the discussion forums. Of the 13 students who gave informed consent for their discussion posts to be analysed for this research, only seven students posted. All students accessed the online environment for their blended course; however, almost half of the students who at the beginning of the semester considered that they would post online, did not.

The instructor provided online discussion forums in three key areas. Firstly, she provided forums where students could introduce themselves and discuss their expectations of the course. Secondly, there were forums for assessment related discussions. Finally, other forums related to the content modules for the course: leadership and management; visioning and strategic planning; human resource management; and financial management. Interestingly, the last two content forums had no student posts even though a trigger post was created by the instructor. The archives from the online forums in relation to assessment and content were coded for cognitive and teaching presence. The introductory and course expectation forums were not analysed, as they consisted of social presence postings rather than cognitive and teaching presence, which were the focus of this research.

Cognitive presence is actioned through the four phases of the practical inquiry model as previously mentioned in Chapter 2. The phases and indicators generated by Garrison et al. (2000) have provided a framework to assess critical thinking in online discussion as a means to "assess the quality of inquiry" (Garrison & Anderson, 2003, p. 60). Phase 1, Triggering event, involved an issue or dilemma which required investigation. Phase 2, Exploration, required students to relate prior experiences, literature, and suggestions back to the initial dilemma in an attempt to understand the problem in depth. Phase 3, Integration, required learners to integrate ideas from Phase 2 in an attempt to identify multiple ways to solve the problem or issue. Phase 4, Resolution, required solutions to be applied or tested.

The coding results for cognitive presence in Case A are presented in Table 4.2. It was apparent that students favoured posts where they could exchange or connect ideas.

Table 4.2
Cognitive Presence Analysis of Discussion Forums for Case A

Practical inquiry phase	Indicators	Socio-cognitive processes	Number of posts
Triggering Event	Recognise problem	Presenting background information that culminates in a question	1
	Sense of puzzlement	Asking questions Messages that take discussion in a new direction	5
	Total		(6%) 6
Exploration	Divergence – within the online community	Unsubstantiated contradiction of previous ideas	0
	Divergence – within a single message	Many different ideas/themes presented in one message	3
	Information exchange	Personal narratives/descriptions/facts (not used as evidence to support a conclusion) Sharing of literature/resources Questions of clarification	63
	Suggestions for consideration	Author explicitly characterises message as exploration, e.g., "Does that seem about right?" "Am I way off the mark?"	2
	Brainstorming	Adds to established points but does not systematically defend/justify/develop situation	3
	Leaps to conclusions	Offers unsupported opinions	2
Total			(76%) 73
Integration	Convergence – among group members	Reference to previous message followed by substantiated agreement (e.g., "I agree because ...") Building on, adding to others' ideas	3
	Convergence – within a single message	Justified, developed, defensible, yet tentative hypotheses	2
	Connecting ideas, synthesis	Integrating information from various sources – text book, articles, personal experience	12
	Creating solutions	Explicit characterisation of message as a solution by participant	0
Total			(18%) 7

Resolution	Vicarious or real world application of solutions/ideas	Providing examples of how problems were solved Results of application	0
	Defending solutions	Defending why a problem was solved in a specific manner	0
Total			(0%) 0

Source: Analysis of student posts in Case A

The total number of student posts within this case was 96 with the average number of posts per student being 13.7. This was exclusive of introductory posts aimed at developing social presences at the beginning of the course.

When comparing the indicators for each phase, the information exchange indicator within the second or exploration phase had by far the largest number of posts (63 posts). This indicator was characterised by personal narratives, the sharing of literature or resources, and asking questions of clarification. Frances posted "I have had a look on the internet for strategic plans with a search mainly focusing on child care centres. I have not read in detail all these examples but I wanted to share them. [URLs provided]." At this stage, each item was presented quite separately and not yet combined to use as evidence to support a conclusion or create a solution.

The next most common type of posting was within the integration phase (12 posts) where students synthesised multiple sources of information and connect ideas. Peta stated

> I agree with you that E.C. professionals have a great responsibility to educate our students. Leadership versus Management is a crucial part in being able to deliver children's … After reading ch 1, Demystifying leadership by John Zenger it is apparent also that a leader is instrumental in … I have worked in schools where … The school I work in now has a principal who is a leader in many ways.

This post makes connections to a prior post, text reading, and personal experience. There were no posts in either of the indicators for the final phase of resolution.

There were an overwhelming number of posts coded as lower levels of thinking, with the majority being in the second or exploration phase. When each indicator is collated to gain the total number of posts per phase, a comparison of the compiled results indicates that exploration held the greatest number of posts (76%) followed by integration (18%). There was no cognitive presence coded at the resolution level for Case A.

Teaching presence involves designing, facilitating, and directing social and cognitive activities to support learners, and comprised three constructs: design and organisation, facilitating discourse, and direct instruction. Table 4.3 illustrates the indicators for each of the elements in addition to presenting an analysis of the instructor's posts for each indicator for Case A. Many teaching presence indicators had zero or one post; the majority of the posts were those which encouraged students.

Table 4.3
Category of Teaching Presence Posts for Case A

Category	Indicator	Number of Posts
Design and Organisation	Setting curriculum	0
	Designing methods	8
	Establishing time parameters	0
	Utilising medium effectively	0
	Establishing netiquette	0
	Making macro-level comments about course content	0
Total		8 (11%)
Facilitating Discourse	Identifying areas of agreement/disagreement	0
	Seeking to reach consensus/understanding	0
	Encouraging, acknowledging, or reinforcing student contributions	18
	Setting climate for learning	0
	Drawing in participants, prompting discussion	7
	Assessing the efficacy of the process	0
Total		25 (34%)
Direct Instruction	Presenting content/questions	11
	Focusing the discussion on specific issues	12
	Summarizing the discussions	1
	Confirming understanding through assessment and explanatory feedback	12
	Diagnosing misconceptions	1
	Injecting knowledge from diverse sources	3
	Responding to technical concerns	0
Total		40 (55%)

Source: Analysis of instructor discussion posts for Case A

The total number of posts for Case A is 169. The seven students posted 96 messages or 57% of the total posts, and the instructor posted 73 messages or 43% of the posts. The most common type of posts made by the instructor were posts which encouraged, acknowledged, or reinforced student contributions (18 posts) which formed part of the facilitating discourse category. For example, "Thanks for sharing your thoughts and reflection regarding the mission statement for your organisation. I am looking forward to others thoughts on your organisation's vision … as well as sharing their own organisation's vision and their critical reflection".

The next three most common types of posts came from the direct instruction category. The instructor commonly presented content or questions (11 posts); focused the discussion on specific issues (12 posts); and confirmed understanding through assessment and explanatory feedback (12 posts). The following comment illustrated the type of questions posed by the instructor:

> I want you to dig deeper ... you have made some interesting observations about the end result of great leadership but what is happening within the organisation to get it to this stage? What practices are occurring? What method is the leader using?

Interestingly, forums related to assessment had more frequent posts by the students. In other forums, even when the instructor posted messages which concluded with a question inviting students to continue the discussion, she found that the students did not respond.

The most common type of post made by the instructor was that of direct instruction (55%) followed by facilitating discourse (34%). Although an analysis of the online discussions revealed only 11% of the posts focused in the area of design and organization, indicators of this were visible in other areas of the online and face-to-face environments. For example, the curriculum and assessment with appropriate time parameters were provided in the course content document.

Patterns from Online Discussion

In the previous section, the student online discussion archives were mined and coded for content analysis and mapped against the four phases of the practical inquiry model. Understanding the interaction between instructor and learner is not restricted to the message content. Hence, the postings were also analysed to determine if different types of instructor posts evoked different types of student responses.

As part of the analysis, instructor and student posts were tracked to determine the nature of the interactions and if there were any patterns of responses based on the type of posts instructors used to stimulate or continue discussion. Figures 4.4, 4.5, and 4.6 illustrate the types and numbers of responses students gave to instructor posts at each of the three teaching presence categories.

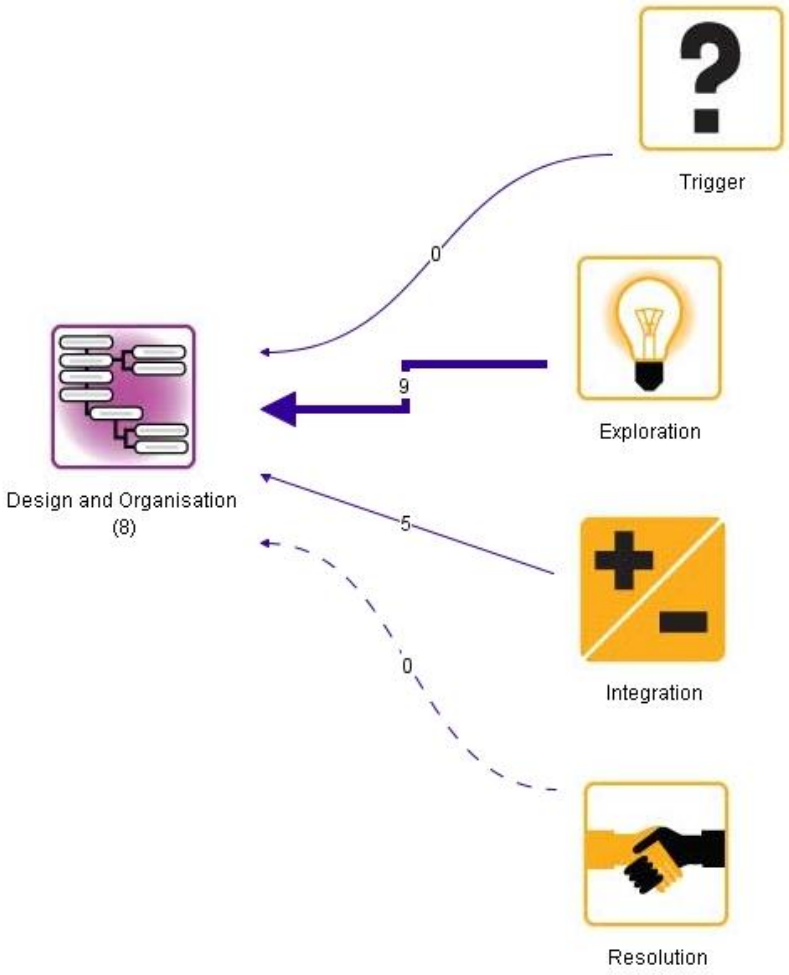

Figure 4.4. Cognitive presence responses to design and organisation posts

Sample Instructor post:

> Is there a difference between management and leadership? Do they evoke a similar response from those around them? What qualities do they hold? Share your ideas around these two key constructs.

Sample Student response:

> Decker and Decker (2005) talk about … In my experience managers have 'managed' situations such as human resources … I have also experienced good leaders, who have 'inspired' me to … Zenger (2002) suggests that people got through predictable development stages in their careers … Good leaders and managers are needed in schools.

As shown in Figure 4.4, instructor posts of the design and organisation nature are likely to gain exploration and integration responses from the students.

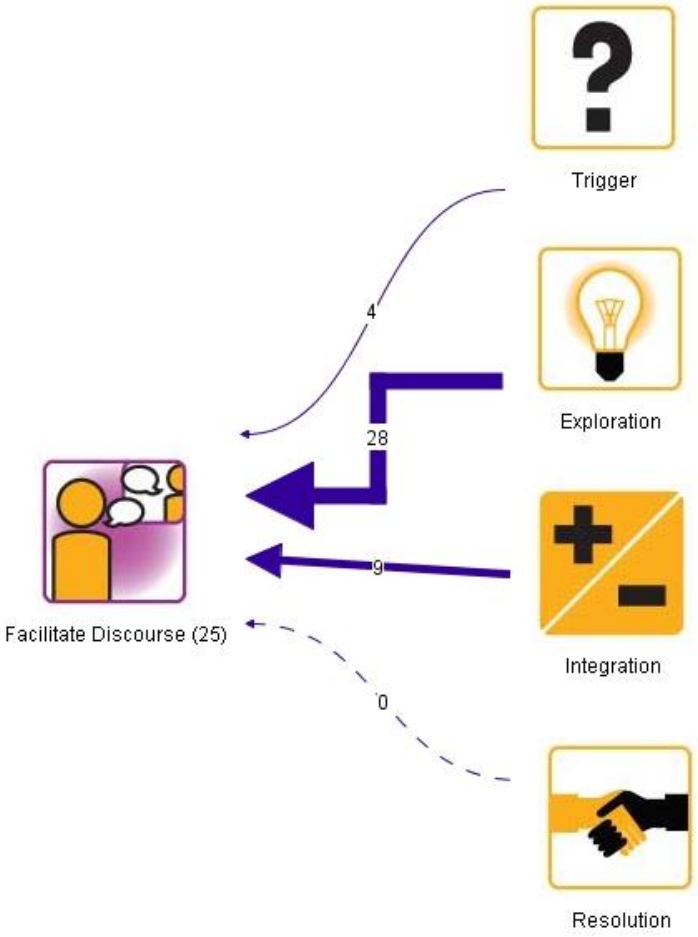

Figure 4.5. Cognitive presence responses facilitating discourse posts

Figure 4.5 reveals that when the instructor posts comments which facilitate discourse, the likely response from students within Case A is exploration and integration posts.

Sample Instructor post:

> Wonderful, thanks Mel, hopefully this will prompt others to share their plans. Perhaps you could get the discussion ball rolling by also adding what you like about the example.

Sample Student response:

> I really liked this strategic plan because it was clearly set out and easy to understand! Here is the link, [URL provided] it seems to align well with some of the examples from p. 100 in the text. Some of the other ones I looked at were really complicated: here some links to others I found but were not really 'user friendly'.

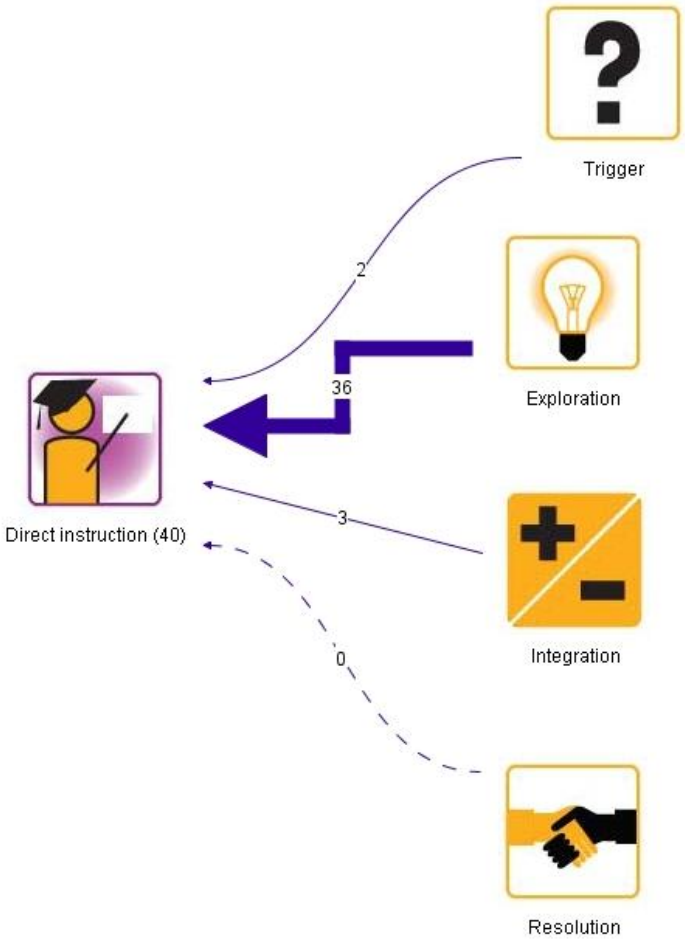

Figure 4.6. Case A Cognitive presence responses to direct instruction posts

As illustrated in Figure 4.6, direct instruction posts are more likely to result in the students' engaging in exploration activities.

Sample Instructor post:

> In reading your information Jacqui, I very much embrace the underpinning philosophy of … it recognises that … The final section should draw together your work and look at educational trends which will impact on your organisation … continue to relate the impact of the trends to your organisation and also try to find theory to back this up.

Sample student response:

> Thank you for clarifying that – one trend that did come up was … It's a bit bewildering to me that … My experience has been that … Has anyone else had similar experiences?

From the three figures above, it is evident that direct instruction and facilitating discourse type posts by the instructor were most likely to achieve exploration posts. When the instructor posted items related to course design and organisation, students' responses totalled almost half the number of integration posts when compared to exploration posts, so they did post at a higher cognitive level.

Table 4.4
Case A Comparing Teaching Presence and Cognitive Presence

		Cognitive Presence of Students			
		Triggering	Exploration	Integration	Resolution
Teaching Presence	Design and Organisation (8)*	0	9	5	0
	Facilitating Discourse (25)	4	28	9	0
	Direct Instruction (40)	2	36	3	0

Note. * The numbers in brackets indicate the number of teaching presence posts which instigated the student cognitive presence posts.

When collating the teaching presence and cognitive presence posts for Case A, Table 4.4 verifies that the majority of the postings sit at the intersection of direct instruction and exploration or facilitating discourse and exploration.

When coding, it was also noted that there was very little collaborative discussion online; it was more one-to-one conversation with the teacher posting and then a student answering and the teacher responding back to the individual, with minimal student posts responding to or encouraging one another.

Instructor Comments on Data Analysis

To refine the data and as part of the member checking process, the instructor of Case A was provided the opportunity to review the data analysis presented in this chapter and participated in a follow-up interview. Initially, she found reading the researchers account and the data interesting but also confronting. A summary of her feedback given during the interview follows.

After reviewing the data for Case A, the instructor made some immediate changes to her teaching in current courses. In online discussion forums she now "sits back to see if other students respond" rather than be "quick to get in and respond to students immediately". In the online discussion forums, she also feels that she now facilitates online discussion in two areas: drawing in participants and prompting discussion; and encouraging, acknowledging, or reinforcing student contributions. She continues to affirm student contributions but ensures that she makes recommendations for students to look at additional literature and adds comments like "have you thought about … ". Her future goal is to encourage ongoing conversation rather than have the pattern of: the student's posts followed by the instructor's reply; which permeated the discussion forums in the data for Case A. Little robust discussion occurred; little explicit direction was given in either face-to-face or online that emphasised the value of student to student discussion. She

has recently had success with postings which are contentious in nature or linked to real world scenarios as a hook to the content or assessment. A future goal is to improve her ability to have students contextualise the content.

She felt that she is now able to better structure questions in discussion forums to encourage higher-order thinking and promote student engagement with the content, herself, and other students. In particular, stimulus questions with scenarios seem to work well in the early childhood context.

Over time the instructor has created a deeper personal understanding of blended and online teaching and learning, she reflected that "as it is more familiar to me I'm willing to try new things". The process of being part of this research brought issues to the attention of the instructor. She felt that she could continue to improve her practice in the online space, and she has started to move along a continuum of ongoing improvement. The instructor also felt that "the online space is a vehicle for collaboratively unpacking content and relating it to context". Her activities were created in an attempt to try to model an appreciation of different contexts, and her goal was to have students delve deeper rather than stay on the surface level.

After reading the account of Case A, the instructor felt that the analysis at the indicator level seemed to make the data disassociated from the key concepts and the lived experience, although it was useful to look at what the indicators were at each level of inquiry.

The instructor is still struggling with her role and pedagogical practice in terms of discussion in the online space. She commented that she "felt slack if I didn't give a detailed response". After reading this documentation, she commented that she now provided "less detailed responses and invited other students to provide details from their perspectives".

Summary of Findings

In summary, the key findings for Case A are that for this course very little robust online discussion occurred. The instructor worked at the first and second generations of flexible learning pedagogies with a heavy emphasis on the first generation in practice, although philosophically aligned herself with the second generation or that of constructivism. Most of the messages posted were individual student-instructor conversations, even though the instructor did populate the forums with triggering questions. The most common type of post by the teacher was that of direct instruction. In response to this type of post, the most common post by students was in the form of exploration which is the second phase of cognitive presence. The online element of the blended course largely replicated the face-to-face section of the course. Elements of teaching presence were visible in the course beyond the online discussion, within course documentation and in the face-to-face environment.

Case B

Context

Case B was a Diversity course from the Primary specialisation within a four year Bachelor of Education program. This course was taken by pre-service teachers in their third year of the program. The purpose of the course was to assist pre-service educators develop their pedagogical awareness and skills to enhance their ability to cater for the collective and individual educational needs of diverse learners. The theoretical context of the course was to investigate: What is the field of diversity? What are the current constructs around diversity? What are key principles of curriculum design for inclusion? The socio-cultural, legislative, policy and professional contexts that inform inclusive education were explored, along with their implications for teaching and learning.

The sample tutorial group consisted of 35 students. Fifteen of the students completed the survey and 35 of them provided informed consent for their online discussions to be analysed for the purpose of this study.

This blended course had no live lectures. In response to feedback from previous cohorts, lecture materials were provided as a podcast instead of delivered face-to-face. The face-to-face component was used to model effective engagement, support social processes, and to explore the topics in a hands-on synchronous mode. It was assumed that the face-to-face modelling of discussion processes and the topics of discussion would flow over to the online discussions. Students had to access the podcasts and assessment material online, but online discussions were not mandated through assessment. Within this university, it was not compulsory for students to attend face-to-face classes. The online space had to be accessed by students to access the pod-cast lectures. However the instructor did not prodive clear guidelines or expectations in how the student should use the online space in conjunction with their face-to-face classes.

Results

Course Documentation Data:

The assessment for this course involved three items. The first item of assessment incorporated several short online quizzes based on the content from the course text. Secondly, a video case study involved students self-selecting and viewing four short video clips and then analysing each clip; and identifying and demonstrating how the clip related to the Queensland professional standards for teachers, the key concepts of inclusion, and the application of inclusive strategies in classrooms.

The third item of assessment was a reflective report based on the students' professional experience and their learning experience within the course. They were to analyse how a school community promotes inclusive culture, policies, and practices. The reflective report had a number of sections. They described the school and class context; identified and profiled a student at risk of under-achievement; described potential barriers for the student's progress; and outlined curriculum planning and delivery implications. They were also required to

document their inclusive pedagogy by providing evidence of planning for modifications to accommodate for diversity, and finally, to reflect on the success of the implementation of the plan and their personal understanding of inclusivity developed through their engagement within the course and their professional experience.

Within the course documentation, it was clear that the instructor had a goal to achieve deep understanding, higher-order thinking, and self-reflection. This was developed in the activities and the course assessment. The assessment purposefully expected high levels of cognitive presence including critical thinking and reflection. The assessment criteria included statements such as:

- Demonstrates a high degree of engagement with the course material;
- Evidence of higher-order thinking and synthesis of information;
- Links made between strategies and approaches;
- Evidence of higher-order professional reflection; and
- Evidence of synthesis and evaluation in response.
  (PRT 3201 Educating for Diversity, 2007)

The face-to-face activities and study guide were saturated with reflective activities each week. This personal reflection was supported with structured activities and models, face-to-face and online discussion, and other resources.

In addition to the course material, assessment, and online discussion forums, a range of other types of documentation were made available in the online space, including a large range of additional readings and supporting documents along with the lecture podcast and separate PowerPoint presentations. Also available online were the formal course content; professional experience materials; face-to-face tutorial resources; and online activities, for example, a Webquest. Specific resources were provided to the pre-service teachers to assist in their development of higher-order thinking skills and information literacy skills.

Considerations for course design included student-centred learning and situated learning. This required consideration of pedagogy beyond the teacher as expert, with a move towards a constructivist position, where knowledge is problematic, contextual, situational, and representational of possible truths. The aim was to move from abstract to concrete, from general to specific application of knowledge, acknowledging where the learner is, what the learners want, their beliefs, and sense of knowledge. It was also recognised by the instructor that the pre-service teachers were adult learners, who would make a choice of the degree to which they would engage in the activities and interact with each other, the resources provided, and the instructor, irrespective of mode or environment.

Within the course design, a range of teaching and learning experiences (online and face-to-face) were seen as a means to challenge the ways in which pre-service teachers think about the many forms of diversity in the Preparatory to Year 7 student population, such as: cultural and linguistic differences; varying abilities, aptitudes and interests; and differences in social and economic resources, family structures, values, and aspirations. Pre-service teachers were encouraged to look beyond the social justice and stereotype view of diversity, to acknowledge that

each individual is different, and to consider what type of learning experiences and assessment opportunities might best enable that student to engage with key concepts and demonstrate their knowledge.

The instructor provided models to deal with individualization, for example, Universal Design for Learning, which allow for a richer response to individual difference. In addition to identifying barriers to access, participation, and outcomes of learning, pre-service teachers were required to provide multiple and flexible ways to: present information, allow for engagement, express learning (and assessment), and motivate learning.

Instructor Interview

At the time of the initial interview, the instructor was a beginning (novice) blended and online educator. However, he repeatedly made the time to discuss ideas about blended and online teaching and learning with educators more experienced in blended and online teaching; and he regularly shared his learning and experiences with other novice educators.

In blended learning, the instructor observed that "the face-to-face must complement the online and vice versa". He contended that a teacher must have a social presence, both face-to-face and online, developing a sense of belonging to a community of learners. He remarked that "the sense of belonging and connectedness is very powerful, and impacts on students' learning outcomes e.g. motivation". He stated that online social presence is fundamental but needed to be planned in or structured. He went on to suggest that as educators in the online space we "need to insert ourselves better" and that social presence "doesn't happen by accident".

The instructor believed he behaved considerably differently online and face-to-face although he made a conscious effort not to do so. He believed this was because each environment "provided different opportunities; with the ability to value add using the advantages of each mode. It provided an increased access and participation for the client base; highly developed ICT skills and pedagogical skills were required". He found that he needed to have strong participation in both online and face-to-face; and when online, it was difficult to manage the quantity of input so that students were sometimes overwhelmed by the amount of information. Participants found it was "easy to get lost or miss items the threads, even when using smaller groups". He followed up by reflecting that blended teaching and learning was an "ongoing learning journey" for both the instructor and the students.

The blended environment provided flexibility. For example, "the use of podcasts instead of face-to-face lectures enabled me to use the face-to-face time for other things." He also relayed that the students and instructor still needed to find the time to interact online. The instructor found he was able to raise different and more controversial questions online, for example ethics and religion, because he found that his students felt "safer online, many students hid behind the computer and felt safe having heated discussions" where they did not have to 'face' others.

He found that both online and face-to-face provided "opportunities to link to other pracs and reflect both backwards and forwards from their practical experiences", and the links with theory and practice were more overt in the online space.

At the beginning of the semester, he made an assumption that his face-to-face teaching was more effective. In the past he had "considered face-to-face as being ideal", and had not considered "online as equal to or a more positive learning experience than face-to-face". He believed that "online might give some students more opportunity to engage when compared to face-to-face", because it is not time dependent. He did have a concern that online does not equal face-to-face. When reflecting on his own work and that of some of his colleagues, he conceded that "despite our beliefs in constructivism many educators use the online space for transmitting information". Table 4.5 provides a summary of the instructor's perceptions of teaching and learning in a blended course.

The reflective comments from the instructor below demonstrate that although he was a novice blended and online educator he was looking for ways to improve the outcomes of the course both for himself and his students. He commented that "it is important to have knowledge of what is possible, and then I need a reason to change my pedagogy and try new tools and practices".

Table 4.5
Case B Instructor Perceptions of Blended Teaching

Positives	Issues	Suggestions for improvement
• Face-to-face was enhanced by online opportunities • Students able to participate regularly irrespective of day or time • Face-to-face complemented online and vice versa • Sometimes face-to-face made it easier to provide examples, explain concepts and clarify • Students began to see they constructed meaning through reading and discussion • Online discussion was used as an opportunity to go back, value add, and extend time for discussion • Provided flexible opportunities to engage with materials, discussion, and have a social presence	• Model behaviours and processes in tutorials and hope for flowover online • Limited explicit teaching linking face-to-face and online • Instructor initially resistant to online teaching	• Need to find out where students are at: practise what he teaches • Provide a model of professional reflection and future action plans • Have strong social and teaching presence in both face-to-face and online elements • Do more hands-on activities in class • Use a variety of learning environments to engage students and provide access to what they need to be successful

Source: Analysis of interview data from Case B

The instructor had no previous knowledge of Garrison, Anderson, and Archer's (2000) CoI framework, nor the four practical inquiry phases; although when questioned he was able to make links to all four phases, as shown in Figure 4.7. He intuitively provided learners with opportunities and learning experiences to move through the phases. Learners were led to the higher levels of cognitive presence through the weekly activities and tasks set for assessment.

Figure 4.7. Mapping the course against Cognitive Presence phases

In particular, the assessment was seen as a driver for students to work at the higher levels of integration and resolution. Moving forward, the instructor has identified a number of things that he would like to more effectively embed in the blended course in the future:

1. Improve social and cognitive engagement both face-to-face and online;
2. Advance the number and depth of opportunities for learners to share experiences;
3. Promote the concept of multiple truths through learners providing different perspectives on topics or experiences;
4. Enhance the range of students' outcomes beyond course content e.g. USQ graduate attributes and skills;
5. Provide explicit modelling and opportunities for learners to develop metacognitive skills and processes;
6. Increase the level of problem solving, research, and inquiry required;
7. More effective embedding of critical theory: encourage different ways of looking at issues; have learners begin to question what they see; acknowledge that responding to diversity through inclusive teaching is problematic;
8. Explicit consideration as to how to improve critical thinking; and
9. Identify long term impact of the course, for example, Has there been a change of values? Do they look at learners differently and see diversity? What types of responses do they make? Are they waking up to previously unexamined elements of life as part of the teaching processes?

The instructor revealed that his "students are perturbed, even at the end of the course. They view diversity and inclusivity as big issues with no easy answers". His aim is to pass on his passion for the key concepts and to provide his students with the knowledge and skills "to challenge norms and values previously unexamined" and respond in a way that will benefit learners. He admits that this is "challenging both from a teacher's and learner's perspective".

During the interview, the instructor's reflective comments indicated that he was reviewing his pedagogical practice within the blended environment and seeking opportunities to improve teaching and learning within his course. Interestingly, his aim is the same as that of the practical inquiry model: he sees that in the future there will be a "need to ask open ended questions learning to promote inquiry and critical thinking".

Instructor Survey

The instructor completed a survey to identify his perceptions of his effectiveness in the online and face-to-face segments of his blended course. The results are presented in Figures 4.8 and 4.9.

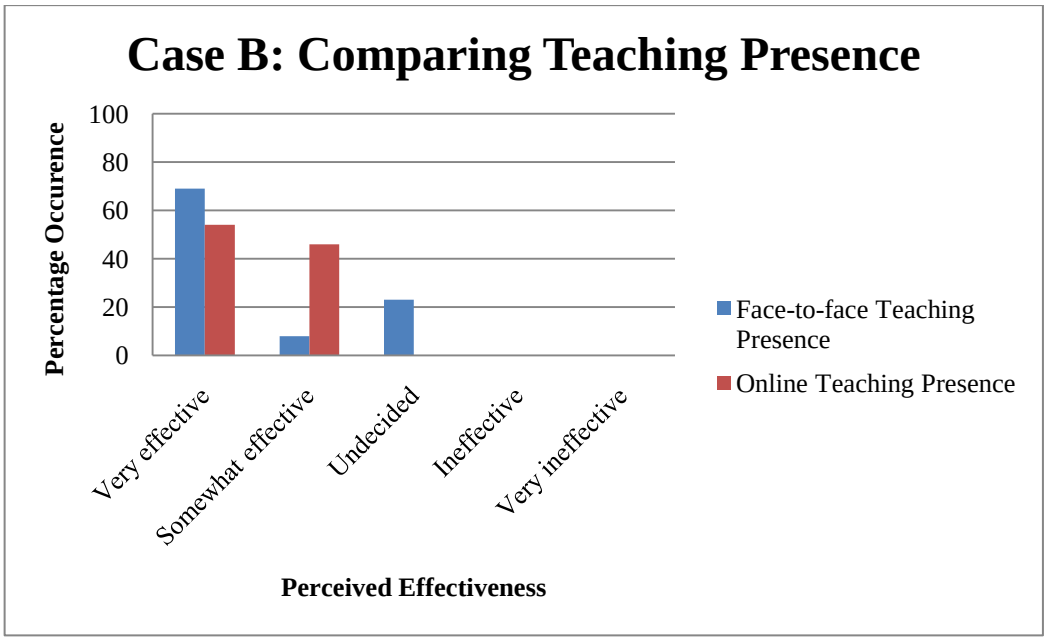

Figure 4.8. Instructor perceptions of Teaching Presence

The instructor perceived he was more likely to be very effective in developing teaching presence face-to-face when compared to online. Interestingly, he was undecided about his face-to-face effectiveness for a number of questions.

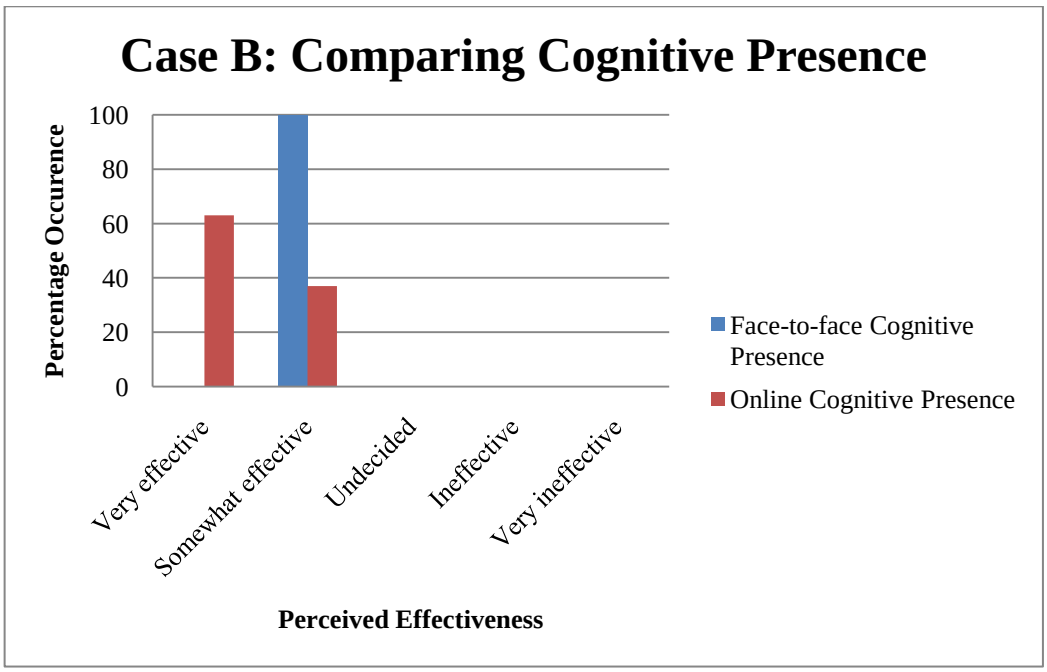

Figure 4.9. Instructor perceptions of Cognitive Presence

When completing the survey and comparing his effectiveness online with that of face-to-face, the instructor perceived that his ability to develop cognitive presence was more effective online than in face-to-face.

Student Survey

From the tutorial group selected for Case B, 15 pre-service teachers completed the student survey. Of these 15 students, 13 were female and only two were male. The age spread of the students revealed that seven students were aged between 18 and 24; five participants were aged between 25 and 41 and the remaining three participants were aged over 42. Most of the students (10) had previously engaged in two to five courses where online discussion was a planned element of the course. Two students had been involved in online discussion in either one or no course previously, and three students had been involved in six or more courses with planned online discussions. None of the participants in Case B indicated they were a novice computer user, and the majority of participants (12) self-reported as intermediate computer users, with only two students indicating they had advanced computer skills. One student did not report on their personal computer skills.

Parts B and C of the survey (See Appendix A) comprised 21 items that measured the pre-service teachers' perception of constructs which contributed to the effectiveness of cognitive and teaching presences face-to-face and online. These included concepts such as stimulating curiosity; synthesizing ideas; applying concepts; communicating expectations; and providing feedback. As with the instructor survey the responses to the survey were scored using a scale 1 = Very Ineffective to 5 = Very Effective. The mean (m) and standard deviations (s.d.) were calculated for each element of teaching and cognitive presence to identify perceptional differences between online and face-to-face environments. Table 4.6 provides a summary.

Table 4.6
Case B Mean Values for the Categories of Teaching Presence and Cognitive Presence

Presence	**Categories**	**Face to Face**		**Online**	
n = 15		Mean	Std Dev	Mean	Std Dev
Teaching Presence	Design and organisation	4.5	0.46	4.2	0.66
	Facilitating discourse	4.8	0.34	4.2	0.89
	Direct instruction	4.6	0.58	4.2	0.84
Cognitive Presence	Triggering event	4.8	0.47	4.3	0.67
	Exploration	4.8	0.32	4.4	0.89
	Integration	4.6	0.50	3.9	0.87
	Resolution	4.6	0.53	4.1	0.77

Source: Case B student survey

For both teaching presence and cognitive presence, all elements scored higher means in face-to-face when compared to the online segment of their blended course. There is little differentiation between the means, with the exploration phase of cognitive presence face-to-face yielding the highest mean (m = 4.8, s.d. = .32), and the integration phase of cognitive presence face-to-face yielding the lowest mean
(m = 3.9, s.d. = .87). As indicated in Chapter 3, when viewing effect size Cohen's benchmark of 0.5 represents a large change; 0.3 - 0.5 indicates a medium change; and <0.3 corresponds to a small change.

The Wilcoxon Signed Ranks Test, a non-parametric test, was run, with difference scores being calculated as face-to-face teaching presence minus online teaching presence. Based on these differences within teaching presence, a mean positive rank of 8.65 and a mean negative rank of 4.63 resulted in a *z* score of -2.135 with a *p* value of 0.033 and an effect size (*r*) of -0.39. This is a medium to large difference, which supports the conclusion that within their blended course the students perceived that the teaching presence in the face-to-face environment was more effective than in the online environment.

The Wilcoxon Signed Ranks Test for cognitive presence resulted in a positive mean rank of 7.45 and a negative mean rank of 1.75 ($z = -2.797$, $p = 0.005$, $r = -0.51$). This indicates a medium to large difference, with the students again having perceived that the face-to-face environment was more effective than the online environment when related to cognitive presence.

Although there were only 15 students from Case B who completed the survey there were a large number of responses to the open ended questions at the end of the survey. When discussing the effectiveness of both environments within their blended course, the students commented positively for both environments. They particularly mentioned that how the instructor used the environments was unlike their previous blended learning experiences. Table 4.7 provides a summary of their comments. Interestingly, in the face-to-face environment the pre-service teachers did not comment on assessment or modelling; however, they did comment on both elements when talking about the online component of the course.

Table 4.7
How the Learners Perceived the Effectiveness of the Environments

Elements of the Blended Course	**Comments about the Face-to-face Environment**	**Comments about the Online Environment**
Learning preferences/comfort	I prefer face-to-face lectures instead of podcasts. Face-to-face is much more valuable as you can clarify things much more easily. Love the face-to-face and really hope humanity does not suffer the overthrow of machines.	Have become increasingly comfortable in an online environment.
Motivation	Teaching is more engaging and exciting in the flesh.	Enjoyable, engaging, relevant and delivered in a wonderful way.

Perceptions on course design	Face-to-face environment helped me to learn and apply concepts. Interaction with other students gives you a chance to discuss ideas and is easier for me to learn as you get instant answers and you don't have to wait for people to reply.	The online Study desk was well organised and relevant. The online environment allowed us to access info at any time.
Assessment		The online quizzes were great assessment tools.
Teaching and learning activities	Face-to-face environment of this course was very open and provided students with the opportunity to discuss issues and different methods to help address issues. Teacher conducts classes in a manner which encourages group participation and enhances learning through stimulated thinking, real-world connectedness and meaning making.	A wonderful demonstration of effective teaching and learning incorporating an online environment. Online environment was very active and provided great issues to consider and question as educators in the 21st century . A great online aspect for the course. By far the best that I have ever been involved in since at uni.
Modelling		Online environment is underutilised in the program, yet ICT integration is embedded in the professional standards for teachers. Why is this not being modelled and ingrained in future teachers elsewhere?
Support	The face-to-face environment of this course was excellent. There is no better feeling than knowing that even if you don't understand something, the teacher is more than happy to continue explaining it to you until you understand (no matter how much time it takes, or even if it takes their own time). Teachers were available in a face-to-face setting assisted immensely with understanding some concepts. It was great support as required.	I have found the online aspect very useful and the teacher support has also been excellent.

Source: Case B student survey open ended responses

Within Case B, the pre-service teachers valued the instructor's teaching presence in both the face-to-face and online areas. They expressed disappointment that in other blended courses the online environment had not been used in similar ways to harness the advantages that environment brings.

Pre-service teachers also commented on the relationship between the work they did online and face-to-face. Table 4.8 provides a summary of the students' commentary on how their face-to-face work enhanced their online work and vice versa.

Table 4.8
How the Learners Perceived the Face-to-Face and Online Work Enhancing Each Other

How did Face-to-face Enhance Online Components	**How did Online Enhance Face-to-face Components**
Face-to-face complemented online	Online complemented face-to-face.
Just gave me a little more confidence to approach tasks.	Broadened my thinking, and reinforced some thoughts I had constructed after learning the classes.
In felt more equipped with knowledge so I could participate online.	Was also very important support when on prac.
Attending tutorials after listening to podcasts and lecture online helped me to understand underlying principles.	As I wasn't always motivated to listen to the lecturer online it didn't hence my face-to-face work as much as it could have.
Tutorial sessions allowed opportunities to ask questions and actively listen to other key points and ideas from other students.	The online work allowed for discussions prior to tutorial and a greater enhancement during the tutorial time with teachers.
	Knowledge acquired online could be transferred to face-to-face.

Source: Open-ended questions from student survey

Table 4.8 shows how the pre-service teachers were able to identify how the course provided opportunities for them to engage at all four phases of cognitive presence. It also offers their perceptions on how the teaching presence impacted on cognitive presence and suggestions for improvements. Table 4.9 provides a summary of the commentary on how learners saw teaching presence impacting on their cognitive presence and critical thinking and possibilities for enhancement of learning.

Table 4.9
Case B Student Commentary on Teaching Presence

Instructor Modelling of Cognitive Presence	Teaching Presence Impact on Cognitive Presence	Ideas for Improving Teaching Presence
Triggering	We were given scenarios whereby we were to consider appropriate outcomes.	
Exploration	The tutors bought real life stories into the discussion which made it relevant. Teacher passions were expressed, and they provided many examples.	Reduce the referral to quotes in the text and/or referral to limited range of personal experience/monologue.
Integration	This course was linked with all other subjects and previous learning. It made links to other pracs, and self perception on prior pracs. Teacher could always relate theory to every day experiences and practices. Teacher could assist in the application of knowledge across various areas. Skilled at assisting us to make connections with our work and prac. Personal anecdotes drew on theories from previous courses in a practical way that enhanced understanding of their application in the classroom.	Theory - prac V's reality.
Resolution	We had to determine outcomes from scenarios.	Sometimes difficult to come up with a single best solution: I took responsibility for my own learning and decided to follow up on many issues bought up in class, research them and go to PD days etc.
Explicit links to critical thinking	Thinking in other disciplines areas. Online discussions were the key to higher-order thinking.	Need to ask more open-ended questions.

Source: Open-ended questions from student survey

These comments suggested that the pre-service teachers found the teaching presence enabled them to move through the phases of cognitive presence and improve their critical thinking.

Online Discussion Archives

Posting in the online forums was not a compulsory activity nor was there an assessment obligation to do so. Of the 35 learners who provided informed consent for their postings to be analysed for the purposes of this research, 16 of them did not post in the online forums. Although all students accessed the online environment, as with Case A almost half of the students who considered they would post within the forums did not. Table 4.10 presents an analysis of the student posts against the cognitive presence indicators.

During the data analysis process, it was observed that there were a number of posts of a reflective nature which did not relate to any of the indicators in the framework developed by Garrison et al., (2000). Although reflection is regularly discussed as being part of the CoI framework, there is no explicit reference to it within the framework. Reflection appears to be an emergent indicator within the resolution phase. To this end, an additional indicator has been added to Table 4.10 below.

Table 4.10
Cognitive Presence Analysis of Discussion Forums for Case B

Practical Inquiry Phase	Indicators	Socio-cognitive Processes	Number of Posts
Triggering Event	Recognize problem	Presenting background information that culminates in a question	0
	Sense of puzzlement	Asking question Messages that take discussion in a new direction	5
Total			(5%) 5

Exploration	Divergence – within the online community	Unsubstantiated contradiction of previous ideas	0
	Divergence – within a single message	Many different ideas/themes presented in one message	2
	Information exchange	Personal narratives/descriptions/facts (not used as evidence to support a conclusion) Sharing of literature/resources Questions of clarification	58
	Suggestions for consideration	Author explicitly characterises message as exploration, e.g., "Does that seem about right?" "Am I way off the mark?"	3
	Brainstorming	Adds to established points but does not systematically defend/justify/develop situation	5
	Leaps to conclusions	Offers unsupported opinions	7
Total			(74%) 75
Integration	Convergence – among group members	Reference to previous message followed by substantiated agreement (e.g., "I agree because . . .") Building on, adding to others' ideas	8
	Convergence – within a single message	Justified, developed, defensible, yet tentative hypotheses	0
	Connecting ideas, synthesis	Integrating information from various sources – text book, articles, personal experience	9
	Creating solutions	Explicit characterisation of message as a solution by participant	2
Total			(19%) 19
Resolution	Vicarious or real world application of solutions/ideas	Providing examples of how problems were solved Results of application	0
	Defending solutions	Defending why a problem was solved in a specific manner	0
	Reflection	Reflecting on learning outcomes Reflecting on learning processes	2
Total			(2%) 2

Source: Analysis of discussion posts for Case B

Table 4.10 revealed that the indicator of information exchange within the exploration phase had the most posts (58 posts). Within this indicator, students provided information gained from the literature or in the form of personal descriptions; alternatively, they posted questions of clarification. Robert demonstrated an example of a post where he shared resources or literature: "I stumbled across this website in my studies, and remembered some people saying they weren't 100% sure on the different learning disabilities and their abbreviations … Here's the link [URL provided]. Hope some find it useful." Although the divergent information and questions were all related to the problem or question under exploration, there was no attempt to synthesise the information.

The next most common indicators are both within the integration phase. Firstly, where students connect ideas from multiple sources this area had nine posts and the next most frequent indicator was where students build on the ideas of others (8 posts). Devon's post showed a convergence amongst group members by referencing back to the previous message followed by substantiated agreement and adding to the ideas of others:

> Well said Julie. I agree with you and Steve's motives … I think as future educators we need to be exposed to situations that we may have to deal with and we can begin to think about steps that we can take to deal with these circumstances. I read this article today and it provides some ideas on how we can go dealing with some of these issues … create inclusive classrooms where a broad range of student differences are accommodated as an ordinary part of the school day.

One of the triggering events which generated a strong reaction was digital images of disabilities from the World Health Organisation (WHO). These images were both presented in class and made available online. This gave all students the opportunity to 'be there' and respond. The images were confronting and aimed at stimulating discussion at the cognitive, descriptive, and emotional levels. Samantha shared: "WOW – I looked at the images and I wept … I had no idea. I am moved with compassion."

The total number of student posts in Case B was 101, with the average number of posts per student being 5.3. This does not include the introductory posts which occurred at the beginning of the course and aimed at developing group cohesion; nor did it count the posts which were related to the administration of the professional experience embedded within this course, as these were perceived by the researcher as not being related to the development of cognitive presence.

Students regularly commented on their peers' posts rather than waiting for the instructor to do so. They also shared prior personal experiences as demonstrated by this post from Philip:

> I remember when I was in grade 12 and we had a discussion about suicide. At the conclusion of the discussion one of the students got up on the stage and said the he had considered committing suicide because of the bullying that he suffered at school. He also contemplated suicide because of some health issues that he had at the time. The people that were responsible for bullying these students were the first students to go up to him and offer support to him.

After collating the indicator posts, the data reveal that the majority of the students' posts (74%) were at the exploration phase; with 19% at the integration stage. The triggering and resolution stages held the least number of posts with 5% and 2% respectively.

The total number of posts in Case B was 141, with 28% (or 40 posts) of total posts completed by the instructor. The instructor posts were also analysed. Table 4.11 illustrates how the instructor posts were spread across the indicators within the three categories of teaching presence: facilitating discourse, design and organisation and direct instruction.

Table 4.11
Teaching Presence Posts for Case B

Category	Indicator	Number of Posts
Design and Organisation	Setting Curriculum	0
	Designing methods	1
	Establishing time parameters	0
	Utilising medium effectively	0
	Establishing netiquette	0
	Making macro-level comments about course content	0
Total		(2%) 1
Facilitating Discourse	Identifying areas of agreement/disagreement	2
	Seeking to reach consensus/understanding	0
	Encouraging, acknowledging or reinforcing student contributions	12
	Setting climate for learning	0
	Drawing in participants, prompting discussion	4
	Assessing the efficacy of the process	0
Total		(45%) 18

Direct Instruction	Presenting content/questions	8
	Focusing the discussion on specific issues	2
	Summarising the discussions	1
	Confirming understanding through assessment and explanatory feedback	3
	Diagnosing misconceptions	0
	Injecting knowledge from diverse sources	6
	Responding to technical concerns	1
Total		(53%) 21

Source: Analysis of instructor discussion posts for Case B

The most common type of instructor post (12 posts) was to encourage, acknowledge, or reinforce student contributions within the facilitation discourse category. An example of this type of posting from the instructor is: "Thank you for your honest and sincere sharing. The issues of how societies have treated 'difference' historically and still in the present are confronting at many levels for us". The next frequent type of posting (8 posts) was one where the instructor presented content or questions within the direct instruction category.

In Case B, the most common types of instructor posts were those that fall in the category of direct instruction (53%), closely followed by facilitating discourse (45%). There were only 2% design and organisation posts within the online forums; however, within the course documentation and in the course online space it was obvious that the instructor did participate in design and organisation activities such as setting the curriculum and establishing time parameters.

Online Discussion Archives: Pattern Analysis

The tables above resulted from the coding of online discussions through the lens of the CoI framework. Within this section, a number of figures will illustrate the number and types of posts the pre-service teachers gave in response to the instructor's posts in the three different categories of teaching presence.

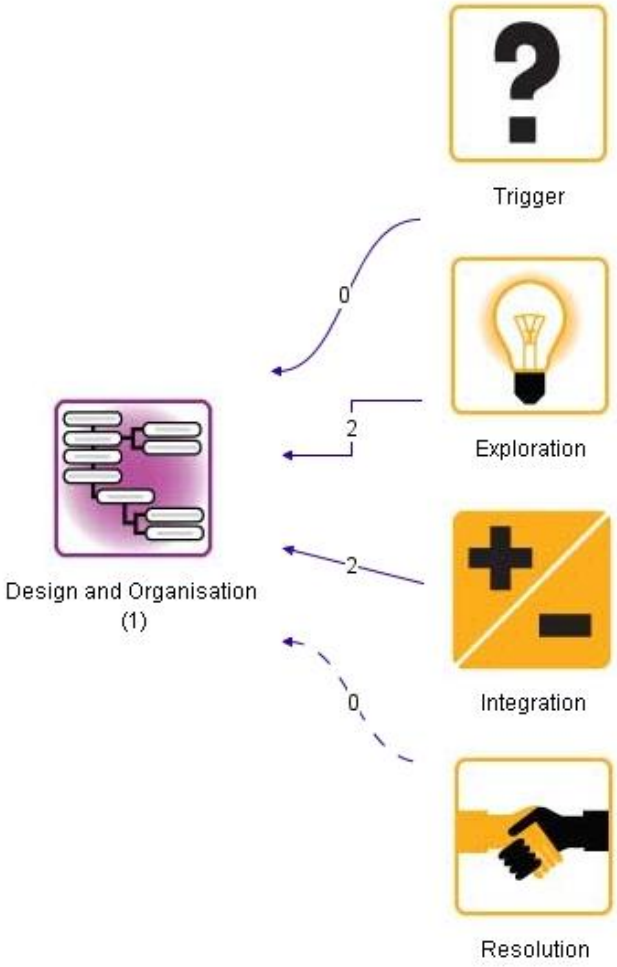

Figure 4.10. Case B pre-service teacher responses to design and organisation posts by the instructor

In this case only one design and organisation post was made by the instructor and it resulted in very few student responses. Figure 4.11 however demonstrated that when an instructor posts messages which fall within the facilitate discourse category, the students were likely to respond with numerous exploration type posts within the second phase of the practical inquiry model.

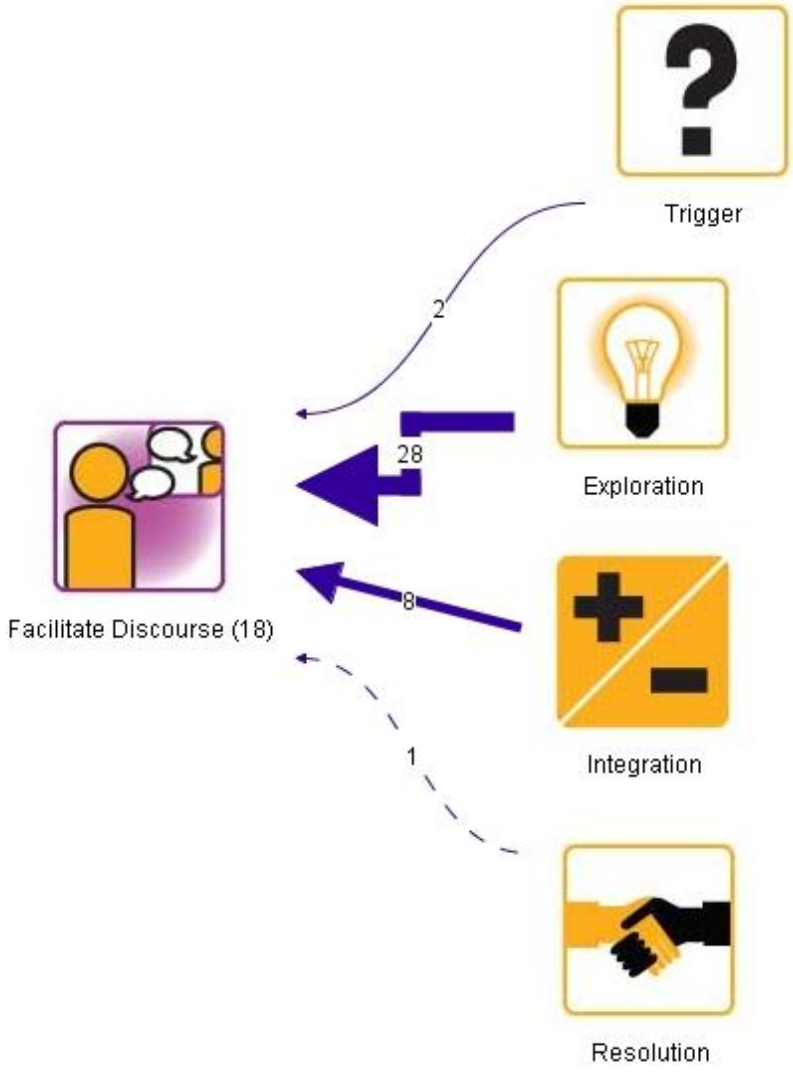

Figure 4.11. Case B pre-service teacher responses to facilitating discourse posts by the instructor

The pre-service teachers' responses to facilitate discourse posts by the instructor were usually in the exploration and integration phases with minimal triggering and resolution posts.

Sample instructor post:

> Hi James and Matthew, I appreciate your input here. Thanks. A young woman in my tute this afternoon … This is a complex issue I know. How would you respond to that Matthew given your work with intellectually impaired people?

Sample student response:

> Hi, this was a subject that my friend and I often debated due to the nature of our work …I do admit though, I was … My friend had … I do however understand why people do feel …I have to admit that today's early intervention programs must make a huge difference to the lives of families with disabled children.

Figure 4.12 below indicates that students rarely posted responses to the instructor's messages of a design and organisation nature.

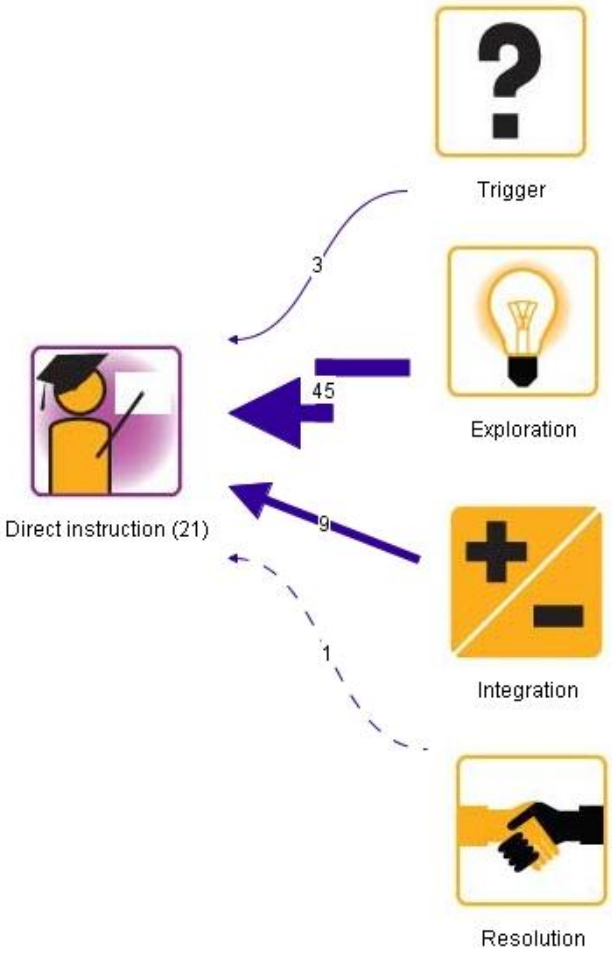

Figure 4.12. Case B pre-service teacher responses to direct instruction posts by the instructor

Sample instructor post:

> This week I have included a set of photos that was designed to challenge our preconceptions about 'disabled bodies' and minds. The context was the history and evolution of ideas about disability as one aspect of the diversity that we face in contemporary classrooms … the photos were intended to perturb our comfortable notions of caring for people who are 'less fortunate than ourselves' and to explore the influence of context …could you always tell who had the disability in the photo?

Sample student response:

> Hi, there were some images that highlighted disabilities. However it was hard to distinguish between people who were 'normal' and those who are impaired. My favourite photo is the first photo. To me that photo is beautiful because … the photo with the man sitting next to the tree stood out to me also. To me it looks like a photo of isolation … The picture that made me quite mad and feel sad was the older man lying on his stomach … so why shouldn't people who are different be shown?

If students do respond to design and organisation posts, it is most likely to be with exploration or integration. However, it is likely that pre-service teachers internalise the information provided in design and organisation posts, and use that information in future responses in other areas or within their assessment of learning activities. This is in contrast to the number of posts with which pre-service teachers respond to direct instruction posts. The direct instruction posts resulted in 45 exploration posts and nine integration posts, in addition to posts at the trigger and resolution phases.

The three figures above indicated that the type of post made by the instructor does impact on the number and spread of posts across the phases of cognitive presence that pre-service teachers respond with. Facilitate discourse and direct instruction posts gained the most response from pre-service teachers. The intersection of posts is summarised in Table 4.12 below.

Table 4.12
Summary of Instructor and Student Posts in Case B

		Cognitive presence of students			
		Triggering	Exploration	Integration	Resolution
Teaching Presence	Design and Organisation (1)*	0	2	2	0
	Facilitate Discourse (18)	2	28	8	1
	Direct Instruction (21)	3	45	9	1

Note. * The numbers in brackets indicate the number of teaching presence posts which instigated the student cognitive presence posts.

Additional Data Outcomes:

While analysing the data for Case B, a number of further outcomes were noticed. Although not formally mapped within this research when coding and analysing the online discussions, it was observed that learners posted messages which would have also been coded as social presence in the forums identified. Social presence posts were not restricted to initial introductory forums. It was also noticed that students posted messages which could have been coded twice: as both cognitive presence and as teaching presence.

Instructor Comments on Data Analysis

After reviewing the data analysis for Case B, the instructor commented that he enjoyed reading and was interested to read the researchers portrayal of the interview and the interpretations around the data. In terms of his work in blended learning, he had previously considered face-to-face teaching and learning to gain more positive outcomes. He is now more hopeful that the blended and online environments will result in the same or better outcomes for students.

During the time between data collection and the instructor's reviewing the data analysis, he had the opportunity to try other things online. He had been trialling new tools to support reflection and other forms of technology and media to support student learning. He had been surprised by the quality of students' work online. If it was designed and implemented effectively "the depth of the student reflection is of better quality online than in face-to-face". He also found that "the quality of the peer feedback online tends to be better online than in face-to-face activities".

With more experience designing and teaching both online and blended courses, the instructor had seen a change in his attitude towards blended and online learning. He is no longer resistant to online teaching and no longer considers online as inferior to face-to-face teaching. He has a broader consideration of what blended learning is and acknowledged that online learning can enhance students' face-to-face learning experiences.

The instructor has made a concerted effort to continue his personal learning to improve his pedagogy practice in online and blended environments. However, he continues to experience limited student engagement in online discussion within his courses. He observed that it is difficult to "get students in and engaged, however once they are in, the engagement and learning outcomes are positive". A personal question for him is "how do I get them in" the online space of a blended course? The instructor has found that even though his design of the course, his ongoing instruction, and his online facilitation have changed over time, by providing more opportunities for engagement and scaffolding of activities for enhanced student engagement, he is still concerned with the lack of frequency and depth of student postings. Even in the "assessment forum which has many more posts, there is not a lot of thinking; students ask very low level questions". The instructor remained frustrated about levels of student engagement in the online discussion spaces.

The instructor remarked that it was crucial for the teacher to have a high social presence. Some students sometimes feel there is no one there if there is no instructor presence. He remarked that "social presence seems to be very significant factor in the online experiences". The instructor felt that he had a responsibility to respond to all student posts; often with long responses, providing links to further information.

He also perceived that there is a variety of student expectations about what the online environment for a blended course might entail. In addition to those students who believe the online space in a blended course is a social space, others

believe it is a space for digital information with no expectation of human connectedness; and a third group of students expects human interaction online to be part of the overall learning experience.

When checking the report or statistics provided in the Learning Management System, the instructor has found many of his students were 'lurkers'. He found:

> students going online to look but not contributing, this limited the different perspectives on the issues due to the lack of participation by so many students. When my students share we get multiple perspectives which are important to see patterns, outliers and contribute to collective knowledge building. Because personal experience is not the same for us all, the sharing of perspectives is important especially when trying to link field experience with theory.

He felt that he (and many of his colleagues) were developing skills online, but the students were "not coming along with us". There seems to be a change in the nature of instructional work completed by academics, however, students also need to adjust to their new roles as online learners.

Although the instructor of Case B describes his teaching approach as that of a constructivist, he feels that he

> needs to be the director. I have the information; I plan the learning events that I hope will highlight key points. However I fear my approach in practice runs counter to my intentions. I need to move to inquiry or problem based in the future, to a more constructivist approach in practice.

Overall, the instructor sees learning occurring as a result of an experience: then students need to make sense of the experience; and add to collective meaning-making through discussion, so in the future they can respond to the same/similar experiences with increased confidence to respond in context/practice. "This is the change for me as a pedagogue: both face-to-face and online".

For future teaching in blended environments the instructor sees himself

> taking a real world scenario and encouraging students to ask questions. Students would then engage in a process of discovery and exploration based on their own questions. My job would be to inject information when and where it is needed to assist the exploration. I see students collectively sharing the results of their exploration, experience and knowledge.

He perceives this new way of working as having three phases: "What do you want to know? How do you want to know? How can I help?".

He has a desire to help students with transferable skills rather than share wisdom, content, and experience. The instructor commented that when working in blended environments you "have to know when to get out of their way. The more I pour in the less room there is for others to contribute".

The instructor sees the online element of blended learning as having ebbs and flows of interaction. He questioned, "Can high levels of interaction be sustained by both instructors and students over the whole semester?" He also sees blended learning as demanding, interesting, and motivating when students take the time and have the interest to contribute to the total experience.

Summary of Findings

Key findings from Case B were that to have a critical mass of students working at the higher cognitive levels will not happen by accident: it needs to be planned into the learning activities and/or assessment. Even without a mandate for online posting in blended courses, many students do still post, although approximately half of the students were lurkers, this resulted in many one-on-one type of conversations rather than one-to-many and many-to-many. Teaching presence does occur in elements of a blended course other than online and face-to-face discussions. The instructor worked at the first and second generations of flexible learning pedagogies with a heavy emphasis on the first generation in practice, although philosophically aligned himself with the second generation. It is difficult to match the student expectations of what happens online with instructors' expectations. The most common type of posting by the instructor was that of direct instruction, and the most common cognitive presence post by students was at the exploration phase.

Case C

Context

As stated previously, the researcher was also the instructor for Case C. This case involved a course from the Secondary specialisation within a four year Teacher Education program. The course was taken by students in the second year of their program and it focused on two broad areas: firstly, issues for Middle Years learners which may lead to disengagement, and secondly, curriculum and pedagogical approaches for students in the Middle Years.

The assessment for this course required that learners investigate two Middle Years issues which may lead to disengagement, one through an individual inquiry and the second through an online collaborative approach. In addition, pre-service teachers developed a unit outline appropriate for Middle Years learners. This plan had to demonstrate their ability to engage students in learning activities that promote higher-order thinking and ICT integration. Students also completed a professional experience placement in a secondary school and were required to complete an associated reflective activity.

This course blurred the boundaries between traditional face-to-face and online learning. It provided flexible learning opportunities for anyone, anywhere, anytime; and enabled a broader cross-section of the educational community to access and to engage in the learning experiences. In this case, the online environment afforded the opportunity of practicing teachers to join the pre-service teachers in online discussion about authentic issues in today's classroom. This blended course had weekly face-to-face workshops in addition to online activities. Because the enrolment in the course on one of the satellite campuses was very small, the face-to-face workshops were held via video conference to enable those students to have real time connections to the instructor and the students on the main campus.

The sample tutorial group consisted of 36 students. Seventeen of the students completed the survey and all students provided consent for their online discussions to be analysed as part of this investigation.

Results

Course Documentation Data:

Unlike Case A and Case B, student participation in online discussion was an integral element of both the learning activities and assessment in Case C. Although many of the materials made available during face-to-face sessions were also provided online, the online discussions and student individual and collaborative meaning-making were a key aspect for Assignment Two. Student participation in online discussion and the resulting reflection on the learning from the process of online discussion contributed to 40% of the students' final grade in the course.

Other types of documentation available within the online space for the course included course content, assessment details, weekly workshop notes and activities,

additional supporting readings, links to the library and academic learning support, and links to digital resources and opportunities for online discussion and sharing of resources.

The theoretical backgrounds for the course design were those of social constructivism and connectivism supported by authentic content and authentic dialogue. It was based on social constructivism, where learners made meaning through dialogue, communication, collaboration, and interaction. Connectivity was enhanced by the ICT, providing a flexible learning environment which enabled pre-service teachers, mentors, lecturers, and experts to access and interact with a plethora of resources and people. This process supported innovative ways for curriculum to be taken up and fostered dynamic discussions as part of a rich learning experience. The whole learning experience was designed to provide flexibility and promoted critical inquiry among undergraduate students to promote deep knowledge within a community of learners and making authentic links between theory and practice within both the learning activities and the assessment.

Course Instructor Reflection

The instructor was not a novice blended or online educator, however she would not refer to herself as an expert either, even with a number of years of online teaching under her belt. The course was designed to take advantage of the benefits that each mode enables. The face-to-face and videoconferencing mode was ideal for brainstorming and gathering ideas quickly: presenting information; having the students engage with hands-on activities; and unpacking the key elements of the assessment, for example.

The online discussion areas were used to bring external people into the course (without travel) and to continue more in-depth conversation about the issues brought up in the synchronous discussions. The online space allowed the opportunities for models to be provided, and for students to extend the face-to-face conversation and ask further questions. In addition, the online space provided an opportunity for pre-service teachers to delve into the key issues for Assignment Two in depth, with pre-service teachers from another country along with practising experts in the fields of inclusivity, autism, cultural diversity and second language learning, bullying and cyberbullying, and ICT integration. Students were provided clear instructions regarding the expectation of their online interaction and online presence. For example, tips were provided regarding the types of postings which might be constructive and support collective meaning-making.

Both the online and the face-to-face conversations provided opportunities for students to engage at all four levels within practical inquiry. This included students' questions resulting from stimulus; brainstorming and sharing information; students justifying comments and creating solutions; and finally, either testing their solutions while on professional experience or defending their solutions to their peers. Activities and assessment were designed into the course to enable students to move through these various levels of thinking and to enhance student cognitive presence both face-to-face and within online discussions, with an aim of gaining improved learning outcomes in the course.

The instructor reflected on the positive and negative aspects of the learning experience and revealed some suggestions for improvement. These are presented in Table 4.13.

Table 4.13
Case C Instructor Reflective Data

Positives	Issues	Suggestions for improvement
• Combines the benefits of dynamic and spontaneous conversation with that of a more informed and reflective type of discussion • The classroom is not restricted by space, time, nor membership • Authentic discussions and assessment can result from authentic and blended activities • Increased access to different types of information and people • Able to keep a record of student engagement both online and face-to-face • Students can self-select engagement options • Students provide ideas for course improvement for the implementation of the next iteration	• Some students don't see the value in interaction • Some students focus on assessment rather than improving overall learning • Some staff struggle to see their role online in blended learning • Requires increased time commitment: need to be available both face-to-face and online	• Provide opportunities for synchronous online activities in addition to asynchronous • Encourage enhanced participation from all students at a higher level • Create alternative activities that require students to work at the integration phase

Source: Analysis of reflective data from Case C

The work in the face-to-face environment was often to provide models or unpack examples which enhanced the students' work online. For example, sample student postings were analysed and students identified elements which made the posts effective and suggested ways in which the posts could be improved. They then translated this into creating more effective posts online. Technical issues were often dealt with in the face-to-face time where the instructor could visually demonstrate the tools to students rather than tell them what to do. Often students asked face-to-face rather that online, questions of clarification about what/how to do things.

The online environment provided time and space for extended discussions, often following up or sharing resources related to a face-to-face conversation or activity. Both the pre-service teachers and the instructor found they were able to share literature or resources to add to the fast-moving face-to-face discussion. Group work in face-to-face activities was often shared online rather than face-to-face due

to time constraints. Some activities were started face-to-face, that is, the triggering event occurred during face-to-face classes, and were then completed over time using both face-to-face and online environments.

The instructor had previous knowledge of the four phases of practical inquiry and over time was making modifications to the course to include activities and assessments which explicitly took students through the four phases. Figure 4.13 provides some examples and comments from the instructor regarding ongoing improvements to promote all four phases of practical inquiry.

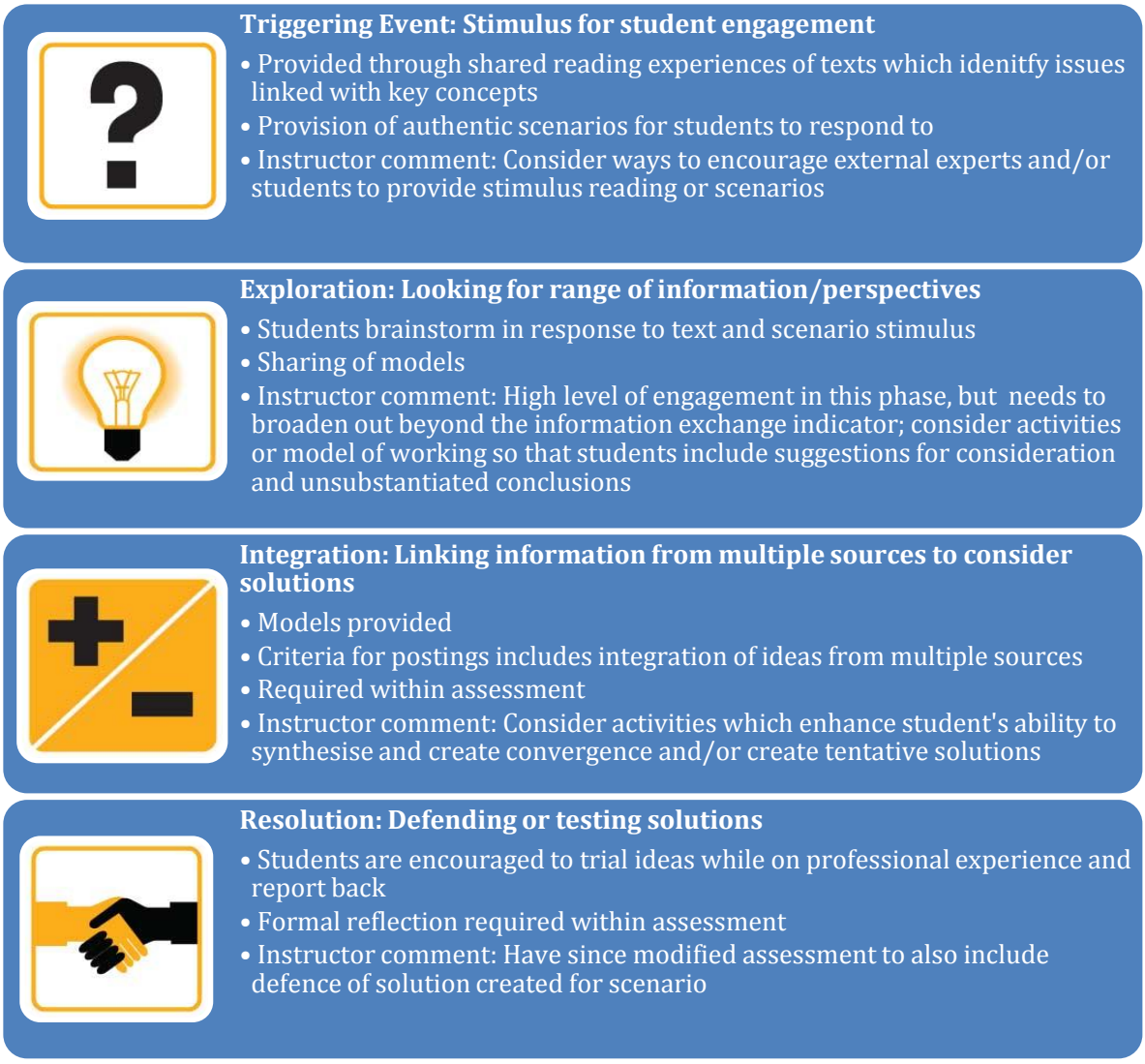

Figure 4.13. Case C Mapping the course against Cognitive Presence

The instructor did not perceive herself as behaving differently online when compared to face-to-face, although she does find that with the text based communication in online discussions, she is likely to make short conversational type responses and use emoticons regularly rather than formal responses, as she has observed colleagues do when responding online.

Instructor Survey

The instructor completed a survey to identify her perceptions of her effectiveness in the online and face-to-face segments of her blended course. The results are presented in Figures 4.14 and 4.15.

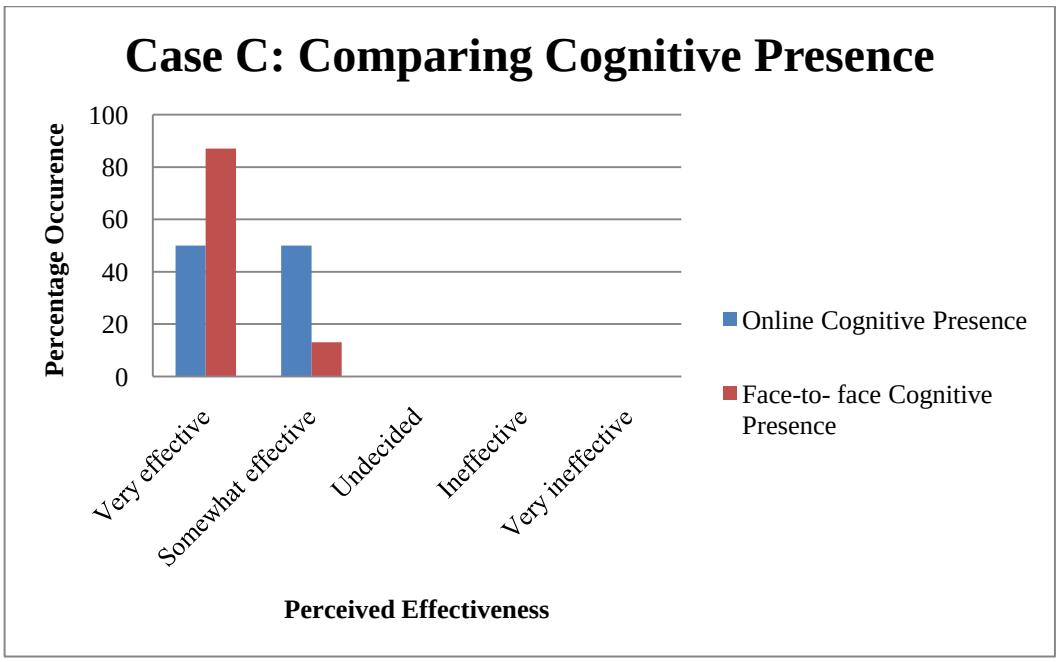

Figure 4.14. Instructor perceptions of Teaching Presence

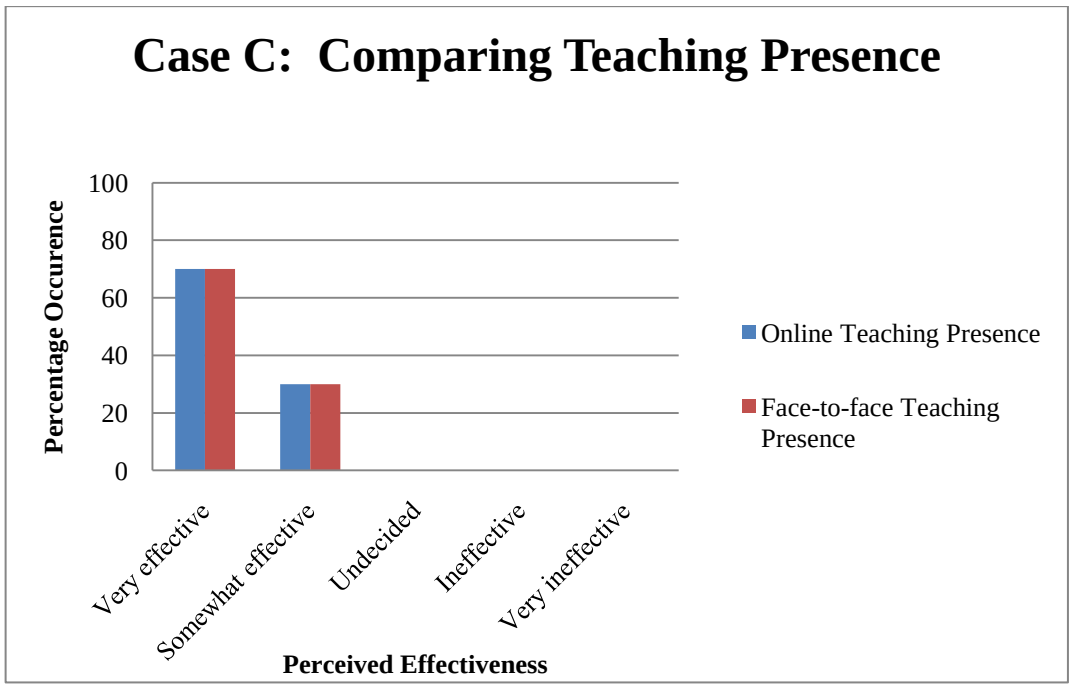

Figure 4.15. Instructor perceptions of Cognitive Presence

Overall, the instructor rated herself at the 'very effective' and 'somewhat effective' levels for all indicators for both face-to-face and online. This may be an indication of the instructors previous positive experience within the course for Case C, or may

be reflective of the blended teaching in all courses. The survey revealed that the levels of teaching presence were the same face-to-face and online. The level of cognitive presence dropped online when compared to face-to-face.

Student Survey

The survey was completed by seventeen students within a face-to-face workshop for Case C. There were eleven females and six males. Twelve of the participants were aged between 18 and 24; two of the participants were aged between 25 and 41 and one participant was aged over 42. Two participants did not indicate their age. Most of the participants (11) had never been involved in a course which had online discussions as a planned element of the course; three had participated in two and five courses with online discussion previously; and the remaining three had participated in between six and twelve courses previously, where online discussion had been a planned element of their course. When self-rating their computing skills, most pre-service teachers (12) indicated they had intermediate skills. Only one participant indicated they were a novice, and four indicated they had advanced computing skills.

As previously mentioned, within the survey pre-service teachers indicated how effective they thought the online environment and the face-to-face environment were for a range of items. A summary of the mean values and standard deviations for each phase of cognitive presence and each element of teaching presence is presented in Table 4.14.

Table 4.14
Case C Average Values for the Categories of Teaching Presence and Cognitive Presence

Presence	**Categories**	**Face to Face**		**Online**	
N = 17		Mean	Std Dev	Mean	Std Dev
Teaching Presence	Design and organisation	4.2	0.75	3.7	0.87
	Facilitating discourse	4.3	0.52	3.8	0.38
	Direct instruction	4.4	0.51	3.9	0.53
Cognitive Presence	Triggering event	4.4	0.57	3.8	0.75
	Exploration	4.4	0.62	4.1	0.62
	Integration	4.4	0.58	3.9	0.71
	Resolution	4.2	0.56	3.8	0.79

Source: Analysis of student survey

As in Case B, the means were consistently higher face-to-face when compared with online. There was a limited spread of the means across both teaching and cognitive presence. Interestingly, in the teaching presence category of design and organisation had the lowest mean both online and face-to-face. In cognitive presence, again the face-to-face means were higher in all phases. The exploration phase of cognitive presence had the highest mean in both online and face-to-face.

The Wilcoxon Signed Ranks Test was run with difference scores being calculated as face-to-face teaching presence minus online teaching presence, as in Case B. The test calculated a positive mean rank of 9.18 and a negative mean rank of 4.75 (z = –

2.340, p = 0 .019). This indicated that the students perceived that, in cognitive presence within their blended course, the face-to-face environment was more effective than the online space. An effect size (r) of -0.40 was reported, which represents a medium to large difference in cognitive presence when comparing face-to-face and online elements of a blended course; although the perceived effectiveness of cognitive presence online and face-to-face is more closely related than that shown in Case B. The difference could be attributed to course content or teaching presence.

After conducting a Wilcoxon Signed Ranks Test for teaching presence, a positive mean rank of 8.87 and a negative mean rank of 3.0 (z = -3.364, p = 0.001, r = -0.58) were calculated. Again, the students perceived that face-to-face is more effective than online when related to teaching presence.

From the survey it appeared that in Case C the pre-service teachers perceived less of a difference in effectiveness, for both cognitive presence and teaching presence, between the two modes in the blended course than occurred in Cases A and B. Perhaps this is because there is a closer link between what happened in face-to-face classes and online within Case C.

Table 4.15 provides a summary of the commentary on how the learners perceived the effectiveness of the online and face-to-face environments of their blended course.

Table 4.15
Case C Student Commentary on Elements of a Blended Course

Elements of the blended course	**Comments about the face-to-face environment**	**Comments about the online environment**
Learning preferences	Face-to-face was very engaging. I enjoyed these classes, they were entertaining and helpful.	The online was difficult for me. I felt confusion most of the time online. Personally I struggle with this style of learning.
Assessment	The blending worked well with the assessment.	I was impressed by online assessment and real discussions.
Structure	Face-to-face environment assisted me in identifying key issues.	I found the online learning well structured. It was difficult to keep up in the online discussions.
Communication	I love face-to-face contact and discussions.	I found it problematic to rely on posts of other students. I felt I didn't know enough content to be able to ask informed questions, especially in the expert forums.

Interface issues	Easier to clarify course requirements and study loads	It was difficult to find new posts and respond to ongoing conversations. The main issue for me with the online was the size of the group. Smaller online groups may have improved the interaction online and hence improve the learning.

Source: Open-ended survey questions from Case C

In the open-ended questions, students did not make commentary on how teaching presence might enhance cognitive presence nor how they perceived the face-to-face and online work enhancing each other. The survey was completed in the face-to-face class, and because of this, the students who responded may be predisposed to like/perceive face-to-face learning as being more effective than online.

Analysis of Instructor and Student Online Discussion Archives

Students were required to post to online discussion forums because of an assessment mandate. A minimum level of participation was not prescribed; however, students self-selected their best posts over a range of activities to submit for assessment based on criteria provided by the instructor. Because of this, in Case C, all students posted, unlike in Case A and Case B. There were 36 students who gave written consent for their discussion posts to be analysed for this research. The discussion forums for a seven week period were analysed for this research. The course examiner designed the discussion forums around a number of key areas which supported the assessment tasks.

Within Case B, an additional indicator for resolution was included as part of the online discussion analysis. After reviewing the data for Case C, it also appeared to have postings which did not fall within the two resolution indicators of application and defending of solutions. It appeared that an emergent indicator of a reflective nature should be added to the resolution phase of the practical inquiry framework.

There were a total of 109 cognitive presence postings. The average number of posts per student, excluding the introductory forums, was three. Pre-service teachers favoured posts (48 posts) where they could exchange information: either through personal narratives, sharing of resources, or asking questions of clarification. The next most common type of posts (36 posts) were those where the learner reflected on the content and the learning process; however this was mandated as part of the assessment. No students responded to the reflection of another student.

Table 4.16
Cognitive Presence Analysis from Discussion Forums Case C

Practical inquiry Phase	Indicators	Socio-cognitive processes	Number of posts
Triggering Event	Recognise problem	Presenting background information that culminates in a question	0
	Sense of puzzlement	Asking questions Messages that take discussion in a new direction	3
Total			(3%) 3
Exploration	Divergence – within the online community	Unsubstantiated contradiction of previous ideas	0
	Divergence – within a single message	Many different ideas/themes presented in one message	0
	Information exchange	Personal narratives/descriptions/facts (not used as evidence to support a conclusion) Sharing of literature/resources Questions of clarification	48
	Suggestions for consideration	Author explicitly characterises message as exploration, e.g., "Does that seem about right?" "Am I way off the mark?"	4
	Brainstorming	Adds to established points but does not systematically defend/justify/develop situation	1
	Leaps to conclusions	Offers unsupported opinions	0
Total			(49%) 53

Integration	Convergence – among group members	Reference to previous message followed by substantiated agreement (e.g., "I agree because . . .") Building on, adding to others' ideas	7
	Convergence – within a single message	Justified, developed, defensible, yet tentative hypotheses	2
	Connecting ideas, synthesis	Integrating information from various sources – textbook, articles, personal experience	8
	Creating solutions	Explicit characterisation of message as a solution by participant	0
Total			(15%) 17
Resolution	Vicarious or real world application of solutions/ideas	Providing examples of how problems were solved Results of application	0
	Defending solutions	Defending why a problem was solved in a specific manner	0
	Reflection	Reflecting on learning outcomes Reflecting on learning process	36
Total			(33%) 36

Source: Analysis of discussion posts in Case C

Many of the indicators of cognitive presence had fewer than five posts. Out of the 15 indicators of cognitive presence, seven of them had zero posts. The most common post at the indicator level was that of information exchange, where pre-service teachers posted questions to clarify understanding or shared personal experiences, knowledge, literature, or resources. The second most common indicator was that of reflection, where students were required to reflect on their online learning experiences as part of an assessment task.

The triggering phase raised the least number of posts (3%) with integration having the next smaller number of posts with 15% of the posts. Table 4.16 shows the number of the posts at each phase. Exploration made up 49% of the total posts and resolution had 33% of the total posts. Within the exploration phase, 48 out of the 53 posts were for the information exchange indicator. At the resolution phase all posts were at the new proposed reflective indicator.

Unlike most face-to-face environments in the online environment for Case C, the students, and not the teacher, dominated the discussions. The total posts included

109 for the students and 72 for the instructor, giving a total of 181. The instructor contributed 40% of the total posts. Table 4.17 presents the teaching presence posts coded at the indicator level for each category.

Table 4.17
Teaching Presence Posts for Case C

Category	Indicator	Number of Posts
Design and Organisation	Setting curriculum	0
	Designing methods	4
	Establishing time parameters	0
	Utilising medium effectively	0
	Establishing netiquette	0
	Making macro-level comments about course content	0
Total		(5%) 4
Facilitating Discourse	Identifying areas of agreement/disagreement	0
	Seeking to reach consensus/understanding	1
	Encouraging, acknowledging or reinforcing student contributions	19
	Setting climate for learning	0
	Drawing in participants, prompting discussion	3
	Assessing the efficacy of the process	0
Total		(32%) 23
Direct Instruction	Presenting content/questions	18
	Focusing the discussion on specific issues	2
	Summarising the discussions	1
	Confirming understanding through assessment and explanatory feedback	0
	Diagnosing misconceptions	1
	Injecting knowledge from diverse sources	23
	Responding to technical concerns	0
Total		(63%) 45

Source: Analysis of instructor discussion posts for Case C

The most common type of post for teaching presence was to inject knowledge from diverse sources, from the direct instruction category, which had 23 posts. The next most common types of posts were those coded at the indicator encouraging, acknowledging, or reinforcing student contributions, under the facilitating dialogue category, with 19 posts.

A summary of the instructor posts at the category level rather than the indicator level revealed that the direct instruction type posts were the most common post by the instructor at 63% with the categories facilitating discourse having the next most with 32%.

Few posts (5%) were of the design and organisation type, however artefacts within the virtual classroom space did provide evidence design and organisation indicators such as setting the curriculum, establishing time parameters, establishing netiquette, and making macro-level comments about the course content.

Patterns from Online Discussion

In the previous section, the student and the instructor posts were mined and coded for content analysis. Figures 4.16, 4.1,7 and 4.18 in this next section presents the types of responses students posted depending on the type of post provided by the instructor.

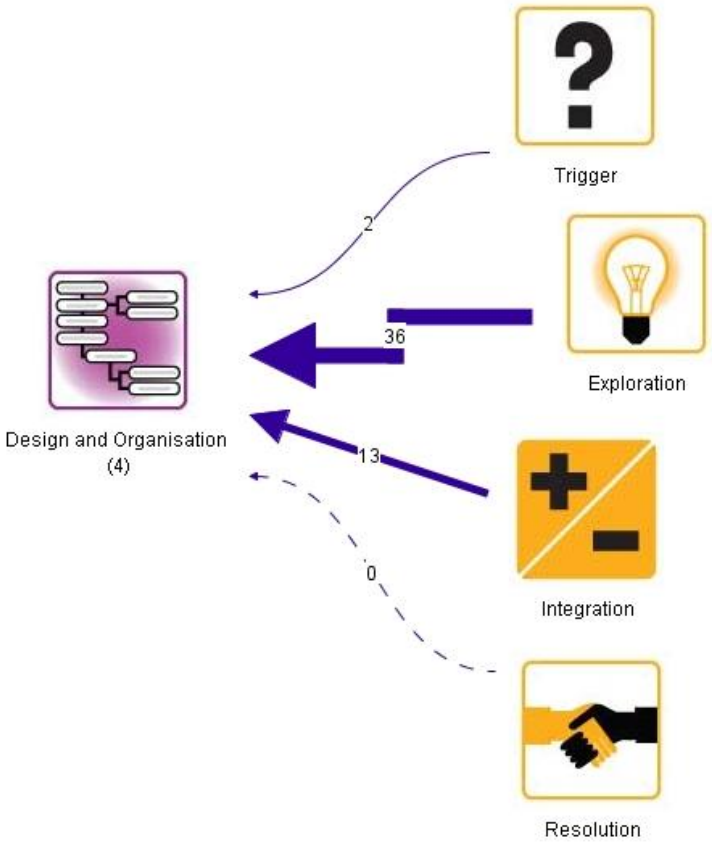

Figure 4.16. Case C pre-service teacher responses to design and organisation posts by the instructor.

Sample instructor post:

> As you post your responses to the inquiry question this week consider how you can enhance the quality of the discussion (e.g. illustrate a point with examples, suggest new perspectives on issues, build on the ideas of others, ask questions that help further discussion, or cite literature or current news events.)

Sample student reply:

> When I was in high school it was abundantly clear who the "leaders" and who the "followers" were. The "leaders" were the … I find it really strange why this is typically … Do girls generally have a competitive nature or a "cattiness" that they can't help? I understand why bullies bully I just wonder why it is so much more prevalent in teenage girls? Can anyone help me?

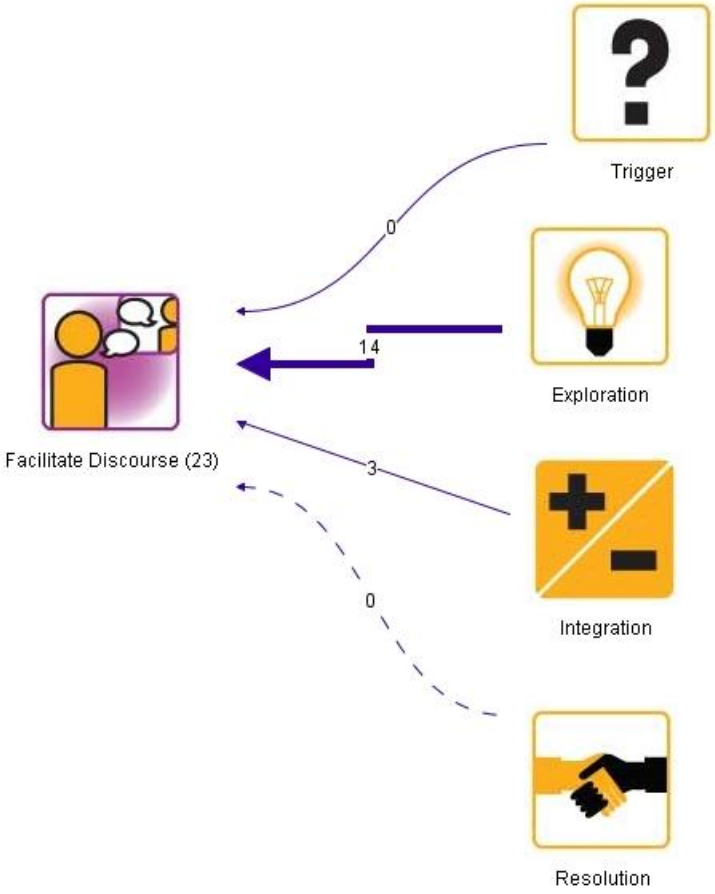

Figure 4.17. Case C pre-service teacher responses to discussion facilitation posts by the instructor.

Sample instructor post:

> Thanks for your comments and sharing your experiences, Jessica. You and your friends seem to have handled conflict in a very healthy way by being able to discuss problems and getting them out of the way so they don't interview with the friendship. How did you learn that, that was a healthy way to deal with issues? Did you have role models who also communicated that way? What are the thoughts and experiences of others?

Sample student response:

> Hi, I just wanted to respond to why I reacted that way I did to people in school. I am fairly introverted and have always believed … I never felt the need to … My parents … I understand why people try to … .

Figure 4.17 shows that when the instructor posted comments designed to facilitate discourse, the students were most likely to respond with exploration posts. However, in direct instruction posts where one of the specific online activities (and the assessment requirement), was to write a reflective item and share it online, all students did so.

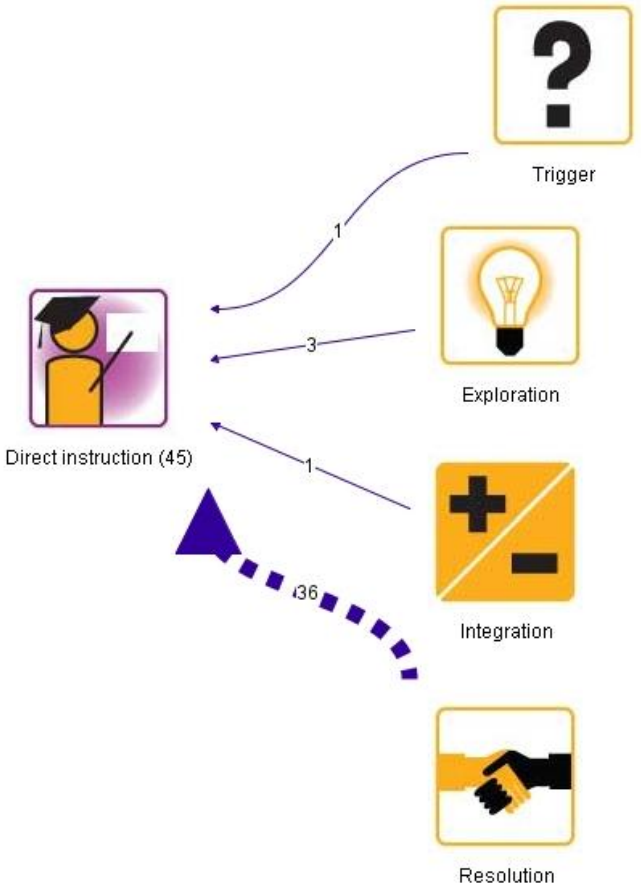

Figure 4.18. Case C pre-service teacher responses to direct instruction posts by the instructor.

Sample instructor post:

> In the tutorial session this week you discussed a scenario in small groups. Now that you have had time to consider the discussion and responses from others in that session, and information and resources shared in the expert discussion forums, post your personal solution to one of the scenarios and justify your suggestion.

Sample student reply:

> My personal approach would be to identify who is involved and assess the incident; its level of severity, when and where are the incidents occurring (home or school?), and frequency. I would gain this information by speaking to each individual student privately. As Drew pointed out, the severity of the situation would determine what type of action to take from here. This could range from … As a teacher, I would hope that my school has policies and procedures set out to guide my decisions. I imagine that dealing with a situation involving any form of bullying in an uninformed, careless way or simply ignoring the problem because you are unsure of how to handle it is very poor practice and could have potentially dire ramifications on the students involved.

Table 4.18
Case C Teaching Presence Posts and Resulting Cognitive Presence Posts

		Cognitive presence of students			
		Triggering	Exploration	Integration	Resolution
Teaching Presence	Design and Organisation (4)*	2	36	13	0
	Facilitating Discourse (23)	0	14	3	0
	Direct Instruction (45)	1	3	1	36

Note. * The numbers in brackets indicate the number of teaching presence posts which instigated the student cognitive presence posts.

When combining the teaching presence and cognitive presence posts (as shown in Table 4.18) the most common posts are found at the intersection of design and organisation and exploration, and direct instruction and resolution.

Instructor Comments on Data Analysis

After reviewing the teaching presence data, the course instructor was surprised at the high number of direct instruction posts, although the majority of these were to inject information from other sources. She also felt that all of the elements of design and organisation were presented both online and face-to-face, although not specifically within the online discussion forums.

The instructor was disappointed with the number of postings at the integration phase. She is seeking guidance as to which types of activities and/or conversations should be facilitated to encourage students to integrate knowledge and information from various sources. From this, she wondered if there were a recommended percentage of postings at each phase which ensured individual and collective inquiry and knowledge building online. She also questioned if the expectations of moving through the four practical inquiry phases were the same in face-to-face teaching and learning.

In the intervening time between data collection and the writing of this chapter, the instructor now includes regular synchronous online discussion using Wimba. The

students who participate in the synchronous online experiences value the opportunity to interact in a manner that simulates the traditional face-to-face experiences they are used to.

Summary of Findings

A number of key findings results from the analysis of Case C, which found that the instructor does not need to control the discussion. In Case C, the students dominated discussions and they also directed the flow of the discussions through the use of their own inquiry questions. Assessment had an influence over the number and types of postings students made. When students were found to integrate information from multiple sources, it ensured that pre-service teachers contributed to discussions with an informed voice. The instructor was found to have competencies in, designed for, and implemented learning across all three generations of flexible learning pedagogies. There is evidence of teaching presence beyond the online discussions. The most common student posts were coded at the exploration and resolution phases of cognitive presence. In terms of teaching presence, the most common type of post was that of direct instruction.

Cross-Case Analysis

In the previous sections, the analyses of each case were reported separately. This section provides a cross-case analysis. The critical element of a multiple case study is when the findings from individual case studies are brought together and the collective outcomes are explored (Yin, 2003).

All student participants are from a teacher education program and participated in a blended course. Table 4.19 provides a summary of the student participants. It must be noted that informed consent was gained from more students than completed the survey.

Table 4.19
Cross-case Survey Demographics

Survey items	Breakdown	Total responses across 3 cases (n = 34)	Sample percentage
Gender	Male	8	24%
	Female	26	76%
Age	18 - 24	21	62%
	25 - 41	7	21%
	42 +	4	12%
	Unknown	2	6%
Previous courses with planned online discussion	Nil courses	13	38%
	1 - 3 courses	10	29%
	4 - 8	8	24%
	9 + courses	3	9%
Computing skills	Novice	1	3%
	Intermediate	26	76%
	Advanced	6	18%
	Unknown	1	3%

Source: Collated from surveys for Cases A, B and C

Overall, the demographic data of the learners was not widely spread. The majority of participants were female students under 24 years of age with intermediate computing skills and who have completed few courses where online discussion was a planned element of their course work. In general, this would parallel the pre-service teacher cohort at the participants' university.

Course Documentation

In all three cases, documentation from the course indicated that levels of teaching presence and cognitive presence occur in elements beyond those previously investigated by other researchers: the online discussions and student survey.

Substantial teaching presence was provided by all three instructors. This was evidenced in the introductory material, within the learning management online course space, and within information provided the pre-service teachers during face-to-face classes. Examples included course topics which specified the curriculum; study schedule which identified time parameters; comments within face-to-face classes which encouraged learner contributions (both face-to-face and online); and provision of additional resources/readings and other relevant material.

Cognitive presence was made visible by the pre-service teachers within face-to-face discussions and assessment submissions, in addition to online discussions and survey data.

Instructor Interviews

All of the instructors were disappointed with the low level of online interactivity. In particular, they were disappointed with the limited social and cognitive presence displayed by the students. The instructors did, however, assume some level of responsibility, as they believed that an improvement in their teaching presence would result in more online engagement by their students. The instructors all believed that it was important that the instructor have a highly visible role and presence in both online and face-to-face spaces of the blended course.

There has been a movement in thinking and practice over time as the instructors have become more experienced in blending face-to-face and online learning and teaching. Initially the instructors were apprehensive, cautious, or resistant to changing to blended teaching from an existing strength in face-to-face teaching. To begin with, the instructors from Cases A and B believed that face-to-face teaching resulted in better learning outcomes for their learners. They are now more comfortable in the online space and more willing to try new ways of using online environments within their blended courses; and feel that the online space can afford the opportunity to improve students' learning within the course.

The instructors identified common positive aspects that the online space brought to their face-to-face teaching and learning. These included items such as ease of access to a range of additional resources without time, space, and location restraints; flexibility of access and media; and the ability to re-use or modify digital artefacts for other cohorts.

Common preferred future outcomes/actions identified by the instructors include making available (additional) models or scaffolds for assessment and discussions and to promote an increased quality and quantity of student participation in the online discussion forums.

As a result of their participation in this research study, the instructors of Cases A and B were able to speak with an interested colleague and view the data from their course. This provided them with the knowledge of "where things sit", an understanding of what might be improved, and a confidence to make improvements and try new ideas. Having the data available and already analysed, brought items to the instructor's attention that were previously hidden in the complexity of their blended course.

Online Discussions

Instances of identified teaching and cognitive presence from the online discussion for each case are grouped in Table 4.20, to examine for common elements. In the cognitive presence area 66% of the postings were exploration; 17% were integration; 12% were resolution and only 5% were triggering. For teaching presence, 13% were identified as design and organisation posts; 36% as facilitating discourse; and 57% were identified as direct instruction. Table 4.20 shows details of cognitive and teaching presence posts across all cases.

Table 4.20
Summary of Online Discussion Posts Across Cases

		Triggering Event	**Explore**	**Integrate**	**Resolve**
Design and Organisation	Case A (8)*	0	9	5	0
	Case B (1)	0	2	2	0
	Case C (4)	2	36	13	0
Facilitating discourse	Case A (25)	4	28	9	0
	Case B (18)	2	28	8	1
	Case C (23)	0	14	3	0
Direct Instruction	Case A (40)	2	36	3	0
	Case B (21)	3	45	9	1
	Case C (45)	1	3	1	36

Note. * The numbers in brackets indicate the number of teaching presence posts which instigated the student cognitive presence posts.

Table 4.20 shows a low level of participation within the first phase of cognitive presence, triggering event. Within blended courses, triggering events appear to occur in places other than online discussion, for example within the face-to-face discussions. In this study, few students responded to the triggering event through the online discussions. A cross-case comparison of the discussion posts is provided visually in Figure 4.19.

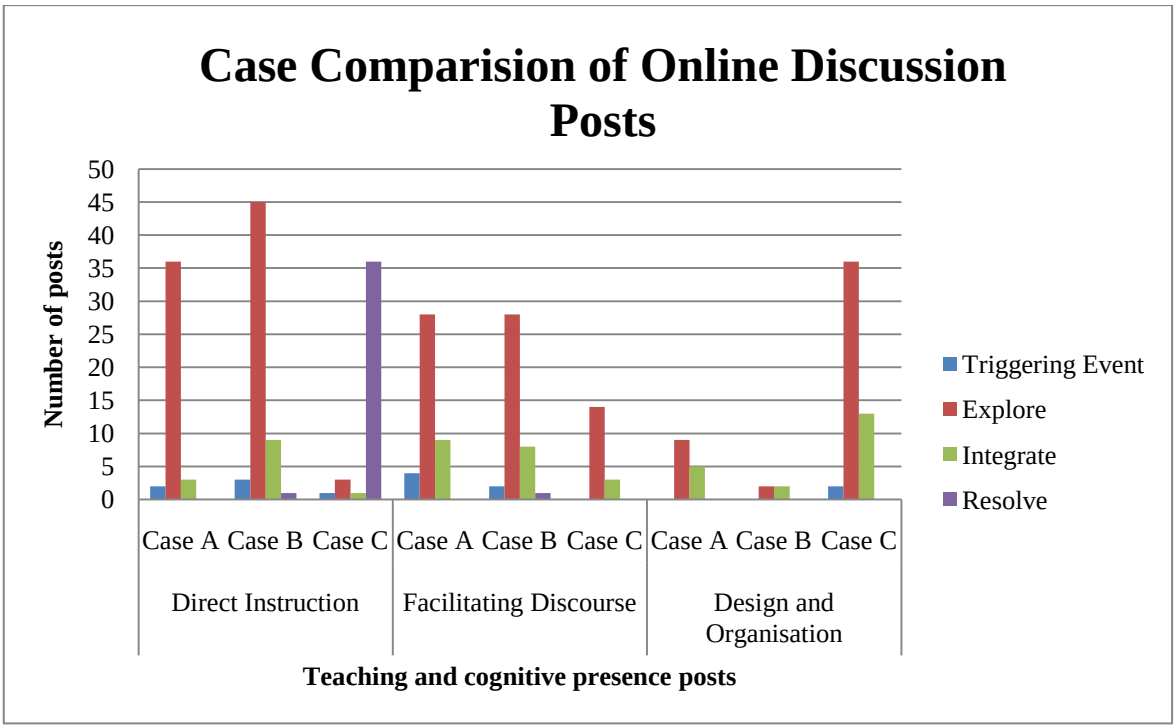

Figure 4.19. Case comparison of Cognitive Presence posts

The pattern of responses of pre-service teachers' online discussion posts in all cases indicates that the most frequent type of post is that of exploration. Although integration activities appear at low levels within online discussions, instructors commented that they identified integration of sources of information and perspectives within face-to-face discussions and learners' assessment scripts.

The final stage of cognitive presence, resolution, appeared in online discussions when the instructor specifically requested learners to share this phase online. Resolution was also found within the assessment scripts of the learners when the assessment task required this type of activity to be completed.

Table 4.21
Teaching Presence and Cognitive Presence Posts for Combined Cases

			Cognitive Presence				Total
			Triggering	Exploration	Integration	Resolution	
Teaching Presence	Design & Organisation (13)*	Count	2	47	20	0	69
		% within Cognitive Presence	14.3%	23.4%	37.7%	.0%	22.5%
	Facilitating Discourse (66)	Count	6	70	20	1	97
		% within Cognitive Presence	42.9%	34.8%	37.7%	2.6%	31.7%
	Direct Instruction (106)	Count	6	84	13	37	140
		% within Cognitive Presence	42.9%	41.8%	24.5%	97.4%	45.8%
Total		Count	14	201	53	38	306
			100%	100%	100%	100%	100%

Note. * The numbers in brackets indicate the number of teaching presence posts which instigated the student cognitive presence posts.

When considering the relationship between teaching presence and cognitive presence, the direct instruction posts of instructors resulted in the highest proportion (45.8%) of responses when compared with the other categories of teaching presence, with facilitating discourse having 31.7% and design and organisation with 22.5%.

Overall, 13 design and organisation posts resulted in 69 cognitive presence posts. This means that each design and organisation post resulted in 5.3 responses from students, with most of them occurring at the exploration phase. Students appeared to respond at a higher rate to design and organisation posts when compared to the other categories of teaching presence. Instructor posts and the facilitating discourse category resulted in a student response rate of 1.47, whereas direct instruction posts had a response rate of 1.3. In all categories of teaching presence, the second level or cognitive presence, exploration, was the most common response by students.

The distribution of posts across the three categories of teaching presence is markedly different in the category of resolution compared with the other categories of cognitive presence. The proportion of direct instruction posts of 97% in the resolution category is significantly higher than the other categories.

Survey

The non-parametric Wilcoxon Signed Ranks Test, was used to evaluate the students' perceptions of teaching presence face-to-face when compared to online using the combined data for teaching presence. The Wilcoxon Signed Ranks Test was run with difference scores being calculated as face-to-face teaching presence minus online teaching presence. Based on the ranking of face-to-face and online perceptions, the following was observed: a positive mean rank of 18.06 for face-to-face, and a negative mean rank of 8.10 for online. This indicated that students perceived that the cognitive presence was more effective the in the face-to-face environment of their blended courses than in the online environment (z = -4.18, p <.001). Associated with the Wilcoxon Signed Ranks Test an effect size (r) of -0.51 was calculated, indicating a medium to large difference in the perception of teaching presence when comparing face-to-face and online elements of a blended course.

The Wilcoxon Signed Ranks Test was again used to evaluate the difference between perceptions of online and face-to-face cognitive presence. The test resulted in a positive mean rank of 16.89 for face-to-face and a negative mean rank of 5.75 for online. Again, the students perceived that face-to-face was more effective than online when related to cognitive presence (z = -3.841, p < 0.001). An effect size (r) of -0.47 was calculated, indicating a medium to large difference in cognitive presence when comparing face-to-face and online elements of a blended course.

An analysis of the combined case mean values and standard deviations for the student responses to the survey are presented in Table 4.23. For each question, the students had to select from a 5-point Likert Scale ranging from very effective to very ineffective.

Table 4.22
Comparing the Elements of Cognitive Presence Online and Face-To-Face for Students

		Face to Face		Online	
	N = 34	Mean	Standard Deviation	Mean	Standard Deviation
Elements of teaching presence	Design and Organisation	4.3	0.64	3.9	0.82
	Facilitate Discussion	4.5	0.55	3.9	0.68
	Direct Instruction	4.5	0.55	4.0	0.70
Phases of cognitive presence	Triggering Event	4.5	0.57	4.0	0.78
	Exploration	4.5	0.56	4.2	0.74
	Integration	4.5	0.54	3.9	0.76
	Resolution	4.4	0.58	3.9	0.78

Source: Analysis of student surveys

Students consistently rated the face to face environment as being more effective than the online environment, with the face-to-face average means for all elements all falling between 4.3 and 4.5, while the average means online range from 3.9 – 4.2.

When combing the categories of cognitive presence the student surveys (n = 34) revealed that online cognitive presence yielded a mean score of 4 (s.d. = 0.66); with face to face cognitive presence scoring slightly higher with a mean of 4.5 (s.d. = 0.51). The combined teaching presence items online yielded a mean score on 4 (s.d. = 0 .62) however, face-to-face yielded the mean of 4.4 (s.d. = 0.48). This aligns with the previous analysis, indicating that students' perception is that the face-to-face elements are more effective than the online elements of a blended course.

Statistical analysis of the instructor surveys was not conducted because of the low sample size (n = 3).

Summary of Findings

The significant findings from the cross-case analysis are that teaching presence and cognitive presence are found in multiple places within a blended course. The cross-case analysis also indicated that the highest levels of cognitive presence are able to be influenced by teaching presence, with the category of direct instruction having the most impact.

Chapter Summary

This study explored the dynamics of teaching and cognitive presence to determine what elements of teaching presence impact on students' cognitive presence. This chapter reported the findings obtained from data analysis procedures employed within the study. It examined, categorised, tabulated and recombined the evidence to identify key issues. Data was presented for each case and then a cross-case analysis was provided.

Chapter 5 will present a discussion of the findings, including a synthesis of the recurring themes found within the data and align them to the research questions.

CHAPTER 5: Discussion

Overview

Within higher education there is a move towards providing more learning experiences online and using the online environment to enhance or complement face-to-face instruction by creating blended learning environments (Graham et al., 2003). This move requires instructors to adjust to their new roles as online designers, instructors, and facilitators; and a parallel adjustment is called for from students as they adjust to being blended or online learners. This study embraced a mixed methods approach to explore the dynamics between teaching presence and cognitive presence. Prior to this study, little research had been completed to explore teaching and cognitive presence in undergraduate blended learning.

Each case study discussed in the previous chapter represented a different perspective on what it means to promote deep learning and critical thinking while engaging with students as an instructor of a blended course. Each instructor embodied a different approach to teaching presence. The data within the previous chapter allowed for different viewpoints: together with the raw data, these will be discussed and form the basis of the response to the research questions. Data were collected from multiple sources to allow data from each to augment data from other sources and collaborate findings (Yin, 2009, ¶ 1). The use of surveys, member checks, interviews, online discussion archives, and document analysis all aided in strengthening and validating the findings.

Chapter 5 outlines the convergence of evidence from the multiple cases and the mixed method of data collection. It will answer the research questions by summarising the findings from each case and the cross case analysis. This chapter provides an interpretation of the results related to the questions and makes links to prior research.

Discussion of Findings

Subsidiary question 1: What is the nature of student cognitive presence in the online discussion element of a blended course?

An analysis of the online discussions in this research indicated that the most common category of the students' cognitive presence was at the exploration phase. In all of the case studies, these posts were primarily inquisitive and divergent in nature. Within the online discussions, the students explored the key concepts while searching for a range of ideas around those concepts. They collectively brainstormed and made suggestions in an attempt to move their learning forward.

This research also found that unless their posts were assessable, over half of the students did not contribute to the online discussions yet participated in vicarious learning through reading the posts of others. The nature of students' cognitive presence may well be related to the expectations articulated by the instructor and also by how the instructor integrates the online discussion with other elements of the course. In the case of novice blended learning instructors in this study, they did not articulate any expectations for how and why students may use the online discussions to support their learning. Another finding from the investigation of this question was that the students who participated online mostly responded to posts of instructors rather than those of their peers.

When coded at the indicator level the majority of student posts (66%) matched the information exchange indicator of the exploration phase. While working at the information exchange or second phase of cognitive presence, students exchanged information by sharing personal narratives, literature, and other resources, and by asking clarifying questions.

The next most common type of student post (17%) was coded as integration. The students were most likely to post at the connecting ideas indicator where they integrated information from various sources. All cases provided evidence that students were reading beyond the course materials provided by the instructor, to develop an informed voice for their postings.

Past research has indicated that when compared with the other phases of cognitive presence the exploration phase has been overrepresented (Garrison et al., 2001; Gorsky, Caspi, Antonovsky, Blau, & Mansur, 2010; Kanuka & Anderson, 1998; Luebeck & Bice, 2005; Redmond & Mander, 2006; Vaughan & Garrison, 2005). This investigation aligns with the previous research as it also has a very high proportion of the posts being coded as exploration. Possible reasons for the high frequency of exploration posts could be that they are easier for students, in that the cognitive level required to post at the exploration phase is not as high as that for integration or resolution levels. It could also be that students feel less threatened to share their personal points of view without having to justify their comments.

When investigating blended faculty development, Vaughan and Garrison (2005) suggested that similar high frequencies of exploration can be found in face-to-

face discussions. In a small study investigating critical thinking of graduate students, Abrams (2005) found that their face-to-face interactions were "based only on their own experiences and personal beliefs rather than on pertinent literature on content or research design" (¶ 46); yet in their online posts the "students provide[d] their peers with detailed, critical feedback, suggestions for improvement and information from other resources" (¶ 48).

The failure of students to demonstrate the highest level of cognitive presence may be due to students' perceptions. Hara, Bonk, and Angeli (2000) revealed that students often treat online discussion "as a means to complete a particular task, rather than as an opportunity to engage in rich discussion and debate with their peers and instructors" (p. 148).

Students were more likely to post a response to the instructor rather than their peers. This could be because the instructor posted back quickly and did not leave time for other students to form a well constructed response. This resulted in numerous independent one-to-one (yet public) conversations rather than dialogue involving the whole learning community involved in the investigation or inquiry.

Some students may have been seeking others to evaluate their ideas; and when there was limited confirmation or encouragement from their peers in Cases A and B, students may have felt a lack of ownership of the discussion, even when the instructor's posts finished with a question to further the discussion and encourage other participants. This is supported by Pena-Shaff, Altman and Stephenson (2005) who commented that the "[l]ack of validation from other students may have affected students' levels of participation and perceptions about the online discussions" (p. 425).

Another reason students may not have posted a response to their peers or at all was due to communication anxiety (Feenberg, 1987) as they had no or little experience in using online discussion as a means of learning. Over one third (38%) of the participants had never enrolled previously in a blended course with online discussion as a significant component of the course. A further 29% of the participants reported having enrolled in only one to three courses where the online discussion was a specific element of the course. This lack of previous experience may have resulted in some students being unsure of how to act and re-act in online discussions. This could have led to the high number of students who were lurking, or it could have been that they had a feeling that their thoughts were not worthy of sharing. Others may have felt that the requirement of consistent and constant requirement to engage in online discussion was overpowering (Bullen, 1998).

Subsidiary question 2:
What is the nature of teaching presence in a blended course?

A review of the data provided through online discussions, instructor interviews and course documentation indicated that all categories of teaching presence within the blended courses can be found in the broader implementation of the course and are not restricted to online discussions as researched in previous studies. This research found that the nature of teaching presence in blended courses is largely direct instruction even where the instructors perceive themselves as constructivist educators.

In all cases, the instructors felt that teaching presence was an important element within both the face-to-face and the online elements of their blended courses. Within the online discussion space the most common element of teaching presence was direct instruction (140 posts). In Cases B and C, the most common indicators of direct instruction were for the instructors to present questions and inject knowledge from diverse sources, yet in Case A the most common indicators were to focus the discussion and to confirm understanding through assessment and feedback.

The second most common category of teaching presence evidenced within the online posts was that of facilitating discourse (97 posts); and design and organisation was ranked third in terms of frequency of posts (69). Interestingly, the student survey results demonstrate that students' perceptions of the categories of teaching presence are distributed much more evenly, with the means for all categories for online teaching presence being 3.9.

This investigation supports an early study by Anderson, Rourke, Garrison and Archer (2001) and a recent study by Gorsky, Caspi, Antonovsky, Blau, and Mansur (2010), who viewed the postings from courses in different disciplines. They also found that the predominant category of teaching presence was that of direct instruction. Anderson et al. (2001) found that the category with the least frequency of posts was that of instructional design, whereas Gorsky et al. (2010) found that facilitating discourse had the lowest number of posts.

The results from this study contrast with the findings of Nagel and Kotze (2010) who used a survey tool and found that the design and organisation construct was the strongest of the three categories of teaching presence, followed by facilitation and then direct instruction. The difference could be because their study was with post-graduate students in a fully online course and peer review was used, indicating that the students were required to take on some teaching presence.

All of the instructors were surprised by the high frequency of their postings having been coded as direct instruction. Having considered themselves constructivist educators, they were expecting that facilitating discourse would have been the higher category. There is strong evidence, within other data sources, of the other categories of teaching presence beyond the online discussions, for example, the course documentation and interview in all of the cases.

All three instructors had different levels of experience working in online and blended learning although they had similar teaching presence results. The instructors were working across two and three different generations of Anderson's (2010) flexible learning pedagogies within the one course. The three generations of pedagogy might be considered a typology or heuristic to discuss the work teachers do. The first generation, has a traditional or behavioural approach to teaching and learning. The second generation, can be closely aligned with the constructivist approach; and the third generation, uses a connectivist pedagogy (Anderson, 2010). He suggested that to enable all types of learning, we need to continue to keep using all three generations as we look to the future of flexible learning which includes the blended learning within this study. Although the generations are evolutionary, they are neither linear nor separate. Good learning can have elements of all three generations, as evidenced by each of the cases in this research.

In this study, most of the posts from the instructors were coded as direct instruction, which aligns to the first generation of behaviourist/cognitive approach. In an era where content scarcity is rare, it appears that instructors still find a need, or respond to students' need, to inject knowledge from different sources. This first generation is still developing; with a new emphasis on reflection, advent of digital footprints, reusable digital learning objects, ability to represent information in multiple ways, and so on. (Anderson, 2010). Educators in the twenty-first century are looking to design for learning beyond learning independently, and the teaching presence of the three instructors also includes components from the second generation (constructivism) where knowledge is socially constructed through dialogue. Constructivist approaches have been promoted as a way of learning and teaching by the instructors' having designed, implemented and facilitated a range of discussion forums and having frequently accessed and responded to student posts. The instructors have promoted group learning through either cooperation or collaboration, and they valued multiple and sometimes conflicting perspectives as an important part of the learning process.

The third generation of pedagogy, connectivism, enriches the second generation by connecting to experts or those currently practising in the field (Anderson, 2010). This generation was strongly apparent in Case C, where knowledge was socially constructed by the students along with experts. The knowledge was emergent, distributed, non-sequential, and able to be contextualised in a range of settings. The instructor left holes for the students to fill up, rather than providing all of the information, as is evidenced in generation one. Connectivism is a process of the learner's developing and pruning networks by making meaningful connections between past and current information and perspectives. The three generations are not mutually exclusive. "Learning is building networks of information, contacts and resources that are applied to real problems" (Anderson, 2010, p. 33). As teacher educators, the instructors feel that their role is to assist their learners in achieving this goal. Because connectivist learning is emergent (Anderson, 2010) it is evolving, soft, scalable, and forces increased learner control rather than instructor command. The instructors were unable to predict the learning outcomes of learning within the

community of inquiry in environments where learners have a high level of direction by the students in relation to teaching and cognitive presence.

Survey results show that the student perspectives of teaching presence were higher face-to-face when compared to online. Conceivably this is because they had not had a lot of experience in blended or online courses and they were more comfortable with the face-to-face section of their course. In contrast survey responses from the three instructors indicated that they had higher perceptions of their teaching presence online (m = 4.56; s.d. = 0.13) when compared to face-to-face (m = 4.2; s.d. = 0.38). There is, however, a difference between the instructor survey results and their interview data. Within the interview, they all perceived that their face-to-face teaching presence would be stronger than their online teaching presence (particularly in Cases A and B). There is also a paradox between the instructors' past experience and new thoughts, with their views changing over time with new experiences; although there was a recognition that the gap between face-to-face and online is reducing as their experience and confidence online grow. This indicates that the nature of teaching presence of an individual changes over time. In Case B, the instructor now sees being a constructivist as easier online than in the past. Perhaps the reason for the disparity is because the instructors have higher expectations of themselves and the learning outcomes they are able to achieve in face-to-face environments.

While there was a difference in the quantity of posts for each instructor (Case A: 73; Case B: 40; Case C: 86), there was little diversity in how the posts were spread over the three categories of teaching presence. In all cases, direct instruction had the highest percentage of posts, facilitating discourse had the second highest, and design and organisation had the lowest number of posts. It appears that the amount of experience in teaching blended or online environments had minimal impact on the types of teaching presence enacted by the instructors.

Although not all instructors were familiar with the CoI framework, they were able to articulate how their teaching presence through design, instruction, and facilitation could enhance students' ability to move through all four phases of cognitive presence. Interestingly the instructors in Cases A and B felt that an increase in their confidence for teaching in blended and online environments, and the knowledge gained from being part of this study, had resulted in their modifying of their teaching presence, particularly in terms of design, to promote increased student engagement and critical thinking within the cognitive presence frame.

This raises a further question: How does and should teaching presence change over time? Garrison and Arbaugh (2007) mention that an instructor "must consider the dual role of both moderating and shaping the direction of the discourse" (p. 168). It seems that an instructor's own understanding of what is effective facilitation of discourse would not remain static. All of the instructors indicated that as they become more experienced blended and online instructors,

they recognised that their teaching presence had changed over time. This would seem to indicate that from one semester to the next, teaching presence does change.

The instructor for Case B suggested that it would be difficult for an instructor to sustain high levels of teaching presence over a whole semester. If the instructor is involved in the online discussions though dynamic participation with regular contributions, is it possible to sustain this over 15 weeks in 4 different courses? There appears to be a need for more research in this area and to investigate whether students and instructors are able to keep up the pace of daily or bi-daily interaction online, even if the interactions were for shorter periods of time than instructors would normally communicate in a traditional face-to-face course.

Shea et al. (2010) found that there is an "ebb and flow to teaching presence" (p. 139). They also found that teaching presence increased in modules or discussions about assessment. At the beginning of the semester, the instructor's presence in online discussions usually performs more of a social role to "reduce isolation and create a community atmosphere" (Duncan & Barnett, 2010, p. 259). The emphasis then moves quickly to cognitive engagement and activities (Redmond & Lock, 2006) and encourages students to explore all of the other elements of the course, for example, course content knowledge, skills, and assessment.

The course documentation provided strong evidence of each of the indicators within the design and organisation category. This supports Archer's (2010) contention that research on the CoI model should be extended beyond online discussions. In this research, other elements of data certainly provided evidence of the categories of teaching presence. A recent publication by Shea, Hayes, and Vickers (2010) is one of a very few other studies which have examined teaching presence beyond online discussions and surveys. Their research found teaching presence occurring in other areas such as communications in announcements, question and answer areas, and emails, and within other course documentation such as lecture and orientation materials.

Subsidiary question 3:
What aspects of teaching presence promote cognitive presence?

Findings from this research study indicate that the direct instruction category had the largest impact on the students' cognitive presence. The category of cognitive presence which was influenced the most was that of exploration. Past research investigating teaching presence has largely been limited to threaded discussions (Shea, Hayes, & Vickers, 2010), however, this research has identified that teaching presence was found in all areas of the course. This question is of importance because "there is growing evidence that teaching presence is a significant determinant of student satisfaction, perceived learning and sense of community" (Garrison, Cleveland-Innes, et al., 2010, p. 32).

When reviewing the quantity and categories of the online post data analysis for the combined cases, this study found that all forms of teaching presence have a major impact on the exploration phase.

Table 5.1
Summary of Student and Instructor Posts

	Triggering Event	**Exploration**	**Integration**	**Resolution**
Direct Instruction	6	84	13	37
Facilitation Discourse	6	70	20	1
Design and Organisation	2	47	20	0

Source: Created for this research

Direct instruction posts resulted primarily in exploration posts (84), but also had some impact on resolution posts (37). When instructors were facilitating discourse, it resulted mainly in exploration posts (70) and also some integration posts (20). The final category of teaching presence design and organisation appeared to have less impact on all of the cognitive presence categories, with exploration again having the most posts (47) and integration having the next highest level (20).

The highest level of cognitive presence (resolution) was visible online only when the instructor designed the assessment around this construct and then through direct instruction asked students to share it online. Both resolution and integration were visible in students' assessment responses; however, this was in the private domain of the student and instructor only, rather than being public, as the online posts are. These findings support Archer's (2010) hypothesis that "we have been looking for these phases in the wrong place" (p. 69) if the research is constrained to online discussions only.

As evidenced in Case C, and discussed by the instructors in Cases A and B, direct instruction can guide and model higher-order cognitive responses for learners. When looking at a blended course in its entirety, this could occur in face-to-face and online discussions, and through the provision of model assessment answers. This research supports the findings of Pawan et al. (2003) who reported that "good learning is collaborative and … understanding comes

through modelling, participation in, and reaction to the behaviors and thoughts of others" (¶ 1). The online environment provided pre-service teachers the opportunity to: collaboratively explore issues; share opinions and feelings; comment on their professional experience; respond and react to the thoughts of their peers and mentors; and view models of professional online interaction at a time and place convenient to them.

Another example of the impact of design and organisation and direct instruction from this research was in Case C, where students were mandated through assessment to provide a reflection on the learning process and learning outcomes and to share their reflection with the rest of the cohort. An assessment mandate influenced the number and nature of postings/responses students made visible. Teaching presence can specifically design for and direct students to work at higher cognitive levels—should the instructor feel that the higher levels in the CoI model are appropriate outcomes for their course.

Statistical testing found that there was a relationship between teaching presence and cognitive presence. Although the numbers in this study were small, Table 4.22 indicates that there is a relationship between teaching presence and the higher levels of cognitive presence. The distributions of integration and resolution are different from that of triggering and exploration. The teaching presence construct of direct instruction impacts on the final phase, resolution, of cognitive presence. There is also a link between the integration phase of cognitive presence, and both the facilitating discourse and design and organisation elements of teaching presence. This study goes some way to responding to Garrison, Cleveland-Innes, and Fung's (2010) recent request to demonstrate "that teaching presence significantly influences social and cognitive presence" (p. 32).

The instructors all used the different categories of teaching presence to promote dialogue and thinking opportunities, to assist students in developing higher levels of cognitive presence within both the face-to-face and online sections of their blended course. In Cases A and B, and to a minor extent in Case C, students failed to elaborate their ideas or participate in ongoing discourse with their peers. In no case was the face-to-face participation of students linked to assessment; however in Case C, the online participation was linked to the students' assessment.

Students who are deep learners and high engagers are often assessment orientated. Instructors can mediate their teaching presence to take advantage of this mindset. As was evidenced in Case C, teaching presence which designs complex, authentic, and cognitively demanding assessment, and requires students to purposefully move through the four phases of cognitive presence, enables instructors to have an impact on the higher-order thinking and sustained engagement within the course. This affirms Bullen's (1998) thoughts that "[o]nline participation has to be seen by students as something integral to their success in the course" (p. 32). When instructors expect, design, direct, and facilitate for students to work at the higher cognitive outcomes of integration and resolution as part of the course assessment, students will work at the higher levels in order to be successful in the course.

It has been contended by Duncan and Barnett (2010) that the difficulty in promoting high levels of cognitive presence requires a shift in "student focus from content to process" (p. 258). This research contends that the same shift is required to establish enhanced teaching presence. If instructors modify their design, instruction, and facilitation from a content focus to one of collaborative inquiry into key discipline issues, enhanced critical thinking and depth of understanding should emerge; as was evidenced in Case C. This notion was also supported by Garrison and Vaughan (2008) who claimed that "true learning is exploratory and often unpredictable" (p. 23).

In the online space, the online discussions are the key communication tool between instructor and learners. They are used as a vehicle to promote collaborative meaning-making and deep personal learning. Instructors in blended and online learning environments need to be able to effectively facilitate the discussions. Within online discussions, instructors need to find a balance between establishing structures and guidelines for participation and preserving curiosity and relevance, while promoting an inquiry process (Duncan & Barnett, 2010). There is often tension between providing a flexible learning environment and providing structure and guidelines which might either support or constrain participation, for example, setting a minimum or maximum number of posts per student.

The different teaching presence approaches between cases yielded a difference in student responses. In Case A, as soon as the instructor stepped in to answer a question students failed to post follow-up messages, even when the instructor's post finished with a question, to continue or encourage further discussion. When the instructor responded quickly to student posts, other students may have felt they did not need to respond, and the discussion became largely a one-to-one discussion with the instructor rather than a one-to-many discussion with peers. This aligned with the findings of Vandergrift (2002) who also found that "[i]t was difficult for [the] teacher not to respond immediately to a truly brilliant insight or, on the contrary, to confusion, muddled thinking, or misinformation" (p. 83).

The instructors needed to change their role to one of encouragement of student engagement rather than being the core responder or overtaking the discussion. However, students may have been requiring endorsement by the instructor or waiting for the instructor to give the answer. While leading the online discussions, the instructors in this research were searching to find a balance in their approach so that they "neither dominate the discussion nor go missing" (Shea, Hayes, Vickers, et al., 2010, p. 15).

In Case B, there were more replies by students than for Case A. These students appeared to value feedback from both peers and the instructor, however, the instructor did respond to more posts than the students. This is in contrast to the findings in Case C where the students, and not the instructor, dominated the discussions. The students responded to each other and drove the direction of the discussion. This parallels the findings from Hara et al. (2000) who found that rather than being teacher dominated the learners contributed significantly more to the discussions. In Case C, the facilitating discourse indicator of

teaching presence, was distributed among a range of participants; meaning that the intellectual and conversational leadership was dispersed among the learners, invited online guests, and the instructor. Results from this case indicate that the instructor does not need to control the discussion, as in Case C the students dominated discussions and they also directed the direction of the content in the discussions through the use of their own inquiry questions.

In cases A and B the instructors did not provide guidelines for student engagement online. No expectations were articulated in how the online space might be used by students to enhance their face-to-face learning experiences. This could well be because both instructors were novices in the online environment. They did not undertake any formal training to assist them in becoming effective instructors in a blended environment. The professional learning was largely through talking to colleagues and their reflections on what was working for them during the course.

A similarity of the facilitation in all cases was for the instructors to frequently share stories or narratives to provide examples and models. This appeared to be a way to personalise the content already provided. It also demonstrated to students that there can be a range of perspectives and ways to resolve issues within an educational context, that is, there is usually no one 'right' answer or way to solve problems in the education discipline. Students should look at a range of solutions and use the one that best fits the context or problem being explored. This research outcome may be limited to the education discipline and further research would need to be conducted in other disciplines to test if there were any differences, among disciplines.

This research indicates that teaching presence is able to impact on cognitive presence through the articulation of expectations. When working in a community of inquiry, Garrison and Arbaugh (2007) suggest that the learners need "to have clear expectation of the nature of critical discourse and how to be a productive member of the community" (p. 168). This information was not provided to the students in Cases A and B. In Case C, there were expectations and examples provided to students and this may have resulted in increased posts at the integration and resolution phases when compared to Cases A and B.

In this study, most of the students were experiencing a change in their role as a learner. They had previously had little or no experience in online discussions as a key part of their courses. This may have impacted on the cognitive presence outcomes, particularly in Cases A and B, where the instructors did not inform students of their changing role as learners (Yang & Cornelious, 2005); nor of the need for honest and open posts which may have required them to share personal details; nor of their role and responsibility in building a learning community (Palloff & Pratt, 2003). Perhaps as students become more confident discussing online, the indicators should change. For example, with students who are very experienced studying online or in blended environment, one would expect that an instructor would have to place less emphasis on 'establishing netiquette', which is part of the instructional design indicator.

Subsidiary question 4:
How can teaching presence in the online component of undergraduate blended courses be modified to enhance cognitive presence and the development of critical thinking?

Critical thinking is a key outcome of higher education. This research indicated that instructors can enhance cognitive presence and the development of critical thinking through direct instruction and the development of activities and assessment which demand students to work at higher levels. If students are not required to propose and evaluate solutions as part of their assessment or discussions, the instructor is unable to see students' levels of critical thinking and the higher levels of cognitive presence.

It has been recommended by Lipman (2003) that "the pedagogy of the 'community of inquiry' should be the methodology for the teaching of critical thinking" (p.3). All elements of teaching presence (design and organisation, facilitating discourse and direct instruction) should be enacted in a manner to promote the development of critical thinking. It has been suggested by others that the role and function of teaching presence is to facilitate higher levels of learning and support the development of critical thinking (Jones et al., 2008; Vaughan, 2004). As was evidenced in these research cases, students in online discussion forums rarely moved beyond the exploration phase of cognitive presence without an expectation through direct instruction and/or design and organisation. The online discussion facilitation had little impact without the other two elements of cognitive presence.

The educator of a blended learning course would expect that learners could demonstrate cognitive presence both online and face-to-face. Students articulate their level of critical thinking through discussion which can be used to develop and improve thinking skills (Lipman, 2003). When posting to online discussion forums, learners make their thinking visible. For those students who engage in discussion frequently, there is regular visibility to instructors; however, for those who lurk in discussions (both face-to-face and online), the only visible evidence which is made available to the instructor is through their assessment tasks.

The interplay between teaching presence and its impact on critical thinking will be discussed in the rest of this section using each of the teaching presence elements: design and organisation, facilitation discussion, and direct instruction.

Design and Organisation:

As previously mentioned, the indicators of design and organisation include: setting curriculum, designing methods, establishing time parameters, utilising the medium effectively, establishing netiquette, and making macro-level comments about course content. Much of the design and organisation of a course occurs prior to the students' engaging in the course. When teaching a blended course, the instructor must consider the design and organisation of both the face-to-face and the online environments. They must also consider the role of discussion and engagement within their course.

When learning is reliant on the interaction of students with content, peers, and the instructor, it becomes critical for the instructor to design and organise the course for the development of these types of engagements. It requires a high level of teaching presence and takes extensive knowledge, to design learning

activities and assessment tasks to establish a learning environment where the flexible and dynamic nature of interactions promote the objectives of the course.

The assessment tasks in all cases indicated that students were required to think critically and make their thinking visible within their response. It was expected that the students' response to their assessment tasks required them to work at the top two levels of cognitive presence: integration and resolution. Student responses included connection and synthesis of ideas from multiple sources and the creating and defending of solutions. In addition, Cases B and C required the students to reflect on their learning as part of their response. All cases required students to reach the final level of cognitive presence, resolution in assessment; however, only Case C designed for this to be part of the online discussions.

Facilitating Discussion:

Facilitation of discussion is represented though: identifying areas of agreement/disagreement; seeking to reach consensus/understanding; encouraging, acknowledging or reinforcing student contributions; setting climate for learning; drawing in participants; prompting discussion; and assessing the efficacy of the process. In a blended course, the instructor would have to facilitate discussion both face-to-face and online.

The formation of a discussion forum does not guarantee the development of critical thinking. As was evidenced in Cases A and B, students rarely moved beyond the exploration phase of cognitive presence, even when prompted by the instructor, if there was no parallel requirement through design and organisation. This is supported by the research of Guldbery and Pilkington (2007) and Bass and Eynon (2009). When developing critical thinking skills through the facilitation of discussion, the instructor needs to set the tone and to encourage open exchange of thoughts and resources to support students' learning (Berge, 1995; Bullen, 1998; Harasim, Hiltz, Teles, & Turoff, 1995).

To establish a climate for high levels of substantive conversation which lead to critical thinking, Newmann and Wehlage (1993) have suggested that the following three features need to be facilitated. Firstly, participants should show considerable engagement with the content and ongoing interaction with others about the key ideas beyond relaying past experiences and prior knowledge. Indicators of high levels of cognitive presence and critical thinking should be present, such as synthesis of ideas, creation of ideas, raising further questions while answering the question or resolving the problem. Secondly, the sharing of ideas is student led, and students respond directly to the comments and questions of others. Finally, the dialogue builds on the ideas of others to assist in the development of personal and group meaning of the content.

In this research, the instructors found that students responded at higher levels best when they were discussing a confronting and complex issue. This is

supported by Lipman (2003) who suggested that when students are "discussing a controversial issue … they employ their best reasoning, make use of their most relevant knowledge, and display their most reasonable judgement" (p. 100).

The mixture of considered and reactive responses gained in a blended environment provides learners with the opportunity to develop high level thinking and communication skills in addition to a deeper understanding of the concepts which form part of their learning experience. No matter where the dialogue is held (face-to-face or online), it is important that the dialogue move beyond a pooling of ignorance or sharing of personal experiences to a substantive conversation. The instructor must facilitate reflective and critical dialogue to enable learners to make meaning through integrating prior knowledge and experiences with new experiences, multiple sources of information and multiple perspectives.

Blended learning enables dialogue in both verbal and written forms as well as interaction with a range of resource types, giving additional opportunities for students to make personal meaning and to work through all four phases of the practical inquiry model, rather than remaining at the exploration phase. Educators working in blended learning courses deliberately design and construct activities for both online and face-to-face learning that encourage and facilitate quality interaction. This interaction results in, and from, reflective dialogue and higher-order thinking through connecting to prior knowledge and exposure to different perspectives.

This rigour from written communication and dialogue is indicative of the types of outcomes aimed for in a tertiary environment. Past literature indicates that the explicit nature of written dialogue supports critical thinking (Applebee, 1984; Fulwiler, 1987; White, 1993). The level of critical thinking is further developed when learners participate in dialogue with others rather than working from principles they already hold (Lipman, 2003). One of the students in Case C, Lesley, supports this notion, reflecting that she was "forced to examine views beyond what I already hold."

Within Case C, the integration of information from multiple sources ensured that pre-service teachers contributed to discussions with an informed voice. The teaching presence acknowledged the multiple perspectives on authentic yet complex issues. Participants were invited to compare, contrast, and connect ideas from other participants and from relevant literature. The online discussion facilitation encouraged pre-service teachers to continue to share and question for understanding and to engage in higher order thinking. In this case, an assessment mandate forced students to regularly and actively engage in the online discussions; and the criteria required students to interact with high levels of cognitive presence and critical thinking. However, the assessment directive may have had an influence over the authenticity of the interactions. This raises the question: How else can we promote sustained and authentic communication between participants as part of knowledge development?

In the open-ended questions in the survey, when the students were asked to share examples of what the instructor did to assist in the development of their critical thinking, they repeatedly referred to the facilitation of the online

discussions. Jacqui commented that the "online discussions rated different questions, e.g. ethical issues"; whereas Debbie revealed that

> the teachers were careful about approaching the development of deeper learning, the tutors used a lot of their personal experiences and shared them with the class to allow for greater appreciation and understanding of how some methods of teaching a subject can work and others are not so successful.

Frank supported the importance of the instructor's role in online facilitation stating that "the teacher was able to skillfully bring discussion back into the core focus of the weekly topic, ensuring a seamless transition from student discussion back to the topic".

Direct Instruction:

The indicators of the direct instruction element of teaching presence within the CoI framework include: present content/questions, focus the discussion on specific issues, summarise the discussions, confirm understanding through assessment and explanatory feedback, diagnose misconceptions, inject knowledge from diverse sources, and responding to technical concerns. Direct instruction was obvious in the face-to-face and online elements of each of the cases and included items such as the course introductory material, the course content, and the assessment tasks, in addition to any face-to-face or online dialogue that the instructor had with their students.

Within the online discussions the instructor in Case C had by far the most posts coded as direct instruction. This could have been because the assessment obligation in the Case C context was much higher, with the students' online discussion participation forming part of an assessment task. The criteria for their online discussions was provided (and unpacked) to support high quality postings from the students. Because this was a blended course, the assessment item (although completed online) also formed part of the direct instruction in the face-to-face environment.

In Cases A and B, the online environment was largely a place to share course materials and the online discussion was mostly teacher directed. This was despite the instructors' beliefs about the importance of constructivist learning environments. This could be considered a space for e-information rather than a true blended learning environment. One of the instructors commented that "instructional intent, planning and actual implementation are not always the same". If we are to achieve critical thinking and deep knowledge, we must align these through all three elements of teaching presence.

This research found that direct instruction had a relationship on the students' cognitive presence, particularly at the highest phase of resolution, where high levels of critical thinking are required. This investigation supports the recent findings of Shea et al, (2010) who shared that"[w]e expect to find more evidence of integration and resolution stages of cognitive presence in documents such as case studies, papers, and projects" (p. 17).

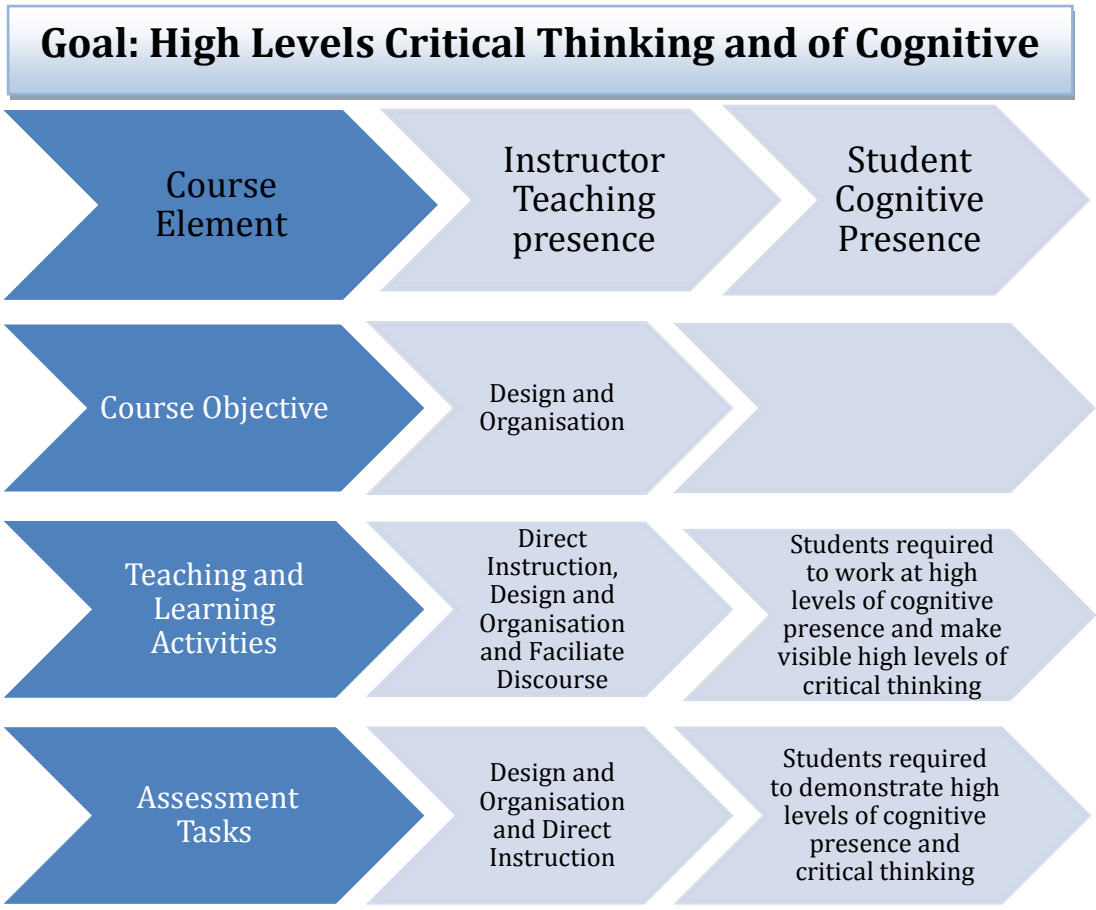

Figure 5.1. Role of Teaching Presence in enhancing Cognitive Presence

Figure 5.1 illustrates that to achieve the goal of high levels of critical thinking and cognitive presence instructors need to design and align the course objectives, teaching and learning activities and assessment tasks towards that goal. Instructors, through their teaching presence, can demand students work at high cognitive levels to be successful in the course and they can impact on the development of student's critical thinking and cognitive presence. When designing the online component of a blended course, instructors should create relevant online discussions and online activities which model and support the development of students' critical thinking and align with the assessment tasks. As students respond to the discussion or activities they make their thinking visible and instructors should provide feedback (one of the direct instruction indicators) to assist students in attaining higher cognitive levels.

Subsidiary question 5:
How might reflection be positioned within cognitive presence?

Although not currently present in the CoI Framework, Garrison, Anderson and Archer assert that reflection is a key construct of the CoI framework. "The premise of this framework is that high-order learning is best supported in a community of learners engaged in critical reflection and discourse" (Garrison, Cleveland-Innes, et al., 2010, p. 32). Furthermore Garrison (2003) reveals that cognitive presence "concerns the process of both reflection and discourse in the initiation, construction and confirmation of meaningful learning outcomes" (p. 4).

This research has found that those posts which could be considered reflective in style and nature are difficult or impossible to code if an additional reflective indicator is not added to the resolution phase. If carefully structured, online discussions provide students with the opportunity to "think socially; they allowed discussion participants to document, retrieve and reflect on earlier stages of the learning process" (Bass & Eynon, 2009, ¶ 13). To facilitate the coding of reflective online posts and other reflective activities within a course, the researcher proposes the following modification to the resolution phase of the original cognitive presence coding protocol.

Table 5.2
Modified Cognitive Presence Indicators

Practical Inquiry Phase	Indicators	Socio-cognitive processes
Triggering Event	Recognise problem	Presenting background information that culminates in a question
	Sense of puzzlement	Asking questions Messages that take discussion in a new direction
Exploration	Divergence – within the online community	Unsubstantiated contradiction of previous ideas
	Divergence – within a single message	Many different ideas/themes presented in one message
	Information exchange	Personal narratives/descriptions/facts (not used as evidence to support a conclusion) Sharing of literature/resources Questions of clarification
	Suggestions for consideration	Author explicitly characterises message as exploration, e.g., "Does that seem about right?" "Am I way off the mark?"
	Brainstorming	Adds to established points but does not systematically defend/justify/develop situation
	Leaps to conclusions	Offers unsupported opinions

Integration	Convergence – among group members	Reference to previous message followed by substantiated agreement (e.g., "I agree because . . .") Building on, adding to others' ideas
	Convergence – within a single message	Justified, developed, defensible, yet tentative hypotheses
	Connecting ideas, synthesis	Integrating information from various sources – text book, articles, personal experience
	Creating solutions	Explicit characterisation of message as a solution by participant
Resolution	Vicarious or real world application of solutions/ideas	Providing examples of how problems were solved Results of application
	Defending solutions	Defending why a problem was solved in a specific manner
	Reflection	Reflecting on learning outcomes Reflecting on learning processes

Source: Modified from Garrison, Anderson and Archer (2001, pp. 15-16)

The quality of inquiry can be assessed using the cognitive presence indicators. Reflection is an important element in achieving deep knowledge and critical thinking of learners. As students move through the four phases of cognitive presence, the "progression of reflection and discourse through to resolution (i.e. understanding), is essential" (Garrison & Anderson, 2003, p. 61) .

The CoI framework was developed a decade ago and much work has already been undertaken to validate the coding protocols. It has been suggested by Garrison and Arbaugh (2007) that the CoI categories be reviewed to fully describe the elements, and recently Richardson and Ice (2010) have recommended that it is time to re-examine the indicators within cognitive presence.

In a new publication, Akyol and Garrison (2011a) investigated the creation of a fourth presence: that of Metacognition. However, they found that it could appear as part of monitoring in cognitive presence in the form of monitoring one's own learning, and in teaching presence in the form of regulating the learning of others. Hence it should not appear as a separate construct within the framework. In another recent publication, Shea and Bidjerano (2010) have also recommended a fourth presence: that of Learner Presence which extends to self-efficacy and self-regulation.

The researcher does not believe that reflection should be a fourth presence, but should be an additional indicator of cognitive presence. Essentially, the researcher argues that reflection is a key element of the CoI framework and should be explicitly placed in the resolution stage of cognitive presence. This is supported by Fogarty and McTighe (1993) who recommended that teachers encourage continuous reflection and that "[h]elping students to become reflective is a fundamental goal for teachers of thinking" (p. 167).

Instructors cannot assume that because they can't see students' reflection in online forums or other elements of a course that it did not happen. Conversely, if instructors do not ask students to reflect and share it in some manner, either publicly in discussions or privately in assessment tasks, they cannot assume that it will happen.

This study used a range of course artefacts and literature to explore the position of reflection in the CoI framework. In an "attempt to broaden the scope of the CoI framework" (Archer, 2010, p. 69) the researcher recommends that the final stage of cognitive presence, resolution, be modified to include the indicator of reflection.

Key research question:
In what ways can teaching presence enhance the development of cognitive presence in a blended undergraduate teacher education course?

This research has found that direct instruction and design and organisation have the largest impact on the highest phases of cognitive presence, even with instructors with different approaches to teaching presence and different levels of experience teaching in blended and/or online environments. If instructors are aiming for the development of cognitive presence, they need to ensure that consideration of this occurs prior to the students' entering the course, in the design and organisation stages, and also when creating materials and responses which would be thought of as direct instruction.

When instructors align the course objectives, content, teaching and learning activities, and assessment tasks to achieve the goal of high levels of cognitive presence students must work at that higher level to attain the course objectives and be successful in the course. High levels of cognitive presence are able to be realized when instructors explicitly consider this as an outcome when they design the course (set the curriculum, set the assessment, and design the methods of interaction and instruction); present questions and confirm understanding through direct instruction; and reinforce student contributions at high cognitive levels through the facilitation of discourse. High levels of teaching presence can encourage high levels of student participation and cognitive engagement in the course.

The blended learning paradigm requires educators to re-think how they design and implement their courses. One of the most demanding components of redesigning a course for the blended environment is considering which elements should continue to remain face-to-face and which elements should move online. When making this decision, instructors should consider how they see all three elements of teaching presence in both environments. They also need to reflect on the cognitive presence expectations of the students in each environment.

Instructors of blended courses should be cognisant of the impact of their teaching presence. Teaching presence (design, facilitation, and instruction) in blended courses should leverage the potential of both the face-to-face and online environments to promote learners' engagement with the content, their peers, and the instructor to enhance learning outcomes.

"[T]here is a distinct lack of confirming research with regard to the causal relationships among the presences … [although] the CoI framework suggests that teaching presence directly influences the creation and sustainability of cognitive presence" (Garrison, Cleveland-Innes, et al., 2010, p. 32). This cross-case analysis revealed that while teaching presence can enhance cognitive presence, it is necessary to look at a course in full and not just the online discussions, as has occurred in most of the research in this area. As Shea et al. (2010) state "looking only at threaded discussion for this evidence is misguided" (p. 15). Research into the CoI framework must move beyond

threaded discussion and investigate other elements of a course, such as assessment, to explore integration and resolution phases, because high levels of critical thinking may not be present/obvious in the online discussions but may appear elsewhere. This research supports Archer's (2010) recent comment that we are "looking for these phases in the wrong place" (p.69).

This study expands on previous literature, advocating that the CoI is a suitable framework to assist in the design of a course and also in research. It recognises that in different courses with different instructor experience, similar data is gained. In conclusion, these findings confirm the influence of teaching presence on the quality of cognitive presence.

Other Research Outcomes and Emergent Themes

Garrison and Vaughan (2008) remind us that "true learning is exploratory and often unpredictable" (p. 23). During the course of this research, a number of additional unintended outcomes have been revealed.

Student participants indicated through a survey that they perceived that in a blended course the face-to-face teaching presence is more effective in promoting cognitive presence than online teaching presence. The instructors' interviews confirmed the same generalised pattern; however, they spoke mainly of the ease of face-to-face in establishing and maintaining relationships rather than learning outcomes.

Students also found blended learning more interesting and engaging than their previous learning experiences. Joe stated that the blended environment "freed up lecture times to do other things". Chloe reflected that the online learning environment of the course

> was always active (in a lot of courses it is dead) so that was good for increasing understanding. The teacher was a regular and active participant … in the study desk which is great. This helped to answer questions accurately, and know that your lecturer is engaged with this course. Teacher presented an image of an active learner, and this flows into an image of an up-to-date teacher.

In support of this statement, Jill commented that it was a "successful delivery of a course that was flexible for all learners".

When the students were asked how the face-to-face component enhanced the online component of the courses there was general agreement that when the two components are integrated it has an impact on learning outcomes. Steven acknowledged that he "preferred face-to-face in order to gain understanding of the concepts being taught. The online lectures were good as I could listen to them in my own time". This comment was supported by other students. James found that the "face to face environment enabled me to synthesise my understandings through engaging in pedagogical discussions with my peers and lecturer; something which is not 'immediate' in the online environment".

Another open-ended survey question asked: How do you see yourself behaving differently (or the same) in the face-to-face components and the online components within a blended course? Student responses varied. Jill responded that she tries "not to be different" and this was supported by others who stated that they "enjoyed participation in both areas". These students were "confident in both realms and love[d] sharing [their] knowledge and opinion", whereas Alison "preferred online discussions because I'm shy and it is easier to participate online". Yet others felt that the permanent nature of their contributions and the delayed responses to online discussions impacted on their responses. Lachlan responded that,

> Online I try to be professional (so everyone can read it, so it's not a personal discussion) and sometimes wonder if it is too late to engage in a discussion if I haven't logged on for a few days. So should I make a posting and have no-one respond? Will I be wasting my time?

The instructors from Cases A and B found that participating in this research and reflecting on their past teaching had some immediate benefits to their current and future teaching. One of the instructors made immediate changes to her pedagogical practice after reading the researcher's account and analysis of the data. Having the instructors look at the data, which had been analysed by someone else through member checking brought some issues to their attention that had not previously been uncovered through their own reflective practice and the student evaluations of the course; and this further developed their reflective practice. The act of looking backward had an impact on the current and future teaching, and the active participation in the research brought positive outcomes for the instructors and their students in current and future courses.

This study also found that over time, teaching presence in blended and online pedagogy evolves together with the ability to embed structures, strategies, activities, and assessment. This promotes higher engagement, and critical thinking improves with experience and reflective practice. Instructors need time to develop the confidence and competence to try new strategies and tools, and to bed down the confidence to use others and increase their effectiveness.

When moving from face-to-face learning to blended or online learning, students also need to adjust to their new roles as online learners, particularly if a social constructivism design occurs; and the online element requires students to move from passive consumer of information to an active inquirer or creator of knowledge.

Both the researcher and the instructors felt that it was unnecessary to code at the indicator level. Coding which gives a big picture view is sufficient, although it was interesting for the instructors to see which indicators they and their students most often posted at. One of the instructors also suggested it would be useful to articulate the indicators to instructors who were new to online or blended learning. This finding supports the recommendations by Garrison et al. (2006) that it is only necessary to code at the category level and not the indicator levels because such fine-grained coding "was not necessary to answer the research questions of this study" (p. 5). Having said that, the instructors considered it interesting (and useful) to identify the types of postings their students commonly posted and also those where few or no posts occurred.

It was noted during coding that there is a hierarchy in cognitive presence, yet no such hierarchy exists within the elements of teaching presence. This meant, when coding teaching presence, where there was more than one element it was difficult to make the call regarding which element to code the post.

The data from the instructors, the students, and also in the literature indicate there are a number of principles or guidelines for practice for improving critical thinking and student centred learning in online discussions. This assumes that the elements of social presence have already been developed.

- Participants (both instructors and students) need to ask open-ended questions to promote inquiry and critical thinking.
- Instructors should promote timeliness of responses to their students. The inherent delays between their initial post and response by others can result in disconnectedness. This would be of particular importance if the online participation were assessable. It would be useful to have a deadline for the initial post and then another for responses to those posts.
- Instructors should avoid being the first person to respond to all posts. This can close down the discussion and devalues the range of perspectives of others when the aim is many to many dialogue rather than one to one public conversation.
- Encourage students to build on posts made by others and be involved in sustained dialogue rather than a 'post and run' mentality.
- Contributions should promote deep discussion, with clear efforts to make personal and group meaning. Student responses to others should be constructive, specific, and supportive.
- Instructors should provide clear directions regarding their expectation of students online and also models of appropriate interactions, particularly in how to avoid 'pathological politeness', that is, students need ways to disagree with others in a manner that does not offend other participants.
- Students should be encouraged to inquire deeply into the topics/questions and integrate ideas from a variety of sources.
- Instructors should design for controversial or difficult/challenging topics where there are likely to be differences in opinion or experiences.
- If instructors wish students to work at the final phases of cognitive presence and make their critical thinking visible through the development of hypotheses, creating solutions, testing and defending their solutions, and reflecting publicly, then instructors need to design in assessment tasks and scaffold activities where students work at higher levels of inquiry and critical thinking and are required to engage in these activities purposefully.
- Require students to elaborate on or justify their opinion/post.
- Increase motivation by the use of relevant or authentic topics or include other professionals in the discussions.
- Students should also feel safe to raise further issues or questions of interest related to the context under exploration.

Personal Reflection

During the extended period of time this dissertation has taken, from the initial conception of the study to the writing of the final thesis, I have matured as both a researcher and a practitioner. Engaging in the doctoral research process has provided clarity of my role as the researcher; an increased awareness of research methodologies; and an understanding of the realities of conducting research.

I have enjoyed the pedagogical conversations with my colleagues regarding the work we do as instructors as part of this (and other) research. It has been rewarding to see that the participation of my colleagues within this study was the catalyst for them to make modifications to their teaching presence which has resulted in higher levels of online engagement by students in their courses. These conversations have also positively impacted on the ongoing development of my own pedagogical practices.

I continue to believe in the benefits and richness of authentic discussion and expert contributions to discussions. I promote critical thinking and reflection while encouraging my students to the value the importance of multiple and diverse perspectives within an inquiry process.

There have been significant changes and an expansion of the ICT tools available within USQ (and in general) during the time that this research has occurred. The online teaching environment has changed, with the ongoing development of Web 2.0 tools providing free access to collaborative spaces, and universities providing additional core ICT systems, instructors now have access to a wider variety of methods to engage students online. Over the last few years, these new tools, and a transformation in the acceptance by staff to use these tools, has resulted in changes to practice at USQ. If this study was replicated again at this site I believe it would result in additional findings.

As a teacher educator my objective is to create opportunities pre-service teachers to understand both the theory and practice of teaching by engaging at

high cognitive levels. I hope to contribute positively to the development of the next generation of teachers who will work 21st century classrooms which are challenging and constantly changing.

Chapter Summary

This study examined some of the issues or themes that need to be considered for the design and development of blended courses to promote higher-order thinking. An overall conclusion is that the quality of cognitive presence can be improved through the teaching presence decisions of practitioners. Chapter 5 provided the researcher's interpretation of the complex case under investigation by presenting a discussion of the qualitative and quantitative data gathered in this study. The findings were summarised in a form to answer the research questions with a comparison to previous research discussed in Chapter 2. Additional findings discovered during the research are also discussed.

The next and final chapter will discuss the conclusions and implications of the results, the contribution of this research to theory and practice, the limitations, and the possible directions for future research.

CHAPTER 6: CONCLUSIONS

Overview

The chief aim of this research was to investigate the teaching and learning in undergraduate teacher education programs within the faculty by building a teaching and learning future that is desired by both educators and learners and is achievable within the constraints of the tertiary environment. It is not understood why undergraduate learners participate less regularly and at surface level, rather than the deep level participation of those learners at the post-graduate level. Hence the need exists to conduct research into undergraduate blended learning environments to determine the impact of teaching presence on cognitive presence.

The CoI framework was used as a lens to view three case studies. Contemporary literature acknowledges that the CoI model can be used "to inform both research and practice in online and blended learning" (Swan & Ice, 2010, p. 1). This study provides an increased understanding of what teachers can do (teaching presence) to assist students within blended courses to achieve deep cognitive learning and critical thinking (cognitive presence).

Chapter 1 introduced the research study with a brief overview of the territory of the study including its key literature and research design, along with the research questions. The second chapter unpacked the relevant literature and related past research. In the third chapter, the research methodology employed in this mixed method multi-case study was discussed. The fourth chapter presented and examined the data gathered from each case, along with a cross-case analysis of the data.

The previous chapter discussed the findings of this research, while interpreting the data and patterns obtained from the cases, and related it to the literature discussed in Chapter 2. Instances from the cases are grouped and the evidence is recombined to examine for common elements while answering the research questions. The conclusions about the research questions, along with implications of the results, limitations of this research, and implications for further research, are outlined in this the final chapter.

Conclusions

The study is situated in a regional university in Australia and the data for this multi-case study was collected from three undergraduate Faculty of Education blended courses within a single semester. The small and defined scope means that the ability to generalise to other contexts is limited. However, the multi-case approach, the mixed methodology with multiple data sources, and the general acceptance of the CoI as a conceptual framework for research and practice by previous researchers open the door to fuzzy generalisations or "cautious translation of findings to similar contexts may be warranted" (Duncan & Barnett, 2010, p. 259).

This section will discuss how this research study makes a number of advances and contributions to theory in the areas of cognitive and teaching presence.

Key Advances to Current Literature:

Although the CoI framework has previously been used as a conceptual framework, this research explored its role as a guide for instructors and it also provided a lens for research in a new context. Previously, most of the research using the CoI framework was limited to post-graduate courses in North America. This research places the framework in a new environment, hearing the voice of those previously not heard in the published literature: an Australian educational context in a blended undergraduate setting.

Some of the research findings do confirm expectations from the existing literature; however, as this research was located in undergraduate blended learning, it was surprising that the same findings hold; that is, the overall high levels of exploration posts by students and direct instruction posts by instructors were still observed. The extant literature also suggested to some extent that there should be a "complementary relationship between teaching presence and cognitive presence" (Garrison & Arbaugh, 2007, p. 163). This research found confirmed the existence of a relationship between teaching presence and cognitive presence.

In addition to exploring the topic with a different group of student participants, this research used a range of data sources. Until very recently, previous research with the CoI framework had been limited to the work of an online instructor and their students within online discussions, and possibly a student survey; and usually focused on only one of the three presences that form the CoI framework. This research used the CoI framework in a much broader context to include both cognitive and teaching presence, and took account of a more expansive range of data sources including the traditional content analysis of online discussions, survey and also course documentation and instructor interviews.

Finally, the instructors within this research could map their expectations of their students' cognitive activities with the four phases of cognitive presence. This indicates that instructors can use the elements and indicators of cognitive presence to plan a course and not just to research the outcomes of the course.

Contributions to the Field

A number of key findings result from the analysis of the data within this research study. Firstly, it is recommended that the existing theoretical model and coding protocols for cognitive presence be modified. As the categories and indicators were initially developed for the online discussions, they may need to be revised to confirm their relevance beyond that small but important element of online and blended teaching and learning. It is recommended that resolution, the final phase of cognitive presence, be expanded to include reflection as an indicator. While numerous pieces of literature discussing the CoI framework point to the significance of reflection, no one has yet included it in the cognitive presence construct or any other element of the CoI framework.

The indicators of the final stage of resolution do not currently include a reflective indicator. The research recommends an additional indicator at the resolution level could be added; this may also go some way to providing data on students' reflection or promoting reflective activities by the students. Table 6.1 provides the recommended modification to the indicators and examples for resolution.

Table 6.1
Modification of Framework for Cognitive Presence.

Resolution	Vicarious or real world application of solutions/ideas	Providing examples of how problems were solved Results of application
	Defending solutions	Defending why a problem was solved in a specific manner
	Reflection	Reflecting on learning Reflecting on the learning processes

Source: Modified from Garrison, Anderson and Archer (2001)

A second contribution from this research was to confirm the recent thoughts of Shea et al. (2010) and Archer (2010) that the elements and indicators of both teaching and cognitive presence were present in places beyond online discussions, for example in course materials, announcements, study schedules, and so on. Although the researcher recognises that online discussions are one way to capture visible evidence of invisible learning, other elements of the course also provide evidence of both teaching and cognitive presence.

Thirdly, this study has provided instructors with guidelines for practice for improving critical thinking and student centered learning in online discussions. As instructors move from face-to-face teaching to blended and online learning spaces they need guiding principles which are efficient, reliable, and practical to help them both understand and improve their online teaching. This is particularly so, if the goal of the online discussions is to enhance students' critical thinking, and their ability to apply knowledge in different contexts and solve problems.

High quality thinking is an aspiration of education. We need to create environments that support the development and application of critical thinking. This study investigated how teaching presence in online discussions might influence the growth of critical thinking. Investigation into teaching presence in the study showed a fourth contribution, in that although all elements of teaching presence can and do impact on critical thinking the largest impact tends to be through direct instruction and though the design and organisation of activities and assessment which demand that students work at high cognitive levels.

Considering the above outcomes, the next step is to explore the implications for teaching and learning of blended courses and online discussions. The next section of this chapter suggests some implications.

Implications

This study provides the noteworthy contributions to the field discussed above, yet it is important to point out implications of the research which might impact on professional practice and research. There are trends emerging from the data of this study that impact on critical thinking, teaching, and cognitive presence.

Student Expectations

One of the instructors commented that it can be difficult to "match the student expectations of what happens online and the instructor's expectations". Even within the one case there was a variety of considerations from students as to what the online space in their blended course was for. Data from the open ended survey revealed that some students considered it a social space online; others considered it a source for information; and others articulated that it was a space to continue to engage in academic discussion around the content.

Previously, learners may have considered that just turning up to class was their participation or 'presence' in face-to-face courses. Other students who had previously been involved in traditional distance education (particularly print based) worked independently and will experience change when moving to online learning "[b]ecause the pedagogy behind online discussion forums assumes that students will work together" (Swan & Ice, 2010, p. 1). It becomes difficult to meaningfully qualify and quantify presence online when the students choose when, how frequently, and how to participate. The concept of a virtual classroom was intangible for them (Bullen, 1998). The instructors also commented that perhaps some of the students did not have the dispositions and skills in self–directed learning, self discipline, time management, and organisation required for effective online learning. The impact of independence of time and place and increased flexibility may have actually created an obstacle to active engagement for some students.

This study was set in the discipline of teacher education and perhaps this colours the thoughts and practices of instructors in this study. Their online pedagogy was still about human interaction or creating materials that invite students to engage in certain types of activities. Perhaps some students do not perceive that they need to interact online for a successful completion of the course and they decrease their engagement beyond a personal level. One of the instructors commented that "all students benefit from the experience of others and their attempts to make sense of the experience as part of the learning process". He went on to ponder that in a blended learning environment instructors need to consider "how they can take students with us online? What is the hook for students?" An implication from this study is that instructors need to clearly articulate expectations for what it means to be a learner in their blended course (it may differ for other courses). It might include topics such as: time online; time management and organisation; dialogical approach to inquiry; admissibility of multiple answers; and ideas about effective online discussion contributions.

Instructor Preparedness and Change Overtime

This study had three instructors with different experience in teaching online and in blended learning environments. The move to a blended learning environment was new to the instructors in Cases A and B. Administrators must consider the level of preparation of both instructors and learners when mandating for all face-to-face courses, to also have an online presence. In the context of the university where this research took place, many undergraduate courses used the online environment to provide unmediated student discussion areas, upload lecture notes, and provide access to other supporting resources. However, novice blended and online educators thought little about how to most effectively use environments, and little

professional discussion occurred to develop their thoughts on this. It is unfair to imagine that students or instructors will engage in effective teaching and learning when moving to blended or online modes, without support and preparation. Two of the three instructors were novices in the blended environment. The results of this study may well be different if it had used data from the courses of three expert instructors.

Finley & Hartman (2004) suggested that we need "more and higher quality discussions" (p.321) with all faculty members requiring strategies and models for the use of online spaces for teaching and learning at the tertiary level. We cannot assume that instructors who are experts in face-to-face teaching will transfer that expertise online. The lack of models of appropriate practices and training, and limited competence and confidence hamper the transfer from face-to-face to blended and online learning environments. Organisations should ensure they provide appropriate professional development and support for instructors as they move to working in an online or blended environment, and they should evaluate the impact of these professional development initiatives.

In all cases the instructors found that they had to modify their course design and pedagogical practices used in face-to-face teaching when moving to blended or online teaching. The instructors all had some positive experiences teaching in blended and online courses, yet they all agreed with one instructor who commented that he was concerned with "how to get the students in and sustain their engagement". The instructors in Cases A and B have suggested that having someone analyse their online discussions and spend time talking about the results was an effective form of professional development and it enhanced their personal reflection. This study has shown that the process provided both immediate and long term positive outcomes. For example the instructors changed the manner of their interactions online in current courses; and they modified assessment and other design considerations in future offerings of the courses.

All three instructors within this research study commented that their teaching presence had changed over time. The faculty's blended and online teaching is now further enhanced by the ability to record face-to-face sessions and also use screen capture assist in answering questions; the ability to create audio responses to questions rather than just text; and the more regular use of synchronous tools online. As the instructors' confidence to use the additional tools increases, their teaching presence changes to move the focus away from content towards the tools which might be used to improve the process of learning and maintain student curiosity. All instructors have suggested that the opportunity to reflect deeply on their own practice and to dialogue with other educators working in blended environments have led to significant and positive changes to their teaching presence.

The ongoing development of new ICT tools available to enhance teaching and learning can return educators to the role of a novice as they familiarise themselves with the new tools. The new tools can lead to enhanced possibilities for learning and teaching; but also increase the demand on instructors to learn how to use these new tools and then how to teach with these new tools to create meaningful learning experiences (Duncan & Barnett, 2010; Ertmer, 2003).

Critical Thinking

The outcomes of this research have also brought to the attention of the instructors their expectations of critical thinking in two ways. Firstly, are their expectations for critical thinking the same in face-to-face discussions and online, and within assessment? Secondly, should instructors look at critical thinking from a point in time or over a period of time (and how much time should this be)? Recently Richardson and Ice (2010) suggested that "[t]ypically online discussions last 1 – 2 weeks, hardly enough time, regardless of topic, to move students through the entire critical thinking process" (p. 57). This research selected a nine week period to investigate the critical thinking outcomes and included assessment responses as a data source. Perhaps instructors should instead look to online discussions as evidence of students' current critical thinking levels and then through teaching presence design for, scaffold and facilitate activities to move them forward.

Pre-service Teachers: from Learners to Teachers

The final implication for teacher education programs is to consider how to move the pre-service teachers from blended and online learners to blended and online teachers. Having students firstly experience the role of a blended and/or online learner is an important step in their development as a blended and online educator. Within schools, Preparatory to Year 12 educators are increasingly blending face-to-face online environments and in some cases teaching fully online. At USQ, there are currently courses developed at the post-graduate level, which develop skills in blended and online teaching. However, program developers need to consider how they might transition the pre-service teachers from learners to teachers in these environments.

Limitations of the Study

The conclusions from this research are strengthened by the use of multiple cases and a mixed method approach. The range of data sources (survey, online discussion coding, interviews, and other documentation) increase the trustworthiness of the data and enhance the generalisablility of the findings. The mixed methods approach provided generalised patterns of both learner and teacher participation and personal narratives of the instructors.

Having said that, the small data set was sourced from only one regional university, and within the discipline of teacher education within one semester. The student participants may not be typical pre-service teachers. Hence only naturalistic generalisations (Stake, 1995) are able to be made. There was a small response rate both within the survey and in the number of students who actually posted online. The small sample size precluded the use of additional statistical tests of association. The implications of the study across the wider educational community would require further research in other contexts.

The student experience survey was used to gain insight into the students' perceptions of teaching presence and its influence on cognitive presence in both face-to-face and online environments. A second limitation in this research was that it used an older version of the survey. Use of the most recent version of the survey (Version 15) may have produced different results.

Finally, the results may have been impacted by the selection of online discussion forums to be coded. Those forums, which focused on establishing netiquette and social presence or responding to technical concerns, tend to have high traffic at the beginning of the semester. They were not used within this research and they may have generated different outcomes.

This research study is no different from other research studies in that there are limitations. The researcher acknowledges the limitations of the research; however, they do not detract from the significance of the findings in this research. The limitations can also provide the basis for further potential research.

Directions for Future Research

As with any case study, the insights gleaned provide a focused understanding of a complex real-life setting limited in this instance to three undergraduate teacher education courses taught in a blended environment at a regional university in Australia. The rich description of the cases is specific to that sample. Similar future studies could build on this and previous research in a more diverse range of disciplines, in other universities or with a larger data set. Education as a social science is often thought of as having soft and applied knowledge which is functional and concerned with ongoing improvement of professional practice, in contrast to the pure or applied sciences whose subject matter is considered to be hard and concerned with either mastery or explanation (Biglan, 1973). It would be interesting to identify cross-discipline generalisations to improve critical thinking in online discussion forums and blended learning in broader contexts.

Further studies could explore if there were any 'wash back' effects from increasing critical thinking and cognitive presence online to that in face-to-face mode. Do students develop 'habits of mind' that transfer from one environment to another or into other learning experiences? Furthermore, how do instructors' expectations of visible critical thinking in online discussions compare with their expectations in face-to-face discussions?

Future research could explore how critical thinking and/or cognitive presence relates to student achievement. It could identify if there is any correlation between the learner's participation online (include the quantity and quality of online discussions, as found through discussion analysis) and the learners' result or grade. That is, does the nature and number of posts make a difference to learners' results?

Another concern for future research could be to develop a hierarchy within teaching presence. Garrison et al. (2006) comment that the CoI framework provides a coding which "is structured as a hierarchy of presences, categories, and indicators" (p. 5). The phases of cognitive presence and their indicators provide a hierarchy of thinking skills. No such hierarchy appears in the element of teaching presence. Each element is at the same level, and all are important at different times within a course. Perhaps future research could involve refining the indicators of teaching presence to develop a hierarchy and consider other artefacts within a course.

Successive studies could map the number of concurrent conversations and track which topics individual learners respond to (and why). Investigating the level of

engagement through the lens of cognitive presence could identify why some topics are pursued in depth and others in a more shallow fashion or not at all. Finally, it would be beneficial to explore the nature of topics introduced by students and the types of responses they garner when compared with those introduced by instructors.

Summary

As the true benefits of the blended learning environment for both cost containment and quality improvement (Heterick & Twigg, 2003) become apparent, there will be an increasing reliance on the blended learning environment in 21st century education. This research explored the relationship between teaching presence and cognitive presence in a blended undergraduate setting. The CoI model provided a conduit to analyse the experiences of pre-service teachers and their instructors within three different blended courses.

The literature suggests that there is a relationship between instructor teaching presence and student cognitive presence in online discussions. This research showed that teaching presence can be found in a range of places beyond online discussion, it does change over time, and it can impact on students' cognitive presence and critical thinking in a course. In addition, the researcher modified the cognitive presence element of the CoI framework to include reflection as a third indicator of resolution and provided some guidelines for practitioners who seek to enhance critical thinking and encourage student engagement in their online discussions.

The researcher encourages others to implement and build on the findings and the implications of this study to guide the design, instruction, and facilitation of blended learning at the undergraduate level to enhance cognitive presence and develop critical thinking.

References

Abedin, B., Sydney, A. U., Daneshgar, F., & D'Ambra, J. (2010). Underlying Factors of Sense of Community in Asynchronous Computer Supported Collaborative Learning Environments. *Journal of Online Learning and Teaching 6*(3), 585-596.

Abrams, Z. (2005). Asynchronous CMC, collaboration and the development of critical thinking in a graduate seminar in applied linguistics. *Canadian Journal of Learning and Technology, 31*(2), 23-47.

Agostinho, S., Oliver, R., Harper, B., Hedberg, H., & Wills, S. (2002). A tool to evaluate the potential for an ICT-based learning design to foster high-quality learning. *Proceedings of Australasian Society for Computers in Learning in Tertiary Education*, 29-38.

Akyol, Z., Arbaugh, B., Cleveland-Innes, M., Garrison, D. R., Ice, P., Richardson, J., et al. (2009). A response to the review of the community of inquiry framework. *Journal of Distance Education, 23*(2), 123-136.

Akyol, Z., & Garrison, D. R. (2008). The development of a community of inquiry overtime in an online course: Understanding the progression and integration of social, cognitive and teaching presence. *Journal of Asynchronous Learning Networks, 12*(3), 3-22.

Akyol, Z., & Garrison, D. R. (2011a). Assessing metacognition in an online community of inquiry. *The Internet and Higher Education, Accepted Jan 2011*.

Akyol, Z., & Garrison, D. R. (2011b). Understanding cognitive presence in an online and blended community of inquiry: Assessing outcomes and processes for deep approaches to learning. *British Journal of Educational Technology, 42*(2), 233-250.

Alavi, M., Marakas, G. M., & Yoo, Y. (2002). A comparative study of distributed learning environments on learning outcomes. *Information Systems Research, 13*(4), 404-415.

Albion, P., & Redmond, P. (2008). *Teaching by example? Integrating ICT in Teacher Education.* Paper presented at the Australian Computers in Education Conference Canberra, Australia.

Allen, I. E., & Seaman, J. (2010). *Learning on Demand: Online Education in the United States, 2009*. Needham, MA: Sloan Consortium.

Aminifar, E., & Bahiraey, D. (2010). *Online Learning and Teaching at Higher Education.* Paper presented at the World Conference on Educational Multimedia, Hypermedia and Telecommunications, Toronto, Canada.

Amirault, R. J., & Visser, Y. L. (2009). The university in period of technology change: a historically grounded perspective. *Journal of Computing in Higher Education, 21*, 62-79.

Anderson, T. (2010). Three generations of distance education pedagogy. *The International Review of Research in Open and Distance Learning, 11*(2), 1-50. Retrieved from http://cider.athabascau.ca/CIDERSessions/tanderson/cider%203%20generations%20of%20DE.pdf

Anderson, T., Rourke, L., Garrison, D. R., & Archer, W. (2001). Assessing teacher presence in a computer conferencing context. *Journal of Asynchronous Learning Networks, 5*(2), 1-17.

Applebee, A. N. (1984). Writing and reasoning. *Review of Educational Research, 54*(4), 577-596.

Arabasz, P., & Baker, M. M. (2003). Evolving Campus Support Models for E-Learning Courses. Retrieved December 2, 2009, from http://net.educause.edu/ir/library/pdf/ERS0303/ekf0303.pdf

Arbaugh, J. (2001). How instructor immediacy behaviors affect student satisfaction and learning in web-based courses. *Business Communication Quarterly, 64*(4), 42-54.

Arbaugh, J. (2007). An empirical verification of the community of inquiry framework. *Journal of Asynchronous Learning Networks, 11*(1), 42-54.

Arbaugh, J., Cleveland-Innes, M., Diaz, S., Garrison, D. R., Ice, P., Richardson, J., et al. (2008). *Community of Inquiry Framework: Validation and instrument development*. Paper presented at the 13th annual Sloan-C International Conference on Online Learning, Orlando, FL.,

Arbaugh, J., Cleveland-Innes, M., Diaz, S., Garrison, D. R., Ice, P., Richardson, J., et al. (2008). Developing a community of inquiry instrument: Testing a measure of the Community of Inquiry framework using a multi-institutional sample. *Internet and Higher Education, 11*(3-4), 133-136.

Archer, W. (2010). Beyond online discussions: Extending the community of inquiry framework to entire courses. *The Internet and Higher Education, 13*(1-2), 69.

Archibald, D. (2010). Fostering the development of cognitive presence: Initial findings using the community of inquiry survey instrument. *The Internet and Higher Education, 13*(1-2), 73-74.

Astin, A. (1999). Student involvement: A developmental theory for higher education. *Journal of College Student Development, 49*(5), 518-529.

Australian Council for Educational Research (2009). AUSSE: Australiasian Survey of Student Engagement, Background. Retrieved August 16, 2010, from http://ausse.acer.edu.au/index.php?option=com_content&view=category&layout=blog&id=13&Itemid=8

Australian Council for Educational Research (2010). AUSSE: Australiasian Survey of Student Engagement, Survey Instruments. Retrieved August 16, 2010, from http://ausse.acer.edu.au/index.php?option=com_content&view=category&layout=blog&id=1&Itemid=5

Australian National Training Authority (2003). Blended Learning: Learning new skills in blending. *1*. Retrieved from http://www.schools.nsw.edu.au/media/downloads/schoolslearning/yrk12focusareas/learntech/blended/booklet_1.pdf

Banerjee, M., Capozzoli, M., McSweeney, L., & Sinha, D. (1999). Beyond kappa: A review of interrater agreement measures. *The Canadian Journal of Statistics, 27*(1), 3-23.

Bangert, A. (2008). The influence of social presence and teaching presence on the quality of online critical inquiry. *Journal of Computing in Higher Education, 20*(1), 34-61.

Bass, R., & Eynon, B. (2009). Capturing the Visible Evidence of Invisible Learning. Retrieved 11 March, 2009, from http://www.academiccommons.org/commons/essay/capturing-visible-evidence-invisible-learning#1

Bassey, M. (1999). *Case Study Research in Educational Settings*. Buckingham, UK: Open University Press.

Bazeley, P. (2004). Issues in mixing qualitative and quantitative approaches to research. In R. Buber, J. Badner & L. Richards (Eds.), *Applying qualitative methods to marketing management research* (pp. 141-156). Houndsmill, UK: Palgrave, Macmillian.

Beck, C., & Kosnik, C. M. (2006). *Innovations in teacher education: A social constructivist approach*. Albany, New York: State University of New York Press.

Bereiter, C. (1992). Referent-centred and problem-centred knowledge: Elements of an educational epistemology. *Interchange, 23*(4), 337-361.

Berg, B. (2001). *Qualitative Research Methods for the Social Sciences* (4th ed.). Boston, MA: Allyn & Bacon.

Berge, Z. L. (1995). Facilitating computer conferencing: Recommendations from the field. *Educational Technology & Society, 15*(1), 22-30.

Berge, Z. L., & Collins, M. P. (2000). Perceptions of E-Moderators about their roles and functions in moderating electronic mailing lists. *Distance Education, 21*(1), 81-100.

Bergman, M. (2008). Introduction: Whither Mixed Methods? In M. Bergman (Ed.), *Advances in Mixed Methods Research* (pp. 1-7). Thousand Oaks, CA: SAGE.

Biglan, A. (1973). The characteristics of subject matter in different academic areas. *Journal of Applied Psychology, 57*(3), 195-203.

Biocca, F., Harms, C., & Burgoon, J. K. (2003). Toward a more robust theory and measure of social presence: Review and suggested criteria. *Presence: Teleoperators & Virtual Environments, 12*(5), 456-480.

Bloom, B. S., Engelhart, M. D., Frust, E. J., Hill, N. H., & Krathwohl, D. R. (1956). *Taxonomy of educational objectives: The classification of educational goals. Cognitive domain*: Longman.

Blurton, C. (1999). New Directions of ICT-Use in Education. *UNESCO's World Communication and Information Report 1999*. Retrieved from http://www.unesco.org/education/educprog/lwf/dl/edict.pdf

Bonk, C., Angeli, C., Malikowski, S., & Supplee, L. (2001). Holy COW: Scaffolding case based conferencing on the web with preservice teachers. *Education at a Distance, 15*(8), 21-47.

Bonk, C., & Dennen, V. (2003). Frameworks for research, design, benchmarks, training, and pedagogy in web-based distance education. In M. Moor & W. Anderson (Eds.), *Handbook of Distance Education* (pp. 331-348). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Bonk, C., Hara, N., Dennen, V., Malikowski, S., & Supplee, L. (2000). We're in TITLE to dream: Envisioning a community of practice, the Intraplanetary teacher learning exchange. *CyberPsychology and Behavior, 3*(1), 25-39.

Boud, D., & Prosser, M. (2002). Appraising New Technologies for Learning: A Framework for Development. *Educational Media International, 39*(3), 237-245.

Bowen, S. (2005). Engaged learning: Are we all on the same page. *Peer Review, 7*(2), 4-7.

Bransford, J. D., Brown, A. L., & Cocking, R. R. (2000). *How People Learn: Brain, Mind, Experience and School* (Expanded ed.). Washington, DC: National Academies Press.

Brookfield, S. (1987). *Developing Critical Thinkers*. San Francisco: Jossey-Bass.

Brown, R. E. (2001). The process of community-building in distance learning classes. *Journal of Asynchronous Learning Networks, 5*(2), 18-35.
Bruning, R., Schraw, G., Norby, M., & Ronning, R. (2004). *Cognitive Psychology and Instruction*. Upper Saddle River, NJ: Pearson Education.
Bryman, A. (2008). Why do Researchers Integrate/Combine/Mesh/Blend/Mix/Merge/Fuse Quantitative and Qualitative Research? In M. Bergman (Ed.), *Advanced in Mixed Methods Research* (pp. 87-100). Thousand Oaks, CA: SAGE.
Bullen, M. (1998). Participation and critical thinking in online university distance education. *Journal of Distance Education, 13*(2), 1-32.
Burns, R. (2000). *Introduction to Research* (4th ed.). Frenchs Forest, NSW: Pearson Education Australia.
Chafe, W., & Danielewicz, J. (1987). Properties of spoken and written language. In R. Horowitz & S. Samuels (Eds.), *Comprehending oral and written language* (pp. 83-113). San Diego: Academic Press.
Chickering, A. W., & Gamson, Z. F. (1987). Seven principles for good practice in undergraduate education. *AAHE bulletin, 39*(7), 3-7.
Choi, I., Land, S. M., & Turgeon, A. J. (2005). Scaffolding peer-questioning strategies to facilitate metacognition during online small group discussion. *Instructional Science, 33*(5), 483-511.
Clark, D. (2002). Psychological myths in e-learning. *Medical Teacher, 24*(6), 598-604.
Clark, D. (2003). Blended Learning (White Paper). Retrieved December 17, 2010, from http://www.oktopusz.hu/domain9/files/modules/module15/261489EC2324A25.pdf
Clifford, P., Friesen, S., & Lock, J. (2004). Coming to teaching in the 21st century: A research study conducted by the Galileo Educational Network. Report for Alberta Learning. Retrieved December 2, 2009, from http://www.galileo.org/research/publications/ctt.pdf
Cohen, J. (1960). Coefficient of agreement for nominal scales. *Educational and Psychological Measurement, 20*, 37-46.
Creswell, J. W. (2009). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Los Angeles: SAGE.
Creswell, J. W., Plano Clark, V. L., & Garrett, A. L. (2008). Methodological issues in conducting mixed methods research designs. In M. Bergman (Ed.), *Advances in Mixed Methods Research* (pp. 66-83). Thousand Oaks, CA: SAGE.
Cross, J. (2006). Forward. In C. Bonk & C. Graham (Eds.), *The Handbook Of Blended Learning: Global Perspectives, Local Designs* (pp. xvii–xxiii). San Francisco: Pfeiffer.
Cross, K. P. (1998). Why learning communities? Why now. *About campus, 3*(3), 4-11.
De Vries, Y. E. (1996). The Interactivity Component of Distance Learning Implemented in an Art Studio Course. *Education, 117*(2), 180-184.
Denzin, N. K., Lincoln, Y. S., & Giardina, M. D. (2006). Disciplining qualitative research. *International Journal of Qualitative Studies in Education, 19*(6), 769-782.
Dewey, J. (1933). *How we think* (rev. ed.). Boston: D.C. Heath.
Díaz, S. R., Swan, K., Ice, P., & Kupczynski, L. (2010). Student ratings of the importance of survey items, multiplicative factor analysis, and the validity of

the community of inquiry survey. *The Internet and Higher Education, 13*(1-2), 22-30.
Dickens, C. (2003). *A Tale of 2 cities*. London: Penguin Books Ltd.
Downes, S. (2005). E-Learning 2.0. *eLearn Magazine*. Retrieved December 22, 2010, from http://www.elearnmag.org/subpage.cfm?section=articles&article=29-1
Downes, S. (2006). Learning Networks and Connective Knowledge. Retrieved October 2, 2006, from http://it.coe.uga.edu/itforum/paper92/paper92.html
Driscoll, M. (1994). *Psychology of learning for instruction*. Boston: Allyn and Bacon.
Duffy, T. M., & Cunningham, D. J. (1996). Constructivism: Implications for the design and delivery of instruction. In D. H. Jonassen (Ed.), *Handbook of research for educational communications and technology* (pp. 170-198). New York: Simon Schuster Macmillan.
Duncan, H. E., & Barnett, J. (2010). Experiencing online pedagogy: a Canadian case study. *Teaching Education, 21*(3), 247-262.
Dziuban, C., & Moskal, P. (2001). Emerging Research Issues in Distributed Learning. Retrieved July 12, 2006, from http://pegasus.cc.ucf.edu/~rite/Presentations/Sloanwkshp.ppt
Education Queensland (2005). *Professional Standards for Teachers*. Brisbane: Department of Education.
Ennis, R. (1987). A taxonomy of critical thinking dispositions and abilities. In J. Baron & R. Sternberg (Eds.), *Teaching Thinking Skills: Theory and Practice*. New York: Freeman.
Ennis, R. (1996). *Critical Thinking*. Upper Saddle River, NJ: Prentice-Hall.
Ertmer, P. A. (2003). Transforming Teacher Education: Visions and Strategies. *Educational Technology Research and Development, 51*(1), 124-128.
Eugenio, B. D., & Glass, M. (2004). The kappa statistic: A second look. *Computational linguistics, 30*(1), 95-101.
Facione, P. A. (1990). *Critical Thinking: A Statement of Expert Consensus for Purposes of Educational Assessment and Instruction, Executive Summary. Research Findings and Recommendations*. Millbrae, CA: California Academic.
Facione, P. A. (2010). *Critical thinking: What it is and why it counts*. Millbrae, CA: Insight Assessment/California Academic Press LLC.
Facione, P. A., & Facione, N. C. (2007). Talking critical thinking. *Change: The Magazine of Higher Learning, 39*(2), 38-45.
Fahy, P. J. (2002). Assessing critical thinking processes in a computer conference. Retrieved 22 June, 2010, from http://auspace.athabascau.ca:8080/dspace/bitstream/2149/1220/1/mag4.pdf
Feenberg, A. (1987). Computer conferencing and the humanities. *Instructional Science, 16*(2), 169 -186.
Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). Thousand Oaks, CA: SAGE.
Field, R. M. (2005). *Favourable conditions for effective and efficient learning in a blended face-to-face/online method.* Paper presented at the Ascilite: Balance, Fidelity, Mobility: Maintaining the Momentum, Proceedings of 22nd Annual ASCILITE Conference, Brisbane: QUT.
Finley, L., & Hartman, D. (2004). Institutional Change and Resistance: Teacher preparatory faculty and technology integration. *Journal of Technology and Teacher Education, 12*(3), 319-337.

Fogarty, R., & McTighe, J. (1993). Educating teachers for higher order thinking: The three-story intellect. *Theory into Practice, 32*(3), 161-169.
Fowler, C., & Mayes, T. (1999). Learning relationships: from theory to design. *Association for Learning Technology Journal, 7*(3), 6-16.
Frand, F. L. (2000). The Information-Age Mindset. *Educause Review, September/October*, 14-24.
Fulwiler, T. (1987). *Teaching with writing*. Portsmouth, NH: Heinemann.
Gall, M., Borg, W., & Gall, J. (1996). *Educational research: an introduction* (6th ed.). White Plains, NY: Longman.
Garnham, C., & Kaleta, R. (2002). Introduction to Hybrid Courses. *Teaching with Technology Today, 8*(6).
Garrison, D. R. (2003). Cognitive presence for effective asynchronous online learning: The role of reflective inquiry, self-direction and metacognition. In J. Bourne & J. C. Moore (Eds.), *Elements of Quality Online Education: Practice and Direction* (Vol. 4, pp. 47–58). Needham, MA: The Sloan Consortium.
Garrison, D. R. (2005). Learning Collaboration Principles, *Paper presented for the Sloan-C Summer Workshop*. Victoria, BC, Canada.
Garrison, D. R. (2006). Online community of inquiry review: social, cognitive, and teaching presence issues. *Sloan Summer Workshop*
Garrison, D. R., & Anderson, T. (2000). Transforming and enhancing university teaching: stronger and weaker technological influences. In T. Evans & D. Nation (Eds.), *Changing university teaching: reflections on creating educational technologies* (pp. 24-33). London: Kogan Page.
Garrison, D. R., & Anderson, T. (2003). *E-learning in the 21st century: a framework for research and practice*. New York: Routledge Falmer.
Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: computer conferencing in higher education. *Internet and Higher Education, 2*(2-3), 87-105.
Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education, 15*(1), 7-23.
Garrison, D. R., Anderson, T., & Archer, W. (2010). The first decade of the community of inquiry framework: A retrospective. *The Internet and Higher Education, 13*(1-2), 5-9.
Garrison, D. R., & Arbaugh, J. (2007). Researching the community of inquiry framework: Review, issues, and future directions. *Internet and Higher Education, 10*(3), 157-172.
Garrison, D. R., & Archer, W. (2000). *A Transactional Perspective on Teaching and Learning*. Kidlington, Oxford: Elsevier Science Ltd.
Garrison, D. R., & Cleveland-Innes, M. (2005). Facilitating cognitive presence in online learning: Interaction is not enough. *American Journal of Distance Education, 19*(3), 133-148.
Garrison, D. R., Cleveland-Innes, M., & Fung, T. (2004). Student role adjustment in online communities of inquiry: model and instruction validation. *Journal of Asynchronous Learning Networks, 8*(2), 61-74.
Garrison, D. R., Cleveland-Innes, M., & Fung, T. S. (2010). Exploring causal relationships among teaching, cognitive and social presence: Student perceptions of the community of inquiry framework. *The Internet and Higher Education, 13*(1-2), 31-36.

Garrison, D. R., Cleveland-Innes, M., Koole, M., & Kappelman, J. (2006). Revisiting methodological issues in transcript analysis: Negotiated coding and reliability. *The Internet and Higher Education, 9*(1), 1-8.

Garrison, D. R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. *The Internet and Higher Education, 7*(2), 95-105.

Garrison, D. R., & Vaughan, N. (2008). *Blended learning in higher education: Framework, principles, and guidelines*. San Francisco: Jossey-Bass.

Gaspar, M., & Santos, M. (2009). Learning Communities: way to a new Teaching Model? *Research, Reflections and Innovations in Integrating ICT in Education, 2*, 782-787.

Gerbic, P., & Stacey, E. (2005). A purposive approach to content analysis: designing analytical frameworks. *Internet and higher education, 8*(1), 45-59.

Goodyear, P., Salmon, G., Spector, J., Steeples, C., & Tickner, S. (2001). Competencies for online teaching: A special report. *Educational Technology Research and Development, 49*(1), 65-72.

Gorsky, P., Caspi, A., Antonovsky, A., Blau, I., & Mansur, A. (2010). The Relationship between Academic Discipline and Dialogic Behavior in Open University Course Forums *International Review of Research in Open and Distance Learning 11*(2), 49-72.

Graham, C. R. (2005). Blended learning systems: Definition, current trends, and future directions. In C. J. Bonk & C. Graham (Eds.), *The handbook of blended learning: Global perspectives, local designs* (pp. 3-21). San Francisco, CA: Pfeiffer.

Graham, C. R., Allen, S., & Ure, D. (2003). Blended learning environments: A review of the research literature. *Unpublished manuscript, Provo, UT*.

Greene, J., Caracelli, V., & Graham, W. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis, 11*(3), 255-274.

Greene, M. (1988). Qualitative research and the uses of literature. In R. R. Sherman & R. B. Webb (Eds.), *Qualitative research in education: Focus and methods* (pp. 175-189). East Sussex, UK: Falmer Press.

Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 105-117). Thousand Oaks, CA: SAGE.

Guldberg, K., & Pilkington, R. (2007). Tutor roles in facilitating reflection on practice through online discussion. *Journal of Educational Technology and Society, 10*(1), 61-72.

Gunawardena, C. N. (1995). Social presence theory and implications for interaction and collaborative learning in computer conferences. *International Journal of Educational Telecommunications, 1*(2/3), 147-166.

Gunawardena, C. N., Lowe, C. A., & Anderson, T. (1997). Analysis of a global online debate and the development of an interaction analysis model for examining social construction of knowledge in computer conferencing. *Journal of Educational Computing Research, 17*(4), 397-431.

Guthrie, K. L., & McCracken, H. (2010). Reflective Pedagogy: Making Meaning in Experiential Based Online Courses. *Journal of Educators Online, 7*(2), 1-21.

Halpern, D. (2003). *Thought and Knowledge* (4th ed.). Mahwah, NJ: Erlbaum.

Hancock, D., & Algozzine, B. (2006). *Doing Case Study Research: A Practical Guide for Beginning Researchers*. New York, NY: Teachers College Press.
Hara, N., Bonk, C. J., & Angeli, C. (2000). Content analysis of online discussion in an applied educational psychology course. *Instructional Science, 28*(2), 115-152.
Harasim, L., Hiltz, S. R., Teles, L., & Turoff, M. (1995). Designs for learning networks. *Learning networks: A field guide to teaching and learning online* (pp. 125-144). Cambridge, Massachusetts: The MIT Press.
Hauswirth, M., Euzenat, J., Friel, O., Griffin, K., Hession, P., Jennings, B., et al. (2010). Towards Consolidated Presence. Retrieved November 11, 2010, from http://axel.deri.ie/~axepol/publications/hausw-etal-2010CollaborateCom.pdf
Haythornthwaite, C. (2006). Facilitating collaboration in online learning. *Journal of Asynchronous Learning Networks, 10*(1), 7-24.
Heckman, R., & Annabi, H. (2005). A content analytic comparison of learning processes in online and face-to-face case study discussions. *Journal of Computer Mediated Communication, 10*(2). Retrieved from http://jcmc.indiana.edu/vol10/issue2/heckman.html
Hellsten, L., McIntyre, L., & Prytula, M. (2011). Exploring the Characteristics of Pedagogical Lurkers *Proceedings of Society for Information Technology & Teacher Education International Conference 2011* (pp. 340-343). Chesapeake, VA: AACE.
Henri, F. (1992). Computer conferencing and content analysis. In A. R. Kaye (Ed.), *Collaborative Learning Through Computer Conferencing: The Najaden Papers* (pp. 117-136). Berlin: SpringerVerlag.
Herriott, R. E., & Firestone, W. A. (1983). Multisite qualitative policy research: Optimizing description and generalizability. *Educational Researcher, 12*(2), 14-19.
Hillman, D. C., Willis, D. J., & Gunawardena, C. N. (1994). Learner-interface interaction in distance education: An extension of contemporary models and strategies for practioners. *The American Journal of Distance Education, 8*(2), 30-42.
Hoang, T., Mat, A. C., Toran, H., Chiu, L. K., & Yusri, G. (2010). Instructional development needs for web-based education in higher education. *ASEAN Journal of Teaching & Learning in Higher Education, 2*(2), 1-8.
Holsti, O. (1969). *Content analysis for the social sciences and humanities*. Reading, MA: Addison-Wesley.
Hoskins, S., & Van Hooff, J. (2005). Motivation and ability: which students use online learning and what influence does it have on their achievement? *British Journal of Educational Technology, 36*(2), 177-192.
Ice, P., Akyol, Z., & Garrison, D. R. (2009). *The relationship between instructor socio-epistemological orientations and student satisfaction with indicators of the Community of Inquiry framework*. Paper presented at the 7th Annual Hawaii International Conference on Education.
International Commission on Education for the Twenty-first Century (1996). *Learning: the treasure within*. Paris, France: UNESCO.
Jackson, J. B. (1984). *Discovering the vernacular landscape*. New Haven, CT: Yale University Press.
Jay, J. K., & Johnson, K. L. (2002). Capturing complexity: A typology of reflective practice for teacher education. *Teaching and Teacher Education, 18*(1), 73-85.

Johnson, B., & Christensen, L. (2008). *Educational research: quantitative, qualitative and mixed approaches*. Thousand Oaks, CA: SAGE.
Johnson, B., & Turner, L. (2003). Data collection strategies in mixed methods research. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of Mixed Methods in Social and Behavioral Research* (pp. 297-319). Thousand Oaks, CA: SAGE.
Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher, 33*(7), 14-26.
Jonassen, D. (1997). Instructional design models for well-structured and Ill-structured problem-solving learning outcomes. *Educational Technology Research and Development, 45*(1), 65-94.
Jonassen, D., Davidson, M., Collins, M., Campbell, J., & Haag, B. B. (1995). Constructivism and computer-mediated communication in distance education. *American Journal of Distance Education, 9*(2), 7-26.
Jonassen, D., Howland, J., Marra, R. M., & Crismond, D. (2008). *Meaningful learning with technology* (3rd ed.). Upper Saddle River: Prentice Hall, Inc.
Jonassen, D., Peck, K. L., & Wilson, B. (1999). *Learning with technology: A constructivist perspective*: Upper Saddle River: Prentice Hall, Inc.
Jones, P., Naugle, K., & Kolloff, M. A. (2008). Teacher Presence: Using Introductory Videos in Online and Hybrid Courses. *Learning Solutions Magazine*. Retrieved from https://www.learningsolutionsmag.com/articles/107/teacher-presence-using-introductory-videos-in-online-and-hybrid-courses/print
Kanuka, H., & Anderson, T. (1998). Social interchange, discord and knowledge construction. *Journal of Distance Education, 13*(1), 57-74.
Kanuka, H., & Garrison, D. R. (2004). Cognitive presence in online learning. *Journal of Computing in Higher Education, 15*(2), 30-49.
Kanuka, H., Rourke, L., & Laflamme, E. (2007). The influence of instructional methods on the quality of online discussion. *British Journal of Educational Technology, 38*(2), 260-271.
Kemmis, S., & McTaggart, R. (2005). Participatory action research: communicative action and the public sphere. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE Handbook of Qualitative Research* (pp. 559-603). Thousand Oaks, CA: SAGE.
Kim, J. (in press). Developing an instrument to measure social presence in distance higher education. *British Journal of Educational Technology*. Retrieved December 22, 2010, from http://onlinelibrary.wiley.com/doi/10.1111/j.1467-8535.2010.01107.x/full
Koehler, M. J., & Mishra, P. (2008). Introducing TPCK. In AACTE Committee on Innovation and Technology (Ed.), *Handbook of Technological Pedagogical Content Knowledge (TPCK) for Educators* (pp. 1-29). New York, NY: Routledge.
Koehler, M. J., & Mishra, P. (2010). TPCK - Technological Pedagogical Content Knowledge. Retrieved April 1, 2011, from http://tpack.org/
Krippendorff, K. (1980). *Content analysis: An introduction to its methodology*. Beverly Hills, CA: SAGE.
Kuh, G. D., Schuh, J. H., & Whitt, E. J. (1991). *Involving colleges: Successful approaches to fostering student learning and development outside the classroom*. San Francisco: Jossey-Bass.
Lankshear, C., Snyder, I., & Green, B. (2000). *Teachers and Technoliteracy.* Sydney, Australia: Allen and Unwin.
Larreamendy-Joerns, J., & Leinhardt, G. (2006). Going the distance with online education. *Review of Educational Research, 76*(4), 567-605.

Laurillard, D. (2000). The Impact of Communications and Information Technology on Higher Education. In P. Scott (Ed.), *Higher education reformed* (pp. 133-153). London: Falmer Press.
Laurillard, D. (2002). Rethinking teaching for the knowledge society. *Educause Review, 37*(1), 16-25.
Lave, J., & Wenger, E. (1991). *Situated Learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press.
Lawson, M. J., Askell-Williams, H., & Murray-Harvey, R. (2006). The Attributes of the Lifelong Learner. Retrieved November 11, 2010, from http://www.qsa.qld.edu.au/downloads/publications/research_qsa_lifelong_learner.pdf
Lewis, A., & Smith, D. (1993). Defining for higher order thinking. *Theory into Practice, 32*(3), 131-137.
Lincoln, Y. S. (1991). *The detached observer and the passionate participant: Discourses in inquiry and science.* Paper presented at the Annual meeting of the American Educational Research Association, Chicago.
Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Newbury Park: SAGE Publications.
Lipman, M. (1991). *Thinking in education*. Cambridge: Cambridge University Press.
Lipman, M. (2003). *Thinking in education* (2nd ed.). Cambridge: Cambridge University Press.
Lorenzo, G., Oblinger, D., & Dziuban, C. (2007). How Choice, Co-Creation, and Culture Are Changing What It Means to Be Net Savvy: Technology and the way information is created, used, and disseminated have changed, as has the definition of "net savvy". *Educause Quartley, 30*(1), 6-12.
Loughran, J. (2007). Researching teacher education practices. *Journal of Teacher Education, 58*(1), 12.
Luebeck, J. L., & Bice, L. R. (2005). Online Discussion as a Mechanism of Conceptual Change among Mathematics and Science Teachers. *Journal of Distance Education, 20*(2), 21-39.
Mackenzie, N., & Knipe, S. (2006). Research dilemmas: Paradigms, methods and methodology. *Issues in Educational Research, 16* (2), 193-205. Retrieved from http://www.iier.org.au/iier16/mackenzie.html
Mantyla, K. (2001). *Blending E-learning: the power is in the mix*. Alexandria, VA: American Society for Training & Development.
Masie, E. (2002). Blended learning: The magic is in the mix *The ASTD e-learning handbook* (pp. 58-63). New York: McGraw-Hill.
Mason, M. (2008). Critical thinking and learning. In M. Mason (Ed.), *Critical Thinking and Learning*. Carlton, Australia: Blackwell Publishing Ltd.
Mayes, T., & de Freitas, S. (2004). Review of e-Learning theories, frameworks and models: JISC e-Learning models desk study stage 2. Retrieved from http://www.jisc.ac.uk/uploaded_documents/Stage%202%20Learning%20Models%20(Version%201).pdf
Mayes, T., & Fowler, C. J. (1999). Learning technology and usability: a framework for understanding courseware. *Interacting with Computers, 11*(5), 485-497.
McKlin, T., Harmon, S. W., Evans, W., & Jones, M. G. (2002). Cognitive presence in web based learning: A content analysis of students' online discussions. *IT Forum, 60*.

McLoughlin, C., & Luca, J. (2000). Cognitive engagement and higher order thinking through computer conferencing: We know why but do we know how? *Teaching and Learning Forum 2000*. Retrieved December 2, 2009, from http://lsn.curtin.edu.au/tlf/tlf2000/mcloughlin.html

McPeck, J. (1981). *Critical Thinking and Education*. Oxford: Martin Robertson.

Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2009). *Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies*. Washington, DC: US Department of Education, Office of Planning, Evaluation and Policy Development.

Mehan, H. (1998). Microcomputers in Classrooms: Educational technology or social practice? *Anthropology & Education Quarterly, 20*(1), 4-22.

Meloncon, L. (2007). Exploring Electronic Landscapes: Technological Communication, Online Learning, and Instructor Preparedness. *Technical Communication Quarterly, 16*(1), 31-53.

Meyer, K. A. (2003). Face-to-face versus threaded discussions: The role of time and higher-order thinking. *Journal of Asynchronous Learning Networks, 7*(3), 55-65.

Meyer, K. A. (2004). Evaluating online discussions: Four different frames of analysis. *Journal of Asynchronous Learning Networks, 8*(2), 101-114.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: an expanded source book* (2nd ed.). Thousand Oaks: SAGE publication.

Miller, G. (2010). Collaboration versus competition: Trends in online learning for workforce development *Third International Conference on Higher Education*. Retrieved November 13, 2011, from http://www.sloanconsortium.org/node/2350

Misanchuk, M., & Anderson, T. (2001). Building community in an online learning environment: Communication, cooperation and collaboration. *Middle Tennessee State University Teaching Learning and Technology Conference*. Retrieved July 1, 2011, from http://frank.mtsu.edu/~itconf/proceed01/19.html

Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge. *Teachers College Record, 108*, 1017-1054.

Mishra, P., & Koehler, M. J. (2007). Technological pedagogical content knowledge (TPCK): Confronting the wicked problems of teaching with technology. *Technology And Teacher Education Annual, 18*(4).

Moore, M. G. (1989). Editorial: Three types of interaction. *The American Journal of Distance Education, 3*(2), 1-6.

Morris, L. V., Xu, H., & Finnegan, C. L. (2005). Roles of faculty in teaching asynchronous undergraduate courses. *Journal of Asynchronous Learning Networks, 9*(1), 65-82.

Nagel, L., & Kotzé, T. G. (2010). Supersizing e-learning: What a CoI survey reveals about teaching presence in a large online class. *The Internet and Higher Education, 13*(1-2), 45-51.

National Association of State Boards of Education Study Group (2001). Any time, any place, any path, any pace: Taking the lead on e-learning policy. Retrieved December 22, 2010, from http://www.ecls.ncl.ac.uk/webprimary/elearning/Reports%5ENASBE%20Study%20Group%20on%20e-

Learning%5E%202001_'The%20future%20of%20Education'%20report%20.pdf
National Survey of Student Engagement (2007). *Experiences that matter: Enhancing student learning and Success. Annual Report 2007*. Bloomington, IN: Centre for Postsecondary Research.
National Survey of Student Engagement (n.d.). Benchmarks of Effective Educational Practice. Retrieved August 16, 2010, from http://www.nsse.iub.edu/pdf/nsse_benchmarks.pdf
Newman, D. R., Johnson, C., Cochrane, C., & Webb, B. (1996). An Experiment in Group Learning Technology: Evaluating Critical Thinking in Face-to-Face and Computer-Supported Seminars. *Interpersonal Computing and Technology, 4*(1), 57-74.
Newmann, F., Marks, H., & Gamoran, A. (1996). Authentic Pedagogy and Student Performance. *American Journal of Education, 104*(4), 280-312.
Newmann, F., & Wehlage, G. G. (1993). Five standards of authentic instruction. *Educational Leadership, 50*(7), 8-12.
Ng, K. C., & Murphy, D. (2005). Evaluating interactivity and learning in computer conferencing using content analysis techniques. *Distance Education, 26*(1), 89-109.
Nisbet, J., & Watt, J. (1984). Case study. In J. Bell, T. Bush, A. Fox, J. Goodey & S. Goulding (Eds.), *Conducting Small-Scale Investigations in Educational Management* (pp. 72-92). London: Harper & Row.
Nixon, J. (1996). Professional identity and the restructuring of higher education. *Studies in Higher Education, 21*(1), 5-16.
Norris, N., & Walker, R. (2005). Naturalistic Inquiry. In B. Somekh & C. Lewin (Eds.), *Research Methods in the Social Sciences* (pp. 131-137). London: SAGE.
Norris, S., & Ennis, R. (1989). Evaluating critical thinking. In R. Schwartz & D. Perkins (Eds.), *The practitioners' guide to teaching thinking series*. Pacific Grove, CA: Midwest Publications.
Oblinger, D. (2005). Learners, Learning, and Technology: The Educause Learning Initiative. *Educause Review, 40*(5), 66-75.
Oliver, R. (2001). Assuring the quality of online learning in Australian higher education. In M. Wallace, A. Ellis & D. Newton (Eds.), *Proceedings of Moving Online II Conference* (pp. 222-231). Lismore, Australia: Southern Cross University.
Oliver, R., & McLoughlin, C. (1999). Curriculum and learning-resources issues arising from the use of web-based course support systems. *International Journal of Educational Telecommunications, 5*(4), 419-436.
Osguthorpe, R., & Graham, C. R. (2003). Blended learning environments: Definition and directions. *The Quarterly Review of Distance Education, 4*(3), 227-233.
Pajo, K., & Wallace, C. (2001). Barriers to the uptake of web-based technology by university teachers. *The Journal of Distance Education, 16*(1), 70-84.
Palloff, R. M., & Pratt, K. (2003). *The virtual student: A profile and guide to working with online learners*. San Francisco, CA: Jossey-Bass Inc Pub.
Palmer, P. (1998). *The courage to teach*. San Francisco: Jossey-Bass.
Parks, S. (2010). Using a WebCT discussion forum during the TESL practicum: Reflection as social practice. *Contact, 36*(2), 84-98.
Pascarella, E., & Terenzini, P. (1991). *How college affects students: Findings and insights from twenty years of research*. San Francisco: Jossey-Bass.

Patton, M. (2002). *Qualitative Research & Evaluation Methods*. Thousand Oaks, CA: SAGE.
Paul, R. (1982). Teaching critical thinking in the 'strong sense': a focus on self-deception, world views, and a dialectical mode of analysis. *Informal Logic Newsletter, 4*(2).
Pawan, F., Paulus, T. M., Yalcin, S., & Chang, C. F. (2003). Online learning: Patterns of engagement and interaction among inservice teachers. *Language Learning and Technology, 7*(3), 119-140.
Peck, C., Cuban, L., & Kirkpatrick, H. (2002). Techno-promoter dreams, student realities. *Phi Delta Kappa, 83*(6), 472-480.
Pena-Shaff, J., Altman, W., & Stephenson, H. (2005). Asynchronous online discussions as a tool for learning: Students' attitudes, expectations, and perceptions. *Journal of Interactive Learning Research, 16*(4), 409-430.
Peng, H., Chou, C., & Chang, C. Y. (2008). From virtual environments to physical environments: Exploring interactivity in ubiquitous-learning systems. *Educational Technology & Society, 11*(2), 54-66.
Picciano, A. G. (2002). Beyond student perceptions: Issues of interaction, presence, and performance in an online course. *Journal of Asynchronous Learning Networks, 6*(1), 21-40.
Pierson, M. E. (2001). Technology Integration Practice as a Function of Pedagogical Expertise. *Journal of Research on Computing in Education, 33*(4), 413-430.
Pisutova-Gerber, K., & Malovicova, J. (2009). Critical and higher order thinking in online threaded discussion in the Slovak context. *International Review of Research in Open and Distance Learning, 10*(1), 1-15.
Postle, G., & Tyler, M. A. (2010). Learning and teaching strategies and practices in teacher education through open and distance learning. In P. Danaher & U. Abdurrahman (Eds.), *Perspectives on Distance Education: Teacher Education Through Open and Distance Learning* (pp. 61-74). Vancouver, Canada: Commonwealth of Learning.
Prendergast, G. (2004). Blended Collaborative Learning: Online Teaching Of Online Educators. *Global Educator*. Retrieved May 27, 2007, from http://www.globaled.com/articles/GerardPrendergast2004.pdf
Prensky, M. (2001). Digital natives, digital Immigrants. *On the Horizon, 9*(5), 1-2.
Prensky, M. (2005). Engage Me or Enrage Me: What Today's Learners Demand. *Educause Review, 40*(5), 60-64. Retrieved from http://www.educause.edu/ir/library/pdf/erm0553.pdf
PRT 3201 Educating for Diversity (2007). Introductory Book. Toowoomba, Australia: University of Southern Queensland.
Queensland College of Teachers (2009). *ProfessionalSstandards for Queensland Teachers (Graduate Level): A guidel for use with preservice teachers*. Brisbane: Queensland College of Teachers.
Ramsden, R. (1988). Context and strategy: situational influences on learning. In R. R. Schmeck (Ed.), *Learning strategies and learning styles* (pp. 159-184). New York: Plenum.
Redmond, P. (2010). Investigating the Use of Online Discussions in an Undergraduate Face-to-face Course. In C. Maddux, D. Gibson & B. Dodge (Eds.), *Research Highlights in Technology and Teaching Education 2010* (pp. 27-34). Chesapeake, VA: AACE.

Redmond, P., & Lock, J. V. (2006). A flexible framework for online collaborative learning. *Internet & Higher Education, 9*(4), 267-276.
Redmond, P., & Mander, A. (2006). *Online mentoring of pre-service teachers: exploring cognitive presence.* Paper presented at the Society for Information Technology & Teacher Education 17th International Conference Annual, Orlando, Florida.
Reis, R. (2009, March 3). Imminent changes in higher education and its delivery [Msg 927]. Message posted to http://tomprofblog.mit.edu/?m=200903.
Resnick, L. B. (1991). Shared cognition: Thinking as social practice. In L. B. Resnick, J. M. Levine & S. D. Teasley (Eds.), *Perspectives on socially shared cognition* (pp. 1-20). Washington, DC: American Psychological Association.
Richardson, J., & Ice, P. (2010). Investigating students' level of critical thinking across instructional strategies in online discussions. *The Internet and Higher Education, 13*(1-2), 52-59.
Richardson, J., & Swan, K. (2003). Examining social presence in online courses in relation to students' perceived learning and satisfaction. *Journal of Asynchronous Learning Networks, 7*(1), 68-88.
Richardson, V. (1994). Conducting research on practice. *Educational Researcher, 23*(5), 5-10.
Riel, M. (1996). The Internet: A land to settle rather than an ocean to surf and a new "place" for school reform through community development. Retrieved October 17, 2005, from http://www.globalschoolnet.org/gsh/teach/articles/netasplace.html
Riffe, D., Lacy, S., & Fico, F. (1998). *Analyzing Media Messages: Using Quantitative Content Analysis in Research*. Mahwah, NJ: Lawrence Erlbaum Associates.
Rihoux, B. (2006). Qualitative comparative analysis (QCA) and related systematic comparative methods: Recent advances and remaining challenges for social science research. *International Sociology, 21*(5), 679.
Rittel, H. W. J., & Webber, M. M. (1973). Dilemmas in a general theory of planning. *Policy sciences, 4*(2), 155-169.
Rodgers, C. (2002). Defining reflection: Another look at John Dewey and reflective thinking. *The Teachers College Record, 104*(4), 842-866.
Rodríguez, J. I., Plax, T. G., & Kearney, P. (1996). Clarifying the relationship between teacher nonverbal immediacy and student cognitive learning: Affective learning as the central causal mediator. *Communication education, 45*(4), 293-305.
Romney, P. (2003). The art of dialogue. Retrieved November 15, 2010, from http://romneyassociates.com/pdf/Consulting_Diversity.pdf
Rourke, L., & Anderson, T. (2002). Using peer teams to lead online discussions. *Journal of Interactive Media in Education, 2002*(1).
Rourke, L., & Anderson, T. (2004). Validity in quantitative content analysis. *Educational Technology Research and Development, 52*(1), 5-18.
Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (1999). Assessing social presence in asynchronous text-based computer conferencing. *Journal of Distance Education, 14*(2), 50-71.
Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (2001). Methodological issues in the content analysis of computer conference transcripts. *International Journal of Artificial Intelligence in Education, 12*(1), 8-22.

Rourke, L., & Kanuka, H. (2009). Learning in Communities of Inquiry: A Review of the Literature. *Journal of Distance Education, 23*(1), 30.
Russell, T. L. (1999). *The no significant difference phenomenon*. Raleigh, NC: North Carolina State University
Salmon, G. (2003). *e moderating: The key to teaching and learning online* (2nd ed.). London: RoutledgeFalmer.
Schallert, D. L., & Reed, J. H. (2003). D-Team, T. Intellectual, motivational, textual, and cultural considerations in teaching and learning with computer-mediated discussion. *Journal of Research on Technology in Education, 36*(2), 103-118.
Schrage, M. (1989). *No more teams! Mastering the dynamics of creative collaboration*. New York: Currency Doubleday.
Schrire, S. (2004). Interaction and Cognition in Asynchronous Computer Conferencing. *Instructional Science: An International Journal of Learning and Cognition, 32*(6), 475-502.
Scott, W. (1955). Reliability of content analysis: The case of nominal scale coding. *Public Opinion Quarterly, 19*, 321-325.
Sengupta, S. (2001). Exchanging ideas with peers in network-based classrooms: An aid or a pain? *Language Learning & Technology, 5*(1), 103-134.
Shea, P., & Bidjerano, T. (2008). Measures of quality in online education: An investigation of the community of inquiry model and the net generation. *Journal of Educational Computing Research, 39*(4), 339-361.
Shea, P., & Bidjerano, T. (2009). Community of inquiry as a theoretical framework to foster 'epistemic engagement' and 'cognitive presence' in online education. *Computers & Education, 52*(3), 543-553.
Shea, P., & Bidjerano, T. (2010). Learning presence: Towards a theory of self-efficacy, self-regulation, and the development of a community of inquiry in online and blended learning environments. *Computers & Education, 55*(4), 1725-1731.
Shea, P., Fredericksen, E., Pickett, A., Pelz, W., & Swan, K. (2001). Measures of learning effectiveness in the SUNY Learning Network. *Online education, 2*, 7-31.
Shea, P., Frederickson, E. E., Pickett, A. M., & Pelz, W. E. (2003). A follow-up investigation of Teaching Presence in the SUNY learning network. Preliminary. *Journal of Asynchronous Learning Networks, 7*(2), 61-80.
Shea, P., Hayes, S., & Vickers, J. (2010). Online instructional effort measured through the lens of teaching presence in the community of inquiry framework: A re-examination of measures and approach. *The International Review of Research in Open and Distance Learning, 11*(3), 127-154.
Shea, P., Hayes, S., Vickers, J., Gozza-Cohen, M., Uzuner, S., Mehta, R., et al. (2010). A re-examination of the community of inquiry framework: Social network and content analysis. *The Internet and Higher Education, 13*(1-2), 10-21.
Shea, P., Li, C., & Pickett, A. (2006). A study of teaching presence and student sense of learning community in fully online and web-enhanced college courses. *The Internet and Higher Education, 9*(3), 175-190.
Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher, 15*(2), 4-14.
Siemens, G. (2005a). Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology and Distance Learning, 2*(1).
Siemens, G. (2005b). Connectivism: learning as network creation. *Learning Circuits*. Retrieved from http://www.astd.org/LC/2005/1105_seimens.htm

Simon, H. A. (1996). Designing organizations for an information-rich world. *International Library Of Critical Writings In Economics, 70*, 187-202. Retrieved from http://zeus.zeit.de/2007/39/simon.pdf

Sinclair, J. M. H., & Coulthard, M. (1992). Towards an analysis of discourse *Advances in Spoken Discourse Analysis* (pp. 1-34). London: Oxford University Press

Singh, H. (2003). Building effective blended learning programs. *Educational Technology, 43*(6), 51-54.

Sitzmann, T., Kraiger, K., Stewart, D., & Wisher, R. (2006). The comparative effectiveness of web based and classroom instruction: a meta analysis. *Personnel Psychology, 59*(3), 623-664.

Soo, K. S., & Bonk, C. J. (1998). *Interaction: What Does It Mean in Online Distance Education?* Paper presented at the Ed-Media and EdTelecom 98 Conference, Freiburg, Germany.

Spector, J. M., & de la Teja, I. (2001). Competencies for online teaching. *Eric Digest EDO-IR-2001-09*. Retrieved October 7, 2010, from http://searcheric.org/scripts/seget2.asp?db=ericft&want=http://searcheric.org/ericdc/ED456841.htm

Stacey, E., & Gerbic, P. (2007). Teaching for blended learning––Research perspectives from on-campus and distance students. *Education and Information Technologies, 12*(3), 165 -174.

Stake, R. (1995). *The Art Of Case Study Research*. Thousand Oaks, CA: SAGE.

Stake, R. (2008). Qualitative case studies. In N. K. Denzin & Y. S. Lincoln (Eds.), *Strategies of Qualitative Inquiry* (pp. 119-149). London: SAGE.

Star, C., & Hammer, S. (2008). Teaching generic skills: eroding the higher purpose of universities, or an opportunity for renewal? *Oxford Review of Education, 34*(2), 237-251.

Stark, S., & Torrance, H. (2005). Case Study. In B. Somekh & C. Lewin (Eds.), *Research Methods in the Social Sciences* (pp. 33-40). Thousand Oaks, CA: SAGE.

Stein, D. S., Wanstreet, C. E., Glazer, H. R., Engle, C. L., Harris, R. A., Johnston, S. M., et al. (2007). Creating shared understanding through chats in a community of inquiry. *The Internet and Higher Education, 10*(2), 103-115.

Sternberg, R. (1985). Critical thinking: Its nature, measurement, and improvement. In F. Link (Ed.), *Essays on the Intellect*. Alexandria, VA: ASCE.

Stoney, S., & Oliver, R. (1999). Can higher order thinking and cognitive engagement be enhanced with multimedia. *Interactive Multimedia Electronic Journal of Computer-Enhanced Learning, 1*(2). Retrieved from http://imej.wfu.edu/articles/1999/2/07/printver.asp

Sutman, F. (2000). We Need a Better Understanding of Inquiry in Instruction, *Harvard Education Letter*.

Sutton, L. A. (2001). The principle of vicarious interaction in computer-mediated communications. *International Journal of Educational Telecommunications, 7*(3), 223-242.

Swan, K. (2005). A constructivist model for thinking about learning online. In J. Bourne & J. C. Moore (Eds.), *Elements of Quality Online Education: Engaging Communities*. Needham, MA: Sloan-C.

Swan, K., & Ice, P. (2010). The community of inquiry framework ten years later: Introduction to the special issue. *The Internet and Higher Education, 13*(1-2), 1-4.

Swan, K., & Shih, L. F. (2005). On the nature and development of social presence in online course discussions. *Journal of Asynchronous Learning Networks, 9*(3), 115-136.
Tallent-Runnels, M. K., Thomas, J. A., Lan, W. Y., Cooper, S., Ahern, T. C., Shaw, S. M., et al. (2006). Teaching courses online: A review of the research. *Review of Educational Research, 76*(1), 93-135.
Tashakkori, A., & Creswell, J. (2007). The new era of mixed methods. *Journal of Mixed Methods Research, 1*(2), 3-7.
Tashakkori, A., & Teddlie, C. (1998). *Mixed methodology: Combining qualitative and quantitative approaches*: Sage Publications, Inc.
Tashakkori, A., & Teddlie, C. (2008). Quality of Inferences in Mixed Methods Research: Calling for an Integrative Framework. In M. Bergman (Ed.), *Advances in Mixed Methods Research* (pp. 101-119). Thousand Oaks, CA: SAGE.
Tinto, V. (2003). Learning better together: The impact of learning communities on student success. *Higher Education monograph series, 1*, 1-8.
Toth, M., Amrein-Beardsley, A., & Foulger, T. (2010). Changing delivery methods, changing practices: Exploring instructional practices in face-to-face and hybrid courses. *Journal of Online Learning and Teaching, 6*(3), 617-633.
Trochim, W. (2006). Construct Validity. Retrieved 22 June, 2010, from http://www.socialresearchmethods.net/kb/constval.php
Twigg, C. A. (2003). Improving Learning and Reducing Costs: Lessons Learned from Round 1 of the Pew Grant Program in Course Redesign. Retrieved October 26, 2006, from http://www.thencat.org/PCR/Rd1Lessons.pdf
Twigg, C. A. (2004). Improving Learning and Reducing Costs: Lessons Learned from Round III of the Pew Grant Program in Course Redesign. Retrieved December 2, 2009, from http://www.thencat.org/PCR/RdIIILessons.pdf
Vandergrift, K. E. (2002). The anatomy of a distance education course: A case study analysis. *Journal of Asynchronous Learning Networks, 6*(1), 76-90.
Vaughan, N. D. (2004). Investigating how a blended learning approach can support an inquiry process within a faculty learning community. Unpublished doctoral dissertation, University of Calgary, Canada.
Vaughan, N. D. (2010). A blended community of inquiry approach: Linking student engagement and course redesign. *The Internet and Higher Education, 13*(1-2), 60-65.
Vaughan, N. D., & Garrison, D. R. (2005). Creating cognitive presence in a blended faculty development community. *The Internet and higher education, 8*(1), 1-12.
Warren, K. J., & Rada, R. (1998). Sustaining computer-mediated communication in university courses. *Journal of Computer Assisted Learning, 14*(1), 71-80.
WebCT (2004). WebCT Survey Discovers A Blend of Online Learning and Classroom-Based Teaching Is The Most Effective Form Of Learning Today. Retrieved October 26, 2006, from http://www.webct.com/service/ViewContent?contentID=19295938
Wellington, J. (2000). *Educational Research: Contemporary Issues and Practical Approaches*. London: UK: Continuum.
Weltzer-Ward, M. L. M. (2011). Content analysis coding schemes for online asynchronous discussion. *Campus-Wide Information Systems, 28*(1), 56-74.

Wenger, E. (1998). *Communities of Practice: Meaning and Identity*. Cambridge: Cambridge University Press.
White, E. M. (1993). Assessing higher-order thinking and communication skills in college graduates through writing. *The Journal of General Education, 42*, 105-122.
Wiersma, W. (2000). *Research Methods in Education: An Introduction* (7th edn ed.). Boston: Allyn & Bacon.
Wiersma, W., & Jurs, S. (2005). *Research Methods in Education: An introduction*. Boston, MA: Pearson Education.
Wilkinson, D., & Birmingham, P. (2003). *Using Research Instruments: A guide for researchers*. London, UK: Routledge Falmer.
Wolcott, H. F. (1995). *The Art of Fieldwork*. London: SAGE.
Yang, Y., & Cornelious, L. F. (2005). Preparing instructors for quality online instruction. *Online Journal of Distance Learning Administration, 8*(1), 1–16.
Yin, R. (2003). *Applications of Case Study Research*. Thousand Oaks, CA: Sage Publications.
Yin, R. (2009). *Case Study Research: Design and Methods*. Los Angeles: Sage.
Young, J. R. (2002, March 22). Hybrid teaching seeks to end the divide between traditional and online instruction. *Chronicle of Higher Education,* A33.
Zhao, Y., Lei, J., Yan, B., Lai, C., & Tan, H. S. (2005). What makes the difference? A practical analysis of research on the effectiveness of distance education. *Teachers College Record, 107*(8), 1836 -1884.

Appendices

Appendix A: Student and Instructor Survey

Your responses will be used to develop a profile on how pre-service teachers view and use online learning environments. Please compete all items; this should require about 15 minutes of your time. Usually it is better to respond with your first impression, without giving a question much thought. Your answers will remain confidential.

This survey is in four parts.

PART A

Course code: Sex: (please circle) Male/Female

Age: (please circle) 18 – 24 24 – 41 42 – 60

How many of your previous courses have used online discussion as a planned element?

……..

How would you rate your computing skills? (please circle)

Novice Intermediate Advanced

PART B

By placing an 'X' in the appropriate box rate **the effectiveness of the online environment** within this course with respect to the following activities. You are welcome to add comments in the "Comments" section below.

How effective was the course online environment for ...	**Very effective**	**Somewhat effective**	**Undecided**	**Ineffective**	**Very ineffective**
Identifying key issues?					
Stimulating your curiosity?					
Identifying relevant new information?					
Engaging in exchange of ideas?					
Synthesizing ideas?					
Resolving problems?					
Understanding concepts?					
Applying ideas or concepts?					
Clearly communicating expectations?					
Having well designed activities?					
Setting climate for learning?					
Summarizing discussion?					
Feeling comfortable engaging in discussion?					
Feeling comfortable with teaching methods?					
Understanding the organization of the class?					
Feeling satisfied with teacher interaction (questions, comments, facilitation)?					
Receiving teacher assistance in reaching consensus?					
Receiving teaching intervention?					
Assessing learning outcomes?					
Accepting teacher feedback?					

Comments:

……

……

……

PART C

By placing an 'X' in the appropriate response box rate **the effectiveness of the face to face environment** within this course with respect to the following activities. You are welcome to comment on any of these items in the "Comments" section below.

How effective was the course online environment for ...	**Very effective**	**Somewhat effective**	**Undecided**	**Ineffective**	**Very ineffective**
Identifying key issues?					
Stimulating your curiosity?					
Identifying relevant new information?					
Engaging in exchange of ideas?					
Synthesizing ideas?					
Resolving problems?					
Understanding concepts?					
Applying ideas or concepts?					
Clearly communicating expectations?					
Having well designed activities?					
Setting climate for learning?					
Summarizing discussion?					
Feeling comfortable engaging in discussion?					
Feeling comfortable with teaching methods?					
Understanding the organization of the class?					
Feeling satisfied with teacher interaction (questions, comments, facilitation)?					
Receiving teacher assistance in reaching consensus?					
Receiving teaching intervention?					
Assessing learning outcomes?					
Accepting teacher feedback?					

Comments:

……..

……..

……..

Part D

How did the face-to-face work within the blended course enhance your work online?

……

……

……

……

How did the online work within the blended course enhance your face-to-face work?

……

……

……

……

What did the teacher do to assist with your development of deep learning and higher order thinking (i.e. how did they help you: Focus on big picture; Relates information to previous knowledge within and between disciplines/subjects; Substantiate statements, make judgements, debate, prioritise, predict; Relates theory to every day experiences). Share some examples.

……

……

……

……

What would you have liked the teacher to do to assist you to develop deep knowledge and high order thinking? Share some specific examples.

……

……

……

How do you see yourself behaving differently (or the same) in the face-to-face components and the online components within a blended course? (E.g., some shy students prefer to have their say online).

……

……

……

……

General comments

……

……

……

……

……

Thank you for participating in this survey.

Please return this survey to Petrea Redmond: redmond@usq.edu.au, fax: 4631 2929 or office G441.